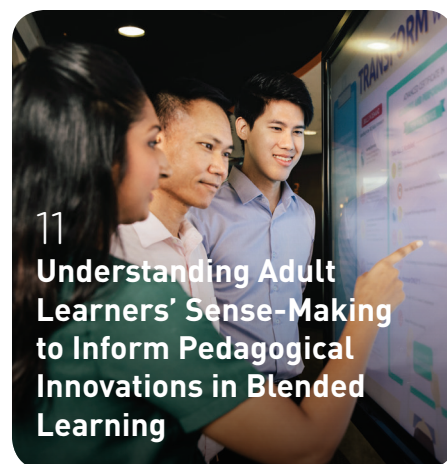
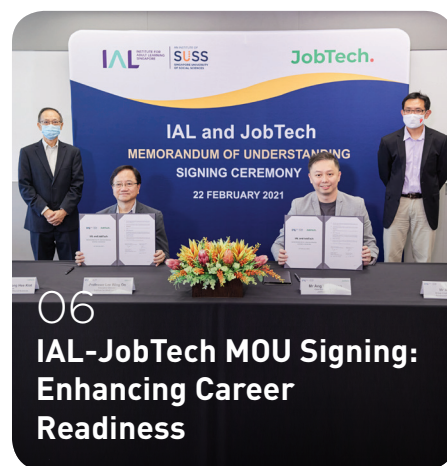
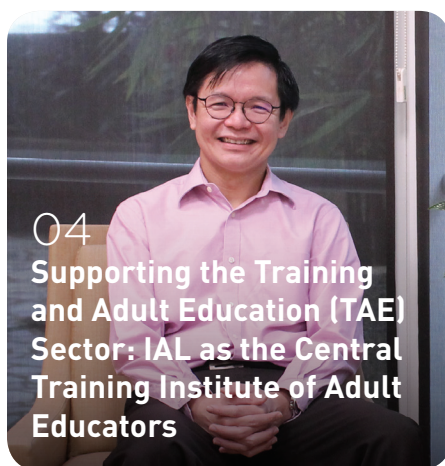


IAL ADVANCE

MARCH 2021 • ISSUE 1

A publication of the Institute for Adult Learning, Singapore University of Social Sciences





in.lab: Celebration of Innovation

in.lab (Innovation Lab), the innovation arm of the Institute for Adult Learning (IAL), established to spur innovation in Adult Learning, celebrated its 5th anniversary with the Minister of State (MOS) for Education, Ms Gan Siow Huang, as the Guest-of-Honour. MOS Gan also launched IAL's Five-Year Strategic Roadmap to lead the transformation of the TAE sector and develop robust and responsive programmes that support SkillsFuture initiatives. In the next five years, IAL intends to work closely with enterprises and industry partners across the TAE community to explore, collaborate, and contribute to learning innovation and digitalisation.

Partnership Pact



From left to right: Daryl Lim (DesignThinkers Academy), Ender Jiang (Hiverlab), Nav Qirti (Ideactio), Siddharth Jain (Playware Studios), Dr Renee Tan (IAL), Ng Teow Khoon (SFX Corp), Alex Ng (Spaze Ventures), Desmond Chua (SUTW Impact Consulting), Alvinder Singh (Visionary Schoolmen)

In 2020, in.lab also formed a partnership pact with eight partner organisations to grow a larger community of learning innovators poised to ride the next wave of transformation and reinvention.

The partners are:

▶ Design Thinkers' Academy – Design Thinking Coaching	▶ SFX – VR/AR/MR Solutions Provider
▶ HiverLab – VR/AR Solutions Provider	▶ Spaze Ventures – Seed Capital Firm and Startup Incubator
▶ Ideactio PL – Industry Design Thinking Consultants	▶ SUTW Impact Consulting – 'Pitch Grooming' Coach
▶ Playware Studios PL – Serious Games and VR Solutions Provider	▶ Visionary Schoolmen – AI-Based Solutions Provider

innovJam 2nd Cohort Winners

innovJam, another signature platform of in.lab, provides a platform for bouncing initial ideas for constructive feedback, while rewarding promising teams with a starter grant for the next development cycle. The second cohort of graduates, which comprises seven budding innovation teams, recently graduated from the innovJam Ideathon.

These graduates were:

★ Team Augmentus with "Code-free robotic training solution that simulates real-world robot applications and teaches practical robot skills on an iPad"	★ Team Noobable on "Create digital courseware like a pro, so simple, even a Noob is Able to do it!"
★ Team PathForge, with an idea on "A social-learning portal that makes learning of new skills practical, fun and cheap"	★ Team Cyclops with their idea of "Hands-free notetaking with video and audio learning"
★ Team Enabley on "Retaining Knowledge, Building Knowledge – Fast and Easy"	★ Team VoyagerX on how learners can "Gather to Learn, Explore and Share, while not being Together"
	★ Team WE3i with an idea to "Predict Employability for the Mature Future"

The Institute for Adult Learning (IAL), an autonomous institute of the Singapore University of Social Sciences, leads in the field of research on adult learning, and builds capabilities by working closely and supporting Adult Education professionals, businesses, human resource developers and policy makers through its comprehensive suite of programmes and services. In an interview with the editorial team, Mr Ng Cher Pong, IAL Council Chairman, deliberated on the role of IAL in the TAE sector.

1

IAL ET: In your view, what constitutes an effective and high-quality TAE sector?

Mr Ng:

The TAE sector is undergoing a period of significant transformation and disruption. IAL needs to ensure high quality TAE training to support the professionals who need to transform, upskill or reskill themselves, and make training accessible and as widely available as possible. Additionally, there must also be a shared sense of professionalism and understanding of their responsibility as an important member of the TAE community; responsible not just for the community, but in helping every industry transform, particularly Singaporeans who are keen to upskill and reskill.

2

IAL ET: From the perspective of the current IAL Council Chairman and former CE of SSG, why do you think there is a need for IAL to become an autonomous institute?

Mr Ng:

The relationship between the National Institute of Education (NIE) and Ministry of Education (MOE) served as a template for IAL's initial set up. It taught us that the quality of teachers would equate to the quality of the education delivered. If we look at how Singapore develops its education system, the emphasis is placed on quality over quantity of the operating model. We adopted a similar model when we set up IAL.

Being an autonomous institute will allow IAL to have greater focus and flexibility in its operations. In order to attract high quality researchers, partnering a university like the Singapore University of Social Sciences has put IAL in an advantageous position. However, high quality training will not be complete if a learner struggles to find assignments. Therefore, if an opportunity comes along, we would like to reconfigure IAL as a somewhat autonomous institute, one that is away from the government



Supporting the Training and Adult Education (TAE) Sector: IAL as the Central Training Institute of Adult Educators

but with a strong nexus with SSG. This will allow IAL to contribute to the broader training community by working with companies to understand their business challenges, rescaling and training workers to help them in their business and integrate workplace training and learning.

3 IAL ET: What is your opinion of IAL's role in supporting industries in their transformation?

Mr Ng:

Industries are transforming and facing disruptions, and therefore IAL needs to offer solutions for businesses. For IAL to succeed, we certainly need to be very willing and prepared to work with companies, both large and small. This is a huge undertaking due to the considerable number of companies existing in Singapore. Certainly, we will not be able to provide one-to-one services with every company, but we would like to ensure that there are platforms for interested companies willing to transform, to approach and to work with us.

“IAL has worked extremely hard over the past year and I hope that the journey has been worthwhile.”

IAL can also tap on the broader TAE community to do a lot more with the company. IAL's role will be to create this platform and get it underway. This is important as apprenticeship is uncommon in Singapore and workplace learning is less structured. Going forward, more structures can be introduced to help people continue to learn, as useful and relevant learning happens mostly in workplaces when they undergo transformation.

4 IAL ET: How do you see IAL supporting individuals in their learning endeavours?

Mr Ng:

There are a few shifts which are necessary to provide networking opportunities beyond training. These measures include building communities of learning to support ongoing training, shifting away from the initial training to focus on Continuing Professional Education (CPE), and supporting the professionals who are already in the community to upgrade themselves. We saw a small aspect of this shift during the circuit breaker, when learning was moved online. Through this, IAL has recognised that training is moving away from classrooms to workplaces, and IAL will need to work with companies to put in place structures to support

workplace learning and build a pool of TAE professionals who can support workplaces in the workplace itself, either as part of the workplace or as consultants.

5 IAL ET: How far, do you think, is IAL from achieving the above-mentioned role/goal?

Mr Ng:

IAL has had a strong start, particularly during the circuit breaker. As an organisation, IAL has shifted quickly, recognising that the community needs us at the forefront to handhold adult educators who may not be comfortable shifting lessons online. In response, IAL has rolled out several initiatives during this period to support adult educators by guiding them on conducting lessons online effectively or by providing tools to use during lessons. While there is still a long way to go, a large part of it has been outlined in IAL's Strategic Roadmap. I have a lot of confidence that IAL will be able to achieve this, and I draw comfort from IAL's quick and effective response during the circuit breaker.

6 IAL ET: What more can we (IAL and/or beyond) do for the Adult Educators (AEs) besides professionalizing them with credentials?

Mr Ng:

I think the services that we provide will evolve over time. What is important is that IAL becomes the single focal point for the TAE sector to turn to. IAL must offer a range of services to ensure that when the sector requires them, IAL will be there. Micro-credentialing is a part of the effort to come up with such a suite. This is the major direction for IAL to aspire to become a leading training institute. IAL must also maintain strong connections with SSG, as we have a critical role to play in enabling the success of SSG.

As we neared the end of our interview, Mr Ng added that “The path to becoming an autonomous institute has never been an easy one as it involves a major transition, and as with every organisational transition, there will be short-term disruptions. There will certainly be gains in the short run as well, but it will not be spread evenly across. I hope that everyone believes in the importance of the mission of IAL, and that the current structure of IAL will serve us better”. He concluded that “IAL has worked extremely hard over the past year and I hope that the journey has been worthwhile”.

IAL and JobTech

MEMORANDUM OF UNDERSTANDING SIGNING CEREMONY

22 FEBRUARY 2021



IAL-JobTech MOU Signing: Enhancing Career Readiness

Standing from left to right: Witnessing the signing were Professor Cheong Hee Kiat, SUSS President and Mr Abel Ang, Executive Director and Member of the Board of Directors, Economic Development Innovations Singapore Pte. Ltd.

Sitting from left to right: Representing the two organisations as signatories were Professor Lee Wing On, Executive Director of IAL and Mr Wee-Tiong Ang, Founder and Chief Executive Officer of JobTech Pte. Ltd.

With the ever-changing landscape of employment and the increased need for workplace learning and transformation, it is critical that the employees in the labour market pick up new skills, adapt and recognise areas of vulnerability. This underlines the pressing need for skills training opportunities, enhanced job seekers' employability and workplace strategies to retain or attract potential talent. The Singapore University of Social Sciences (SUSS) and JobTech Pte. Ltd. are thrilled to announce their collaboration to develop an assessment tool and participate in a research study on the local employment market.

The Singapore University of Social Sciences and JobTech Pte Ltd officially signed and entered into a Memorandum of Understanding on 22 February 2021. The agreement was inked to recognise the two parties' mutual interest in the development of a career readiness and assessment tool as well as establish a joint collaboration study on the local employment market.

The signing ceremony was witnessed by Professor Cheong Hee Kiat, President of SUSS and Mr Abel Ang, Executive Director and Member of the Board of Directors, from the Economic Development Innovations Singapore Pte Ltd. Professor Lee Wing On, Executive Director of the Institute for Adult Learning and Mr Wee-Tiong Ang, Founder and Chief Executive Officer of JobTech Pte. Ltd., officially inked the memorandum between the two companies.

IAL and JobTech will be working towards developing a new psychometric tool based on JobTech's Talent Future Index (TFI) and IAL's Employment Vulnerability

Index (EVI). Merging the TFI's measure of future-ready employees and EVI's vulnerability and career-readiness measure, the new combined model will provide future job seekers with a more accurate career recommendation, based on their skill set as well as an assessment of their employment vulnerability in career development. This is achieved through JobTech's data and machine learning algorithm which maps skill sets at various stages of development across key occupations and industry sectors. The model will also aid jobseekers to make informed choices and improve their career planning, as well as to apprise and review employment in the current employment landscape. Researchers from both institutions hope that this will result in more responsive and innovative employment strategies for optimal workplace performance and business growth.

The two companies will also collaborate on a joint study of Singapore's employment market trends, focusing on career readiness and employment vulnerability. Findings from the study will help to establish information on the disruption and vulnerability of the employment market as well as support the development of organisational recruitment and retention strategies. Results of the study are set to be jointly released later this year and will provide a better understanding of the needs of job seekers.

"At IAL, we recognise that we play a significant role in bridging the needs of job seekers and employers through our research expertise and industry experience in workplace learning and transformation. This may range from enhancing job seekers' employability via the development of skills training opportunities to providing employers with insight into how they can redesign workplace strategies that can attract and retain talent. We are excited to be partnering with JobTech, and we look forward to working together to develop sustainable job seeking solutions that are responsive to Singapore's workforce needs."

- Professor Lee Wing On, Executive Director of IAL



Transforming the Future of Adult Learning

Adult Learning Symposium charted its way into the digital future of adult learning with the debut of its fully online iteration.

From left to right: Mr Lewis Garrad, Partner and Solution Leader for Singapore, Mercer; Mr Kevin Chua, Senior Director Human Resources (APAC), Medtronic; Ms Lim Lee Yee, Director, School of Life Skills and Communication, Singapore Polytechnic; Ms Jael Chng, Co-founder and Chief Problem Solver, My Working Title; Dr Gog Soon Joo, Chief Futurist, Chief Research Officer and Chief Skills Officer, SkillsFuture Singapore participated in a SSG Roundtable Discussion on Building Critical Core Skills in the Increasingly Digitalised World of Work

The 2020 iteration of the Adult Learning Symposium (ALS) organised by the Institute for Adult Learning (IAL), held on 13 and 14 August 2020, contributed to the conversations on adult learning by moving to a platform where learning, content distribution and relationship building were able to co-exist alongside safe distancing measures and travel restrictions.

Digitalising Learning – The New Normal

On 13 August 2020, Guest-of-Honour, Minister of State for the Ministry of Education and Ministry of Manpower, Ms Gan Siow Huang, kickstarted the symposium on IAL Facebook Live and Zoom Webinar. Her speech detailed the Government's strategic commitment to support the development of Singapore's Training and Adult Education (TAE) ecosystem.

"As the current pandemic carries the potential to reshape entire industries, the onus is on workers to adapt quickly, pick up new skills and draw upon their ingenuity," said Ms Gan, stressing on the importance of TAE professionals to come together and reposition the sector for the New Normal. "The TAE sector has a pivotal role to play. Professionals in the sector—whether an educator, learning and development specialist, or learning solutionist—are instrumental in delivering these skills through training opportunities," she said.

Ms Gan urged the sector to consider three main shifts. "Firstly, I would like to suggest an even stronger nexus between training and industry with more training being led by industry and conducted at workplaces. Secondly, TAE training providers need to accelerate the shift towards online learning by adopting digital systems and solutions. Thirdly, the TAE ecosystem needs to be strengthened by further raising quality and reducing red tape, so that we can develop local champions within the TAE sector for the domestic and overseas markets," said Ms Gan.

She also outlined some of the initiatives and support systems that will be rolled out by SSG and IAL to help steer the sector towards the future.

Professor Lee Wing On, Executive Director of IAL, SUSS, indicated that the theme of the symposium, Digitalising Learning – The New Normal, perfectly encapsulated the prevailing times, "where our traditional assumptions of how we learn and work have been challenged, and what we thought impossible—such as moving a symposium such as this completely online—has suddenly become possible in a matter of months".

In the case of IAL, it has meant going from an exploratory stage to fully online programmes in a matter of months. "Before COVID-19, we thought we were making a bit of progress in using technology in the realm of learning,



From left to right: Mrs Praise Mok, Deputy Chief Executive, ROHEI Corporation; Ms Aline Eustaquio-Low, Senior Consultant, ROHEI Corporation discussed the lessons learned delivering online learning

but suddenly, we are launching fully online programmes. The scale at which the pandemic progressed has meant that we have had to ramp up our efforts in a very short span of time,” said Professor Lee.

In tandem with the accelerated efforts, high learner engagement and the ease with which adult educators were able to adapt to online learning delivery and assessment, have proven encouraging. IAL certainly sees its content increasingly containing an online component in the future.

Aside from the fact that it was the first time the symposium had gone fully virtual, ALS 2020 (Live) ushered in many other firsts for IAL, informed Professor Lee. ALS 2020 (Live) had over 1,000 participants—the highest the conference has ever experienced—and it was also the first year that it had the support of 10 Edtech (Educational technology) partners.

“Moving the programme fully online also brought to light certain nuances of adult learning, which will influence trends in how education is imparted,” said Professor Lee.

“While moving the programme online, we realised that adult learning also encompasses an emotional and social aspect. Adults bring a lot of experience to the table. They do not want to just attend classes, they want to be able to share and learn from one another. This is a very important component,” he shared. “Adult educators will remain more vital than ever not only as the designers of the programme or course, but as facilitators of social learning,” commented Professor Lee.

“This learning has been the basis for the two main tracks of discussions at ALS 2020 (Live),” he added.

Marrying offline interactions with online interactivity at ALS 2020 (Live) resulted in a curated mix of keynote

presentations, panel discussions and TAE-focused content. Zoom Webinars, live streaming via Facebook, online fireside chats and panel discussions, as well as a Question-and-Answer segment between participants and overseas keynote speakers helped maintain the vibrancy and boosted participant engagement.

The seamless integration of online and offline environment was materialised in the use of a broadcast studio with recording equipment and a green screen. Necessary COVID-19 precautions and safe distancing measures were put in place, ensuring that the different verticals functioned together without interruption.

The symposium wound down at 5.30 p.m. on 14 August 2020. It garnered positive feedback from participants, who found it interactive yet personal, and was reflective of the current climate of learning. Many even expressed a preference for the online version. ALS 2020 (Live) also scored high on overall organisation and IT support, which helped eased the process for participants and stakeholders alike.

Moving the symposium to a virtual platform also proved advantageous for the organisers. The increased accessibility to symposium participation encouraged a larger number of participants, while keeping the cost much lower than a physical symposium.

Moving forward, IAL is likely to adopt a blended approach, splitting the symposium online and face to face. “We will also be looking into increasing the opportunities for virtual networking and interaction between speakers and participants; and amongst participants. We also hope to expand our outreach and engagement to regional and international audiences,” added Priscillia Yeong, Deputy Director of Design, Development and Partnerships at IAL.



CWLP: Empowering Individuals, Advancing Enterprises

The Centre for Workplace Learning and Performance (CWLP) works with enterprises and offers a suite of consultancy services and funding support for workplace learning and employee-driven initiatives and projects.

To date, the team has worked with more than 90 enterprises who have embarked on their own business transformation to optimise enterprise performance and productivity. The consultancy projects undertaken by enterprises can be broadly grouped into the following five categories – (1) Employee Professionalisation (2) Operational Efficiency (3) Job Redesign (4) Digitalisation and Automation and (5) Employee-Driven Innovation.

Embark on a Workplace Transformation Journey

Enterprises can choose from the suite of consultancy services to meet the needs and goals of the workforce:

1 Learning Enterprise Alliance (LEA)

LEA is a knowledge network of curated enterprises, which represents diverse industry sectors and profiles, who are committed to forge ahead by promoting continuous learning to boost performance and productivity.

Enterprises who are keen and committed to embark on a workplace transformation project and have a company strength of at least 30 employees can receive funding support of up to 80% (capped at S\$10,000) for eligible consultancy costs.

Check out the success stories:

Nurturing Critical Thinking Nurses: How Kwong Wai Shiu Hospital does it with Workplace Learning



This photograph was taken before the COVID-19 period.

[View KWSH's Success Story](#)



Enhancing Customer Engagement: How TAK does it with Workplace Learning



[View TAK's Success Story](#)



2 Employee-Driven Innovation (EDI)

The founding premise of EDI, or Employee-Driven Innovation, is that every employee can innovate. It is the development and implementation of new ideas, products, and processes from employees. It draws on their work experiences as well as knowledge and skills to create incremental or radical improvements to their existing products and processes. At its core, EDI espouses the belief that all employees, regardless of their position or level of education, are capable of innovation.

Four enterprises have since embarked on pilot EDI consultancy projects as part of LEA 2020. They are:



Oversea-Chinese Banking Corporation (OCBC) – Designing an OCBC Employee Learning Agility digital profiler tool to foster employees' self-awareness, critical reflection, and goal setting towards developing learning agility



Deloitte – Facilitating skills transfer between employees from two different job functions through cross-training, and the enhancement of existing work processes



Hotels under FDAWU – Enabling participating partners from the hotel and accommodation services in their transformation journey to achieve operational synergy and productivity



Tim Ho Wan – Refining existing standards and processes to support District Managers in managing restaurant operations and staff development

To develop the Centre's niche in EDI, CWLP has recently embarked on a three-phase research study involving 12 enterprises from 6 different industry clusters under the Industry Transformation Map outlined by the Ministry of Trade and Industry. The first phase of the project is well underway. It seeks to understand how employee-driven innovations are enacted by employees, the kinds of workplace as well as personal practices that encourage the initiation, enactment, and sustaining of employee-driven innovations. The first phase of the study aims to create a draft set of practices and principles that supports employee-driven innovations among Singaporean SMEs. These practices and principles will subsequently be developed into a survey instrument to measure the innovation health of enterprises and validated in subsequent phases.



Understanding Adult Learners' Sense-Making to Inform Pedagogical Innovations in Blended Learning

When any of us experiences ambiguities, incompleteness, confusion or uncertainty, we engage in the process of sense-making; we try to make and give meaning to what we are experiencing. Because sense-making informs our decisions and actions, understanding sense-making, including what prompts engagement in sense-making, places a responsibility on educators that goes beyond the walls of the classroom or online space.

PROJECT TEAM:

Principal Investigator:



Dr Bi Xiao Fang
Principal Investigator
Senior Researcher,
Research Division

Co-Investigator:



Dr Helen Bound
Deputy Director,
Research Division

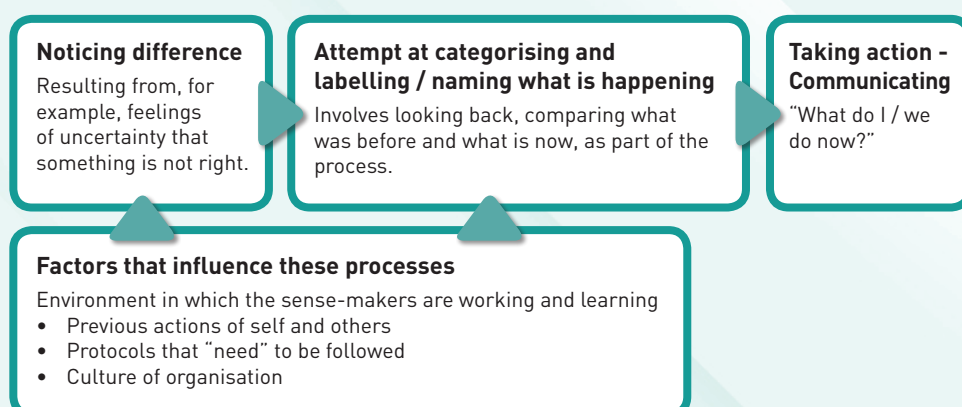
Sense-making is a process of building bridges between what we know and the ambiguity, confusion and incompleteness we occasionally feel or encounter. It is an embodied experience, involving the senses and emotions, and is an ongoing process that takes place over time and across space (e.g. work, the dinner table, classroom discussions, online chats and so on).

As a social process involving individual cognition, internalisation and externalisation, it involves interactions with what constitutes our environments. Therefore, sense-making is not only individual but also collective; that is, teams, groups, organisations sense-make (Weick, 1995). It is less clear in the literature what occurs in learners as they sense-make. Our study focused on how learners from six different courses were sense-making over the time and in different spaces (any combination of classroom, online and workplace) of the blended learning course they attended.

What is happening when learners sense-make?

In their research in organisational sense-making, Weick, Sutcliffe and Obsfeld (2005) identified the following features of sense-making as summarised in Figure 1. Sense-making is distributed across the organisation and it is systemic. Weick et al's (2005) study demonstrated that the work environment provided opportunity for all aspects of sense making as described in Figure 1.

Figure 1:
The Features of Sense-Making Based on Weick et al. (2005)



In our study focused on individual learners, we found many similar processes to those in organisations described by Weick et al (2005). We also found a number of differences – which is not surprising given the focus on learners in courses. The features of sense-making as we saw in action are listed and tabled below:

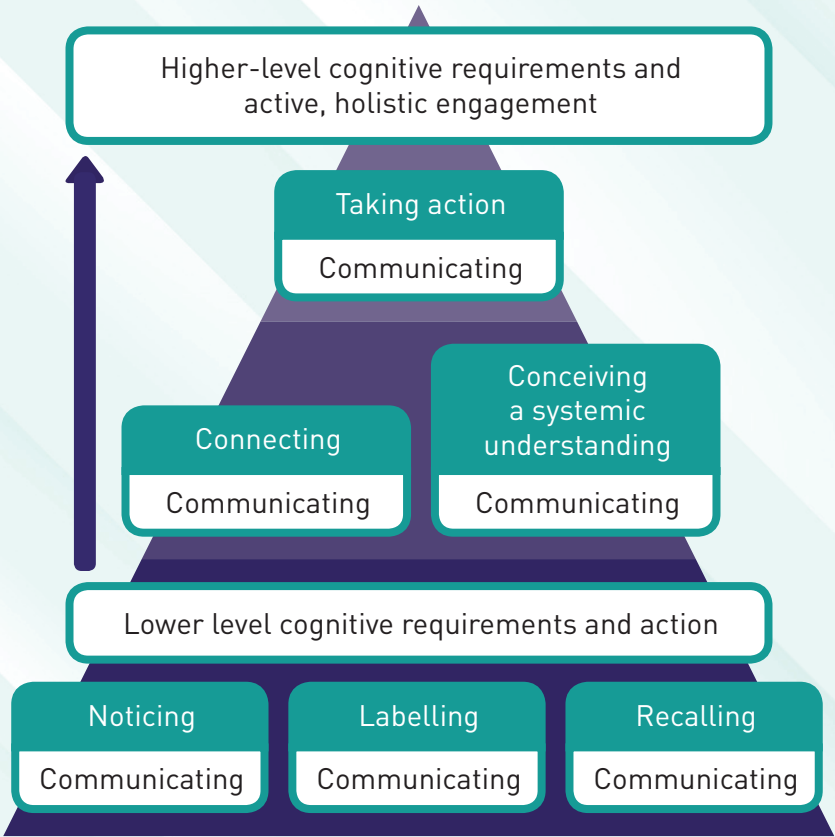
Table 1:
Sense-making features

Sense-making features	Definitions
Noticing	A process of observing, identifying, and experiencing similarities and differences across various situations, conditions and contexts
Recalling	A process of recollecting, reconsidering, and deliberating on past experiences
Labelling	A process of grouping, comparing, naming, and evaluating observed similarities and differences and their extent in knowledge learnt in various conditions and contexts
Connecting	A process of making efforts to link the theoretical and practical knowledge, individually and collectively
Conceiving a systemic understanding	Develop a way of thinking to deepen the understanding of all aspects of professional knowledge or practice within a wider context, and to enable learners to better position themselves in the profession
Taking action	Assume responsibility and take initiative to translate or apply the learning
Communicating	Social and inter-personal processes to further understand what is learnt, e.g. asking questions, posing considerations, predicting, seeking clarifications

As indicated in Figure 2, communication is an essential element that is integrated in each feature. The figure shows the features organised hierarchically with the bottom row involving features with lower cognitive requirements and features at the top involving high-level cognitive requirements and high-levels of active, holistic engagement in authentic learning activities.

What is of concern is that in three of the six courses studied, only some features of sense-making were taking place as represented in Figure 2 . On the bottom row are the fundamental features of sense-making – these are the first or early stages. In two of the courses, noticing, recalling, and labelling were the dominant features. This indicates lower-level cognitive engagement, due to lack of opportunities to engage in the higher level features. In the other two courses, all features except action were more evident; and finally, only one course had all the features, including action, strongly evident.

Figure 2:
The Hierarchy of Sense-Making Features in Blended Learning



What is going on: Why are all features of sense-making not evident in all the courses?

There are many reasons why only learners in one course were using all the features of sense-making. The following lists selected reasons evident from our data from across the different courses, as to why most of the courses showed limited sense-making. Not all of the features mentioned below (Figure 3) apply to every course:

Figure 3:
Reasons Why Features of Sense-Making Are Not Evident

Curriculum	• Designed on the basis of lower cognitive levels (referring to Bloom's taxonomy) • Assessment based on recall or other forms of knowledge reproduction • Authentic learning and assessment experiences for learners were absent, that is, learners were not provided with opportunities to develop and apply systemic understanding i.e. put it to work (a form of taking action) • Theory and practice, technical and soft skills were not integrated but considered separately
Communication	• Lack of communication between adult educators and curriculum designers in designing and delivering the learning and between adult educators and workplace supervisors on learner's progress and challenges
Teaching Approach	• Mono-logical teaching where learners are passive recipients rather than active participants
Historical experiences and perceptions	• Workforce Skills Qualification (WSQ) requirements leading Training Providers to consider that lower cognitive activity and reproduction of knowledge was expected by the system
Competency-based standards	• Competency-based standards that separate knowledge and performance of skills, and technical and generic skills. These documents are followed carefully by curriculum designers and training providers

When comparing the research of sense-making in organisations where all sense-making features are present, the current study suggests that workplaces or authentic settings offer high-level learning opportunities. The reasons for the limited evidence of all sense-making features in the formal courses studied suggest that systemic changes are required (Some of the changes are still underway during data collection). There is a need to further continue professional development for training providers and adult educators in advancing learning design and facilitation to ensure that learners have opportunities to engage in all features of sense-making.

“To enable deep sense-making, practitioners may consider integrating more high-level sense-making features into the design and pedagogical strategies to create seamless experiences for learners when moving across different learning spaces.”

- Dr Bi Xiao Fang, Principal Investigator

This photograph was taken before the COVID-19 period.



Digital Futures of Work Research Programme: Reimagining Jobs, Skills and Education in the Fourth Industrial Revolution

From left to right (first row): Chia Ying, Senior Researcher, IAL; Dr Chen Zan, Principal Researcher, IAL; Dr Arthur Chia, Senior Researcher, IAL; Candice Chong, Researcher, IAL

From left to right (second row): Sahara Sadik, Assistant Director, IAL; Professor David James, Cardiff University; Professor Manuel Souto-Otero, Cardiff University; Sheng Yee Zher, Principal Researcher, IAL; Tan Bao Zhen, Researcher, IAL

From left to right (third row): Simon Freebody, Adjunct Research Associate, IAL; Professor Phillip Brown, Cardiff University; Hanne Shapiro, HANNE SHAPIRO futures, Denmark; Dr Helen Bound, Deputy Director, IAL

Not in picture: Bryan Ang, Researcher, IAL; Kim Dearing, Cardiff University; Professor Ewart Keep, University of Oxford; Professor Caroline Lloyd, Cardiff University; Catherine Ramos, Research Associate, IAL; Professor Johnny Sung, Visiting Research Fellow, IAL; Jazreel Tan, Researcher, IAL; Dr Berlin Tran, Cardiff University; Professor Richard Watermeyer, University of Bristol

Will advances in robotics and artificial intelligence usher in a 'golden age' of jobs or are we headed towards a jobless future? Will smart machines do more of the complex as well as routine jobs? And will the jobs of the future meet the expectations of today's and tomorrow's college and university graduates? Using a range of theories, methods and data to systematically study the shape of the future of work, education and opportunity in the Fourth Industrial Revolution (4IR), the Digital Futures of Work (DFoW) Research Programme seeks to provide robust, theoretically-grounded analyses and insights to inform policy and public debates.

The goal is to enable societal actors in Singapore to make careful assessments and take vital steps to directly shape the 4IR towards human augmentation, social inclusion and a shared prosperity. This article outlines the objectives and key features of this three-year programme in how it attempts to address these key areas of public policy.

Introduction

Without doubt, digital innovation is a game changer. Nations are wrestling with the impact of automation and the disruptive potential of artificial intelligence, as existing models of business, employment, and human capital development are being fundamentally challenged. However, it should not be assumed that the Fourth Industrial Revolution (4IR) will generate increasing demand for skills and graduates, create better quality jobs, or enable shared prosperity. Will investments in education and training sustain jobs in Singapore, given a new wave of digital offshoring accelerated by the current pandemic? Are there more sustainable ways to facilitate the deployment of technologies

to augment labour, and to fully capitalise on the innovative potential of the country? Which international examples show signs of promise or, better still, evidence that they work?

These are some of the questions that the Digital Futures of Work (DFoW) Research Programme seeks to address. The programme is led by Professor Phillip Brown, as part of a longstanding collaboration between the Institute for Adult Learning and Cardiff University, with the University of Bristol and Oxford University's Centre of Skills, Knowledge and Organisational Performance (SKOPE), as programme affiliates.

Key Features of the Research Programme

To properly address these questions, the DFoW research programme brings together new research evidence and conceptual approaches for thinking about the future of work.

- 1 Firstly, it involves international academic and policy analyses, aimed at overcoming a siloed approach where the focus is on either 'supply' (e.g. skills, education, training, lifelong learning), or 'demand' (job redesign, gig work, job vacancies), together with the study of the labour markets which have not received adequate attention. Studying the changing relationship between them rather than in isolation distinguishes this research programme from other studies on the future of work. Indeed, such analyses will be key in shaping a new education, work and labour market ecosystem, necessary to allow education and training to deliver on its role to build skills, and facilitate social mobility.
- 2 Secondly, it builds on the specification of national and international contexts and institutions through the study of seven countries.¹ This is important to avoid the limitations of 'technological determinism' and the assumption that national economies will converge in the way work is organised and the workforce is trained. Previous periods of industrial transformation have shown that technological innovation is non-linear. We live in an age of recombination as well as invention, and digital technologies are a key enabler. Therefore, a distinct comparative approach will enable critical examination of the key trends and policy reforms that provide the best prospects for delivering economic transformation for a better future of work.
- 3 Finally, it adopts new methodologies for investigating the future of work, by integrating a mix of methods and data streams, including 'big data'. Notably, the research programme, includes Burning Glass Technologies and AMPLYFI as its data partners, contributes real-time labour market analytics and data-harvesting and visualisation solutions for a more responsive and comprehensive evidence base.

¹ The other six countries apart from Singapore are China, Finland, Germany, the United Kingdom, the United States, and Vietnam.

Two Contrasting Theories for the Future of Work

We put two contrasting theories to explain the implications of technological innovation on the future of work. Each model offers contrasting approaches for how policy-making should proceed in the 4IR.

The first and dominant view contends that technological advancement, while disruptive, will lead to greater demand for higher skills. It will therefore be a race between education and technology to prepare the workforce for the new and better jobs being created. Here, governments are required to invest in skills anticipation and

matching strategies, as well as to build a high-quality and industry-aligned education and training system to help workers take on new jobs.

The alternate view asserts that market-driven innovation will lead to an increasing scarcity of high quality jobs as businesses are incentivised to use technology to reduce costs required to sustain high-skilled labour. This will come into conflict with societal expectations of securing 'good' jobs, amidst rapid expansion of higher education and lifelong learning provisions.

Implications for Singapore

Which of these two scenarios are we more likely to see panning out in Singapore, in the next five to 10 years, and beyond? Already, there are some indications to suggest that the first scenario is not necessarily where we will end up, especially if the right structural and institutional conditions are not put into place. To understand the true impact of technological innovation, we will need to get 'under the bonnet' of business strategy, to examine how it affects the type, nature, and location of future industries and jobs at all levels of the occupational structure. Only by doing so can we develop more targeted mechanisms and interventions that take into account the varied industrial landscapes, to nudge businesses to engage in technological innovations in human-

centric ways; by aligning industry, workforce, and skills strategies. Critically, an industrial policy focused on embedded capabilities will directly complement the key objectives of Singapore's education and training policies as a source of competitive advantage and shared prosperity for Singaporeans.

The COVID-19 pandemic has accelerated the pace of digital transformation in broad sectors of the economy. This makes it all the more urgent to assess the potential impacts of digital technologies on jobs and skills, and to forge new pathways and institutional arrangements in building a socially-inclusive future.





What Makes a 'Good' Job? Putting Forth a Multi-Dimensional Framework to Measure Job Quality in Singapore

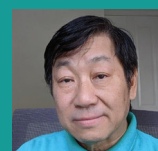
PROJECT TEAM:



Sheng Yee Zher
Principal Investigator
Principal Researcher,
Research Division



Chia Ying
Senior Researcher,
Research Division



Prof Johnny Sung
Visiting Fellow,
Research Division

The quality of work and employment conditions is a critical element embedded within the wider narrative of productivity, jobs, and skills. The Skills and Learning Study (SLS) puts forth a multi-dimensional framework to systematically examine what good quality work looks like at the job level, from the perspective of the individual job-holder.¹ The findings suggest that a broader conception of what contributes to a 'good' job is necessary to obtain a richer and multi-faceted account of work and employment and develop appropriate interventions to create better jobs.

Introduction

For most adults, a significant part of their life is spent working in order to earn a living. Hence, it is undoubtedly beneficial that their job not only provides them with a decent livelihood, but also offers them personal recognition and satisfaction, meets their growing aspirations, and contributes to the overall quality of their life.

At the same time, structural shifts in the global economy as a result of changing global value chains and rapid technological advances have given rise to a much more complex and varied employment landscape in Singapore. Traditional job roles are being transformed, and alternative work arrangements such as gig work are emerging. These changes have profound implications on the quality of work and employment.

It is therefore critical to be able to systematically examine what good quality work looks like at the job level to better understand these implications on jobs at different segments of the labour market. This will be necessary in order to develop targeted interventions in creating better jobs.

What makes a 'good' job?

In examining job quality, the attention has mostly been focused on wages; or more narrowly, on the level of wages. While this attention is not misplaced, wage on its own does not provide a complete picture of what contributes to a high-quality job. Rather, it will also be necessary to address other intrinsic qualities of the job that make it valuable.

¹ The SLS is the second iteration of a skills study conducted by IAL, covering a range of skills topics including skills utilisation, job quality and qualification and skills mismatch. This iteration has also been expanded to include a component on lifelong learning. The study is constructed as a national random sample survey, covering a representative sample of Singapore residents of age 20 to 70 years old. Data collection for this iteration of the survey took place from July 2017 to March 2018.

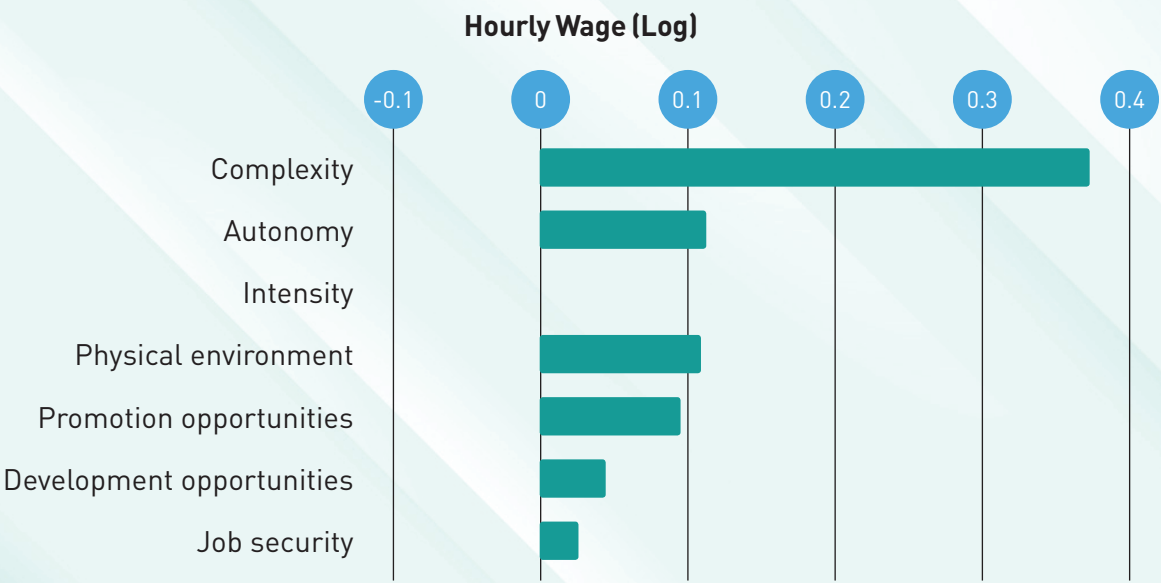
The Skills and Learning Study (SLS) examines job quality from eight key dimensions, namely: wage, complexity of work performed, autonomy at work, intensity at work, physical work environment, development opportunities, promotion opportunities, and job security; covering the pay, non-pay, and prospects of the job (Figure 1).

Figure 1:
The Dimensions of Job Quality in SLS

Categories	Dimensions	Example of Indicators
Pay	Hourly wage	Level of hourly wages
Non-pay	Complexity	(Minimal) task repetition, task variety, complex problem solving
	Autonomy	Personal influence on deciding: how hard to work, what tasks to do, how to do the task, the quality standards, where to work, the time to start and finish work, the sequence of tasks
	Intensity	Working at high speed, working to tight deadlines, working extra time, working long hours
	Physical Environment	(Minimal) exposure to physical risk
Prospects	Development opportunities	Marketable work experiences or education experiences provided by the job, improved resume due to the job
	Promotion opportunities	Opportunities provided by the job for increases in pay, managerial responsibilities, or job scope
	Job security	(Low) risk of job loss

The findings from the study show that apart from work intensity, the other dimensions of job quality measured in the survey are independently and positively associated with wage (Figure 2). This suggests that in developing strategies to drive high-wage employment, it is important to look at factors such as the skills required of the work performed, the autonomy afforded to the workers that allows them to influence decisions at work, as well as the long-term job prospects such as promotion and development opportunities at work, all of which contribute to better wage outcomes.

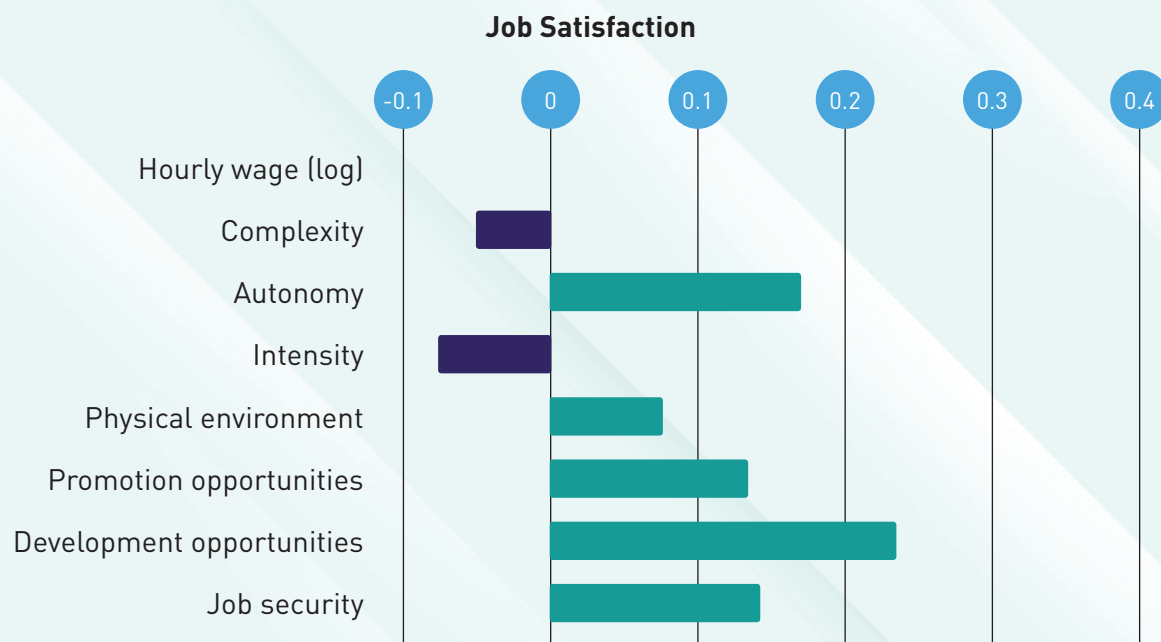
Figure 2:
Relationship between Wage and The Other Dimensions of Job Quality



Note: The figure shows the result of the Ordinary Least Squares (OLS) regression analysis of the log hourly wage on the seven other dimensions of job quality measured in SLS. The bars in the figure represent the relative association (standardised coefficient) of wage and each of the seven other dimensions of job quality. Only coefficients that are significant at the 1% level are presented.

Furthermore, the findings also show that after controlling for the seven other dimensions, wage has no significant correlation with job satisfaction. Rather, it suggests that non-pecuniary conditions, such as having opportunities for career development and promotion, or having the autonomy to influence decisions at work, drive higher job satisfaction.

Figure 3:
Relationship between Job Satisfaction and the Dimensions of Job Quality



Note: The figure shows the result of the OLS regression analysis of job satisfaction on the eight dimensions of job quality measured in SLS. The regression includes controls for gender, age, occupation, and industry. The bars in the figure represent the relative association (standardised coefficient) of job satisfaction and each of the eight dimensions of job quality. Only coefficients that are significant at the 1% level are presented.

Taken together, the findings suggest that it is critical to take on a broader conception of what contributes to a 'good' job – moving beyond the narrow focus on wages to obtain a richer and multi-faceted picture of work and employment, in order to develop appropriate interventions to create better jobs.

Implications

Despite an increase in wages between 2014 and 2017, there is a mixed picture of the changes in the other aspects of job quality in Singapore. Comparing against data collected in 2014, there is a decrease in the extent of autonomy that workers have in making decisions on what they do at work and how they do it.² At the same time, there is also an increase in working under intense conditions, such as having to work at high speed or to tight deadlines.

The COVID-19 pandemic has certainly altered the nature and character of jobs in the Singapore labour market. Moving forward, how would this impact the quality of work and employment? The data that will be collected in the next iteration of the Skills and Learning Study in 2021-2022 is timely and most anticipated. It will provide a glimpse of what to expect of jobs in the coming decade.

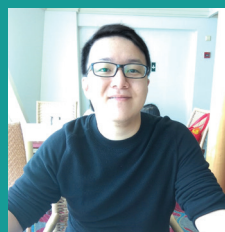
² The 2014 data is from the Skills Utilisation (SU2) Study conducted by IAL.



The Editorial Team



Dr Sharon Quek



Mr Ong Yong Liang



Ms Restria Fauziana

For further enquiries or email subscription, please email to IAL_Advance@ial.edu.sg

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 11 Eunos Road 8, #07-04 Lifelong Learning Institute, Singapore 408601

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