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Response, Re-evaluate and Redesign: The role of digitalisation in Brunei's TVET resilience to Covid-19 pandemic

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The advent of digitalisation and its potential impacts on jobs, education, training and skills are now central to many countries' research and policy priorities, including Brunei. Major disruptions like the coronavirus disease (Covid-19) pandemic have exponentially accelerated these impacts which are evidenced in innovative approaches to education and training, more specifically, digital learning. This chapter provides an opportunity to reflect on the resilience of Brunei technical vocational and education and training (TVET) sector leveraging of technology to support remote learning and digital learning as a response to Covid-19. Based on this premise, the chapter is driven by two framing questions within the Bruneian context: How did TVET respond to the pandemic and what are the lessons learned to foster an agile and resilient TVET learning ecosystem in the rapidly changing circumstances of digital transformation? The chapter starts with outlining the background for TVET which is one of the contributors to the workforce development in Brunei. It then provides insights into one of the main public TVET providers' journey in navigating the challenges during this time of disruption, specifically the shift of learning and teaching approaches towards more flexibility through the use of digital learning platforms. Whilst this shift might be a flexible and rapid solution, there remains a challenge to ensure the continuity of practical skills training and work-based learning which are essential components of a vocational program. In addition, this approach, to an extent, widened the digital gap because the question of equitable access to learning opportunities was not addressed. Hence, to promote learning continuity and to uphold equal access to quality education and training for all, the responses adduced suggest that we need to consider 1) innovative practice-based learning approaches and 2) preparedness and capacity of institutions and learners. One clear message to emerge from this discussion is that we need to build a robust digital learning ecosystem to remain agile and increase the resilience of TVET institutions. The chapter concludes with suggested future policy directions to strengthen the resilience of TVET in preparing a skilled workforce for the era of digitalisation.

Introduction

Technical and vocational education and training (TVET) in the world has been significantly disrupted by Covid-19 and the extent of the disruption has long lasting

implications on the learning and teaching approaches for the future. These disruptions have resulted in learning losses which are apparent in all education sectors due to school closures. The magnitude of these losses was exacerbated in TVET (OECD, 2021) due to the fact that the core curriculum of vocational learning is on practical skills training and work-based learning which was so difficult to do remotely. At the same time, the closure or reduced operations of many industries have made work-based learning that is so essential for the completion of vocational training difficult. In an attempt to promote continuity in learning and teaching, supranational organisations like UNESCO (2023) and the Organisation for Co-operation and Development (OECD, 2020) underscored the range and variety of TVET responses globally which included the increasing provision of digital learning and teaching to ensure continuity of their programmes. Countries without a robust digital learning ecosystem suffered the greatest disruptions resulting in students experiencing learning losses (UNESCO, 2021). Additionally, the lack of a robust digital learning ecosystem could have widened the digital divide within the country. For example, there were various barriers individuals faced when accessing and experiencing digital technologies such as the lack of digital literacy skills. Despite these challenges, the crisis accelerated the Brunei's digital transformation strategy which was already underway (Digital Economy Council, 2021). These issues formed the underpinning case for promoting a robust digital learning ecosystem to better respond to future disruptions and crisis. This chapter does not attempt to provide a comprehensive analysis of how Brunei TVET has responded to Covid-19 pandemic but rather it aims to engage in a discussion on the lessons learned from the use of digital learning platform for teaching and learning and other promising practices. The title "Response, Re-evaluate and Redesign" frames the structure of this chapter which is driven by two interrelated questions within the Bruneian context: 1) How did TVET respond to Covid-19? and 2) What are the lessons learned for TVET from this crisis? To address these questions, the chapter gives an overview of the position of TVET as one of main contributors to the workforce development in the country. It then presents Brunei's TVET journey in managing the pandemic. Following on, the chapter presents the lessons learned with possible recommendations to build a robust digital learning ecosystem as part of a resilient TVET system in Brunei. It then concludes by setting out suggested priorities and foci in policy and research for future directions.

Technical and Vocational Education and Training in Brunei

The nature and scope of TVET has shifted throughout its history but its focus remains unchanged. This focus has largely been orientated towards preparing individuals with relevant knowledge, skills and competencies for work and life through an overall lifelong learning framework. That is, TVET provisions are closely dependent on the demands of the labour market and the structure of the economy it serves. Thus, many countries

increasingly recognise that high-quality TVET plays an instrumental role in the economic and social development of a country (OECD, 2015a). Moreover, TVET has re-emerged as an important lever for many countries' human resource development policy discussions due to the advent of Industrial Revolution 4.0 (Spöttl and Windelband, 2020, Ahrens and Gessler, 2023). In Brunei, it provides an alternative pathway for a diverse range of learners who seek vocational and technical skills to enter the labour market and learners who wish to progress to higher education. Additionally, there has been a growing discussion on the pivotal role of TVET in extending opportunities for adult learners who wish to re-enter the labour market or to reskill or upskill to increase their employability. Despite being marginalised in the past, TVET has emerged as pivotal in contributing to skilling Brunei's workforce. Over the last two decades, the scope and nature of Brunei's TVET landscape has gradually changed (Goh, 2023a) to serve the needs of labour market. On one hand, the range and educational level of programmes offered have expanded and diversified according to the needs and requirements of the labour market. On the other hand, there has been a gradual increase in the uptake of these programmes (see MOE, 2020; Goh, 2022). In parallel, up to 15 per cent of the labour workforce in Brunei has been made up of TVET graduates based on the recent labour force survey (Department of Statistics, 2022).

Formal TVET in Brunei is considerably young compared to other countries but it has progressively grown since its establishment in 1971. Over the last decade, this growth has accelerated in response to Brunei's 2035 Vision or Brunei Wawasan 2035 which aims to create a nation that is widely recognised for its world-class education and highly educated and skilled workforce, high quality of life, and dynamic and sustainable economy by 2035 (National Task Force, n.d.). This vision, recognises and promotes the importance of a quality education system to be competitive in an increasingly integrated global market. The national education system which is now referred to the 'National Education System for the 21st Century' or Sistem Pendidikan Negara Abad Ke-21 (SPN 21) was reformed in 2019 as a response to fulfil the needs and challenges for the social and economic development of our country (MOE, 2013). There are three key changes made to the national education system, which are education structure, curriculum and assessment and the repositioning of TVET in the whole education system. The repositioning of TVET in the national education system is intended to widen the access to and increase the participation of students in post-secondary education which contributes further to the workforce development of the country.

In recent years, we have seen a decline in the employment of TVET graduates in the government sector due to limited job vacancies but an increase in the number of graduates who venture into starting their own business, where they are supported by the government, as part of the entrepreneurship development agenda (MOE, 2020). Another issue that has led to the unemployment of graduates is skills mismatch. As one

of the initiatives to address unemployment related issues, the Manpower Planning and Employment Council (MPEC) was established which is supported by the Manpower and Industry Steering Committees (MISC) at the Prime Minister's Office. One of the main role of the MISD is to strengthen the partnership between education and training sector and the industry, where it supports MPEC to ensure employability amongst the local graduates. It does this through identifying current and future sectoral jobs that are high in demand and assists in developing competency standards in the following five industrial sectors: Energy, Construction, Information and Communication Technology, Marine and Hospitality and Tourism. With the support of MPEC and MISC, the networks of TVET public and private training providers and training organisations (Figure 1), lifelong learning centre (L3C) and other industry organisations help in strengthening the country's skills ecosystem, as they collaborate to address issues and are responsive to industry needs. For example, TVET providers like the main public provider, Institute of Brunei Technical Education (IBTE) works closely with MISC and other stakeholders like the JobCentre Brunei to identify new training programmes to address issues related to skills mismatch and to prepare competent graduates for the industry.

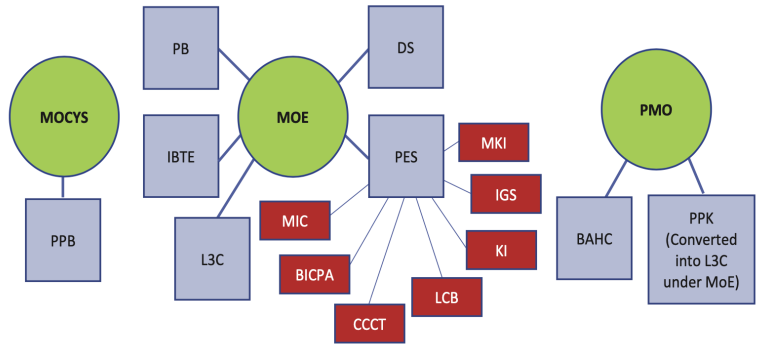

Figure 1: Network of TVET institutes in Brunei Darussalam. (MOE, 2020)

There are several TVET providers under the jurisdiction of different ministerial organisations: Prime Minister's Office, Ministry of Education and Ministry Culture Youth and Sports. Each of these providers (see Figure 1) offer programs that range from Brunei Darussalam Qualification Framework (BDQF) 1 to 5 or higher. Non-formal TVET programmes are also offered by the Youth Development Centre. In addition, L3C acts as a skills hub which coordinates and manages the upskilling and reskilling programmes offered by public TVET providers, higher education institutions and registered training organisations to the public.

Brunei's Journey in managing Covid-19 pandemic

Most countries across the world temporarily closed their educational premises in an attempt to mitigate the spread of Covid-19 pandemic. About 90% of the world's student population was affected during these closures (UNESCO, 2020a). Subsequently, there was a shift of learning from on-site settings to remote settings with the use of digital platforms or other media such as television and radio. The extent of success of this shift depended largely on the context and digital infrastructure of a country. Besides having a robust digital infrastructure, most countries' journeys in managing this pandemic, including Brunei, revealed the importance of digital inclusion to ensure equitable access to learning opportunities for all.

We have learnt that it takes a whole-of-nation approach to produce a cohesive and rapid response (Omar and Halim, 2021). What follows provides an overview of Brunei's response to the pandemic at different levels. This will form the underpinning basis for our discussion about how to foster a resilient TVET leveraging the use of digitalisation. A joint survey was conducted to collate information in mitigating the effects of the pandemic in the areas of TVET and skills development (UNESCO-ILO, 2020). The survey which involved 126 countries, including Brunei, revealed that complete closure of TVET centres was common, which had disrupted the continuity of the provision of TVET. One of the key findings which resonates strongly with Brunei's TVET experience was the challenge in ensuring the continuity of the practical skills training and work-based learning for some vocational programmes.

A whole-nation approach: From national to institutional response

Brunei's first confirmed Covid-19 case was reported in March 9, 2020. Within a short time, the number of cases escalated. In parallel, the pandemic induced a decline in global oil and gas prices which could have buffeted Brunei's economy. However, with quick, prudent and decisive interventions, Brunei was able to control the first wave of outbreak through a unified 'Whole of Nation Approach' (see MoFE, 2020) which consisted

primarily of three areas: 1) Maintaining Public well-being; 2) Supporting Businesses/ Individuals; 3) Supporting the Labour Market. One initiative to support these interrelated areas was the provision of free online training related to business matters. MPEC also worked with the private sector by providing training to upskill and reskill for their local workers (Biz Brunei, 2020). Companies were encouraged to conduct upskilling and reskilling training for their local staff, as provided by MPEC. The apprentices' programme under the i-Ready scheme, which is a 3 -year apprenticeship programme aimed to expose unemployed graduates to various industries (JobCentre Brunei, 2021) was extended for half a year, especially for those which ended before September 2020 in the public and private sector. In addition, the number of apprenticeship programmes was also increased to expand the work-based learning programmes.

Swift responses to the disruption triggered by the pandemic were also manifested at the ministerial level. The Ministry of Education implemented measures to maintain continuity in teaching and learning from home during the three waves of pandemic. Amongst these measures was the use of online educational platforms and other non-face to face teaching and learning approaches such as educational television programmes and home-pack learning to ensure all students were included (MOE, 2020). The use of online educational platforms was not only central to support learning during the temporary closure of educational institutions but it also provided an impetus to maximise leverage on technology in learning (Abdullah, Almunawar, and Ali, 2021). Given the central use of online educational platforms, MOE recognised the need for a robust digital learning ecosystem required to conduct effective teaching and learning by first, providing students and teachers with the provision of sufficient bandwidth and data speed. However, this provision was not sufficient to support all groups of students, for example, one such group was the TVET student community (Sabli, 2020). Second, the public was encouraged to donate used or new computers, laptops and tablets to support underprivileged students (Ministry of Finance and Economy, 2020). These measures were crucial in reducing any further learning losses and minimising the digital divide or inequality gap amongst these students which might have existed before the pandemic (OECD, 2015b).

TVET response – harnessing the potential of digitalisation for teaching and learning

One of the main providers of TVET, the Institute of Brunei Technical Education (IBTE), under the jurisdiction of MOE responded to the Covid-19 by following a business continuity plan. Like many of other educational institutions in Brunei, TVET leveraged the use of digital learning platform to maintain continuity. On the one hand, shifting to online learning and teaching was mostly viable for some programmes. On the

other hand, the abrupt transition posed a major disruption to programmes which required practice-based training. In many circumstances, learning of these skills had been acquired in different physical settings where context was important, either in the college workshops or in the workplaces as part of the work-based learning provision. Many of these workplaces had to adapt to online work practices as a precautionary measure. To ensure safe working practices, work-based learning programmes such as industrial attachments and apprenticeships had to be postponed. In view of this, students were given project-based assignments to do which exacerbated the skills gap issue because of the loss of any context for their learning: 'context' remains pivotal in supporting students to experience the real world of work. Inevitably, IBTE also had to put formal procedures in place for social distancing by rescheduling some of the training workshops so as to accommodate smaller groups of students in order to uphold social distancing measures (IBTE, 2020). In addition, IBTE faced challenges due to a lack of a robust digital learning infrastructure. A robust technological infrastructure takes account of the availability of internet connectivity and devices, an online learning platform which can accommodate the diverse needs of the TVET student community such as students who are geographically remote or from a less privileged background and limited staff capacity to support online learning and teaching (Sabli, 2020). On a different note, a robust technological infrastructure is essential in pursuing the UN Sustainable Development Goal (SDG4) to ensure inclusive and equitable quality education and promote lifelong learning opportunities for all (UN 2015, p.4)

Looking ahead: A digital learning ecosystem for skilling the workforce in era of digitalisation

The challenges faced during Covid-19 raise implications for the pace and depth of digitalisation across the Brunei economy, labour market and the training sector such as TVET providers. As the Brunei Darussalam's Digital Economy Masterplan 2025 makes clear, the country has several critical milestones to achieve the country's vision, goals and strategies into a digitalised nation before the pandemic (see Figure 2).

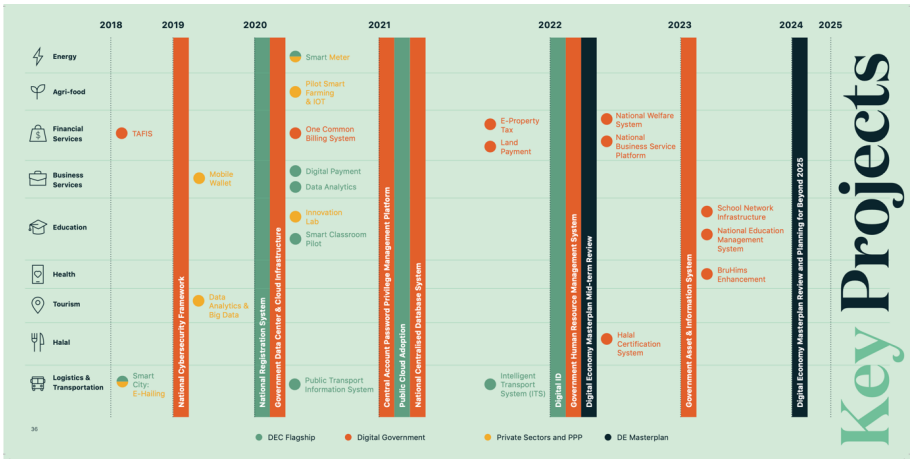

Figure 2: Brunei's Digital Economy Masterplan 2025 (Digital Economy Council, 2021. p.36-37)

Aligning to this plan and Brunei Vision 2035, the Ministry of Education recently published the Digital Transformation Plan 2023-2027 with its vision "quality education through digital transformation" where quality education refers to providing equitable quality education guided by the values of the Malay Islamic Monarchy to develop future-ready citizens who are equipped with knowledge and skills of the 21st century, developing learners to become positive and responsible individuals who can contribute positively to the nation" whilst digital transformation is the process by which processes are fundamentally changed or reorganized to obtain benefits through the adoption and integration of emerging digital technologies, and deliver values to our customers (educators, learners and the public) (MOE, 2023). Essentially, Covid-19 has become an integral catalyst for the digital transformation process in the educational sector but it also presents a new set of challenges in TVET institutions. These challenges forced TVET providers to rethink their learning and teaching practices to accommodate greater flexibility and to mitigate any challenges in a short period of time.

Despite the many favourable opportunities brought about by digital learning, depending on the availability of proper infrastructure and resources, Covid-19 perpetuated inequality amongst students from underprivileged background (Borneo Bulletin, 2022). These students experienced more acute challenges during the shift from physical to digital online learning. Therefore, in the context of the pandemic, a single-faceted educational solution such as digitalisation for disadvantaged groups can hardly be effective. Covid-19 pandemic has also revealed the lack of preparedness in IBTE on the transition to fully remote or online training environments. Teachers and students had to

adapt to these environments in a short span of time without having the appropriate level of the fundamental digital literacy skills i.e. the knowledge, skills and confidence required to use available technology and technological devices to perform work processes (Borneo Bulletin, 2022, Sabli, 2020). Furthermore, teachers had limited pedagogical knowledge and skills for online learning and teaching. Moreover, teachers also had to develop innovative ways to deliver vocational programmes which relied heavily on hands-on training.

Promote digital competence for lifelong learning

In my commentary (Goh, 2023b), I suggested shifting the TVET paradigm to move in tandem with the digital transformation in the country in order to stay relevant to the changing landscape of work. What we learnt from this pandemic is that Covid-19 has also accelerated the changing skills needs in the face of digital innovation which has direct and indirect implications for TVET and as a country. These changing skills needs include, firstly; digital skills within jobs that are not themselves primarily focused on or located within digital industries (Martin, 2017). For example, teachers were required to change their work practices such as renewing how they teach online and creating digital online learning resources. Secondly, they include digital literacy as a fundamental skill as the broader impact of innovation on skills needed in all forms of employment (Keep, 2021, Laar et al., 2017). Thirdly, new skills needs and jobs are emerging, directly related to the digital sector and digital technology, as in the case of cyber security. Such changing skills needs raise the implications of digital innovation which require TVET to redesign their programmes with the industry. In view of these changing and new set of skills, the TVET community and more specifically teachers as key agents need to continue to strengthen their capabilities to be agile and adapt to changing circumstances.

One potential approach to support the repositioning of TVET paradigm is to leverage the use of e-training platform, as a part of TVET teachers professional lifelong learning journey (Goh, 2022). One such example has been showcased through UNESCO-UNEVOC promising practices (UNESCO, 2021c). TVET providers could work collaboratively with industry to build this platform where teachers can learn during their own free time. This is also especially helpful for new TVET teachers where they can gain industrial knowledge and skills through this sort of partnership. In parallel, there is an emerging body of evidence that proposes the use of self-directed learning, self-determined and self-regulated learning to promote lifelong learning amongst adult learners (Banerjee, 2019). Subsequently, teachers can exercise their agency in learning than what they are told to do in traditional continuing professional development activities. Notably, this approach to digital lifelong learning suggests that there should be an online community where they could collectively reflect, provide motivation and to

involve the teachers in designing their learning. Having such learning spaces provide empowerment and autonomy to teachers in their own lifelong learning journey.

Innovative work-based learning

Covid-19 disrupted workplaces so it was difficult to implement work-based learning and prompted educators to think about other innovative ways to prepare students for work, as these students were not able to be physically present at the work premises. Based on the responses to Covid-19, it is important to find flexible solutions that could enable work-based learning and practical-based training to continue so that all students are able to progress in their studies, despite restrictions in their opportunities in the workplace. Although digital online learning was used to deliver some TVET programmes during the pandemic, there has not been much discussion on the innovative ways it could be used to facilitate work-based learning. Workplaces have been considered as potential learning sites (Hodkinson and Hodkinson, 2004; Goh, 2021; Goh and Zukas, 2016, Fuller and Unwin, 2003). Most work-based learning programmes, like apprenticeship schemes involve students in experiencing and learning to manage unpredictable work expectations in a workplace. Increasingly, work-based learning programmes are recognised as key to a functional and market-responsive TVET system as they have the potential to develop reflective (Faller, Lundgren and Marsick, 2020) and agentic individuals (Evans, 2017) to adapt to the constant changing workplaces.

Micro-credentials could be an innovative work-based learning approach to ensure better permeability between TVET and the labour market. They have been defined as an isolated demonstration of a learner's performance in a small, well-defined learning task. To ensure that students acquire the knowledge and skills at various learning levels for a particular vocational area, TVET teachers are required to work closely with supporting companies or stakeholders to develop the curriculum and resources to ensure that students get the most out learning through these micro-credentials. In essence, these micro-credentials should consist of theoretical and practical phases and where students would spend the practical phases at the workplaces (Bhoyrub et al., 2020) to learn the dispositions to working at each occupational sector respectively. Hence, collaboration between TVET teachers and supporting companies is seen as pivotal in providing online training for students as evidenced during the pandemic experienced by Finland (UNESCO-UNEVOC, 2021a, 2021b). In such aspects, micro-credentials can also act as a vehicle to support labour-market related and employment relevant training. However, more work needs to be done to integrate micro-credentials into the national qualification frameworks.

As mentioned, there is a limit to online learning when it comes to incorporating the development of practical skills for many occupations. For many occupations (for

example in the healthcare sectors) practice-based learning is considered essential as part of the training (Bhoyrub et al., 2020), requiring students to be in the workplace where they learn a range of skills required to perform a job well. Researchers have argued for the importance of a social dimension of learning in these work contexts which draws on the notion of situated learning (Hodkinson et al., 2007, Goh, 2021, Lave and Wenger, 1991). One complementary way is to replicate the workplace experience with virtual reality (VR) and augmented reality (AR) simulator technology. These simulated experiences, which replicate the authentic work contexts allow students to experience real life situations, reflect on their decisions and improve for their future actions (Goh, 2019). This can also develop their evaluative judgement capabilities (Boud, 2023) for the ever-changing workplace.

Conclusion and moving forward

This chapter shared the journey of one of the main public TVET providers, IBTE in managing the pandemic and the lessons learnt to build a strong and resilient system. This learning journey has provided us with an opportunity to consider the preparedness and adaptive capabilities to any future disruptions. That is, the Covid-19 pandemic has exemplified the direct and indirect impacts of digitalisation that could support in planning TVET for the digital era. Based on the aforementioned challenges, there are many lessons learnt throughout the pandemic but this chapter attempts to focus on the implications of digitalisation in TVET. One of the key lessons learnt which resonates with the TVET sector in other regional and international countries (UNESCO, 2023) is the importance of a robust digital learning ecosystem. A robust digital learning ecosystem is required to uphold digital inclusion, which is defined as "equitable, meaningful, and safe access to use, lead, and design of digital technologies, services, and associated opportunities for *everyone, everywhere*". (United Nations, n.d.) [italics mine]. Equally important, well-planned strategic initiatives such as curriculum evaluation and teacher professional learning should be enhanced to stay relevant with the changing skill sets required in workplaces. In hindsight, Covid-19 provided the opportunities to re-evaluate the TVET system as an early preparation for the digitalisation era. From this brief commentary, there are several implications for practice or policy directions in view of redesigning a resilient TVET system for a digitalised era:

(1) Develop a policy that places emphasis on TVET teachers' and learners' digital competence
(2) Promote TVET digitalisation to strengthen the digital learning ecosystem.
(3) Strengthen the collaboration with industry to develop micro-credentials for flexibility in vocational programmes.

Above all, as the Covid-19 pandemic makes clear, a concerted effort which involves a collaborative partnership between TVET and all stakeholders is quintessential to build and strengthen a resilient system for any future disruptions (OECD, 2020).

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