THE DIGITALISATION SPHERE: WHERE DOES TVET IN THE NORTH-EASTERN CAMBODIA STAND?

Introduction

Over the past century, there has been exponential growth in the development and integration of information and communication technology (ICT) in numerous aspects of education whether at macro, meso or micro level. The epitomes of this are the UN 2030 Agenda for Sustainable Development, EU Digital Education Action Plan 2021-27, and ASEAN_ICT Masterplan 2020. Around the world, progressive policies have been initiated to increase access to digital tools and information, transform curriculum and pedagogy, and improve teaching and learning environments.

The integration of digital technology in education systems has become increasingly common in the technical and vocational education and training (TVET) sector too, as reflected in the UNESCO Third International Congress on TVET (held in 2012), the 2015 Qingdao Declaration, and Sustainable Development Goal 4 (specifically, targets 4.3 to 4.5)[1] (UIS 2018). Such calls for concerted global action on skills development amplify TVET reformation through the use of ICT to jointly address the multifaceted challenges of the 21st century and promote sustainable and inclusive socioeconomic development. However, in the drive to promote the diffusion and uptake of digital technologies, the depth of digitalisation in education and training has been overlooked, as evidenced by the overall paucity of research in this area and in developing countries in particular.

This study aimed to narrow this research gap. To that end, it addressed two research questions: To what extent has digitalisation been incorporated into TVET in north-eastern Cambodia? What are the benefits and challenges of digitalisation in Cambodia's TVET sector?

Digitalisation in TVET: What does this sphere look like?

Digitalisation is bringing about dynamic change in many aspects of society, be it work, business, or education and training. However, before honing in on a particular area, it is necessary to understand the concept of digitalisation.

The term "digitalisation" has been used interchangeably to refer to "digitisation", "digital technology" and "ICT integration" but is usually associated with leveraging digital technologies to transform various aspects of everyday life. As such, digitalisation holds great promise for a world in which people can take bigger roles in improving and modernising economies and societies. This is an oversimplified view, however. Looking at it from the three dimensions of organisational changes (pace, scope, results) against the backdrop of emerging digital technologies, digitalisation is the process of realigning organisational operations for a digital future. Such realignment, however, does not necessarily change the organisation's identity (Gong and Ribiere 2020). Thus, digitalisation in TVET signifies the integration of digital technologies to improve the sector's operation and performance while leaving its technical and vocational characteristics unchanged.

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1   Target 4.3. Ensure equal access to affordable and quality technical, vocational and higher education; Target 4.4. Increase the number of youth and adults who have relevant skills, including technical and vocational skills, for employment, decent jobs and entrepreneurship; Target 4.5. Eliminate gender disparities in education and ensure equal access to all levels of education and vocational training for the vulnerable.

Is it beneficial for TVET to enter the digitalisation sphere?

With digitalisation, TVET can transcend its traditional narrow focus on practical skills and specialised tasks to become an essential catalyst for the changes needed to achieve the Sustainable Development Goals targets. Expansive learning is one of the most visible impacts of digitalisation in TVET. It has been shown to overcome not only logistical barriers such as time constraints and distance to school/university but also internal (e.g. interest, motivation) and external (e.g. socioeconomic, societal values and expectation) factors that affect learning (Pavlova 2009).

With the advent of massive open online courses, open educational resources, social media applications, and augmented reality and virtual reality, people can learn whenever and wherever it is convenient for them (Grech and Camilleri 2017). This is particularly important for disadvantaged groups, such as those living in poverty, remote areas and conflict zones, people with disabilities and internally displaced persons. Typical examples are computer-based Braille systems and free mobile learning tools (Pavlova 2020). There is also evidence that TVET digitalisation has augmented relevancy, authenticity, and creativity in learning and promoted extensive collaboration regionally and globally, resulting in cutting-edge innovation and more knowledge creation. The Covid-19 pandemic, which forced school closures and catalysed online alternatives to face-to-face teaching and learning worldwide, has shown that accelerating the digital transition in education and training is imperative for building resilience against future shocks (ILO, ITU and UNESCO 2020).

Is digitalisation barrier- and risk-free?

Despite potential benefits and opportunities, digitalisation in TVET faces many challenges. First is the digital divide. This complication permeates beyond the issue of access to the issue of competence and content acquisition (Haan 2004). Disparities in access to ICT infrastructure within and between nations and regions have become increasingly salient. Internet usage rates, for instance, are far higher in advanced countries than in developing and least developed countries, where around 47 percent and only about 20 percent, respectively, of the populations have access to the internet, compared to about 87 percent in advanced countries (ITU 2019). Lack of digital literacy is another factor that contributes to the digital divide. This is exacerbated by the misperception that digital natives (people born after 1983) have high levels of digital literacy. As studies have proved, there are wide gaps between self-perceived and actual digital competencies (ECDL 2016). Added to that is the issue of English language proficiency. Because English is the dominant language used for the majority of digital-related tools and resources, those who have little or no knowledge of English cannot access or use them. Moreover, existing learning and teaching resources are not always amenable to TVET nor readily transferrable to different country contexts.

Ensuring the effectiveness of digitalisation in TVET is not the sole responsibility of teachers but involves a wide range of professionals, including instructional designers, media creators and skills experts. Nevertheless, two old obstacles to TVET provision persist – shortages of TVET instructors and their competency deficits (Subrahmanyam 2020). Linked to that is the insufficiency of resources for refurbishing TVET institutions (Badura and Grainger 2019). TVET, which entails both theoretical and practical learning, is more costly than general academic education. Augmented and virtual reality could attenuate such issues, but that would require further sophisticated arrangements.

Adequate and appropriate ICT resources and supports are crucial for accelerating digitalisation in TVET. However, progress will amount to nothing without sufficient interest, motivation and involvement from TVET stakeholders. For instance, the fear that digitalisation will take their jobs has been the cause of perturbation among some TVET instructors (Christensen and Knezek 2018). With this mindset, there is little chance that they will introduce or use new technologies in their teaching, let alone stimulate their students' curiosity in such developments. Similar attitudes are also reflected in some conventional industries.

What is the current situation of TVET in Cambodia?

In the last few years, TVET has gained attention from the government and its development partners, with millions of dollars being invested across different projects. Achievements at policy and operational level include National TVET Policy 2017–25,

TVET quality assurance, increased access to TVET, and infrastructure development (DGTVET 2019).

The government also aims to boost the share of the industrial sector in GDP to 30 percent by 2025, from 24.1 percent in 2013. This will drive up demand for middle-skilled and high-skilled workers (CDRI 2019), but the extent to which such demand can be met is uncertain. The annual workforce demand is predicted to be 310,000, but by 2019, only 85,390 (35,007 female) students had participated in TVET, 73 percent of whom graduated. That is to say, TVET can only meet 27 percent of skills demand. Moreover, only about 20 percent of TVET enrolments are in long-term courses, again raising

concern about the supply of well-trained TVET graduates and their quality (MLVT 2021).

Furthermore, the modus operandi of TVET institutions hinders their ability to keep pace with changing skills needs across industries. Most TVET curricula are not systematically reviewed and updated. In some centres, only about 30 percent of TVET learning is work-based training, which is below the international benchmark for skills training. This underlines the urgent need to improve quality and relevancy in TVET using technology. Doing so would not only create highly skilled workers but would also instil a culture of lifelong learning and build a future-ready workforce (ADB

Figure 1: Digital integration matrix and level of progress
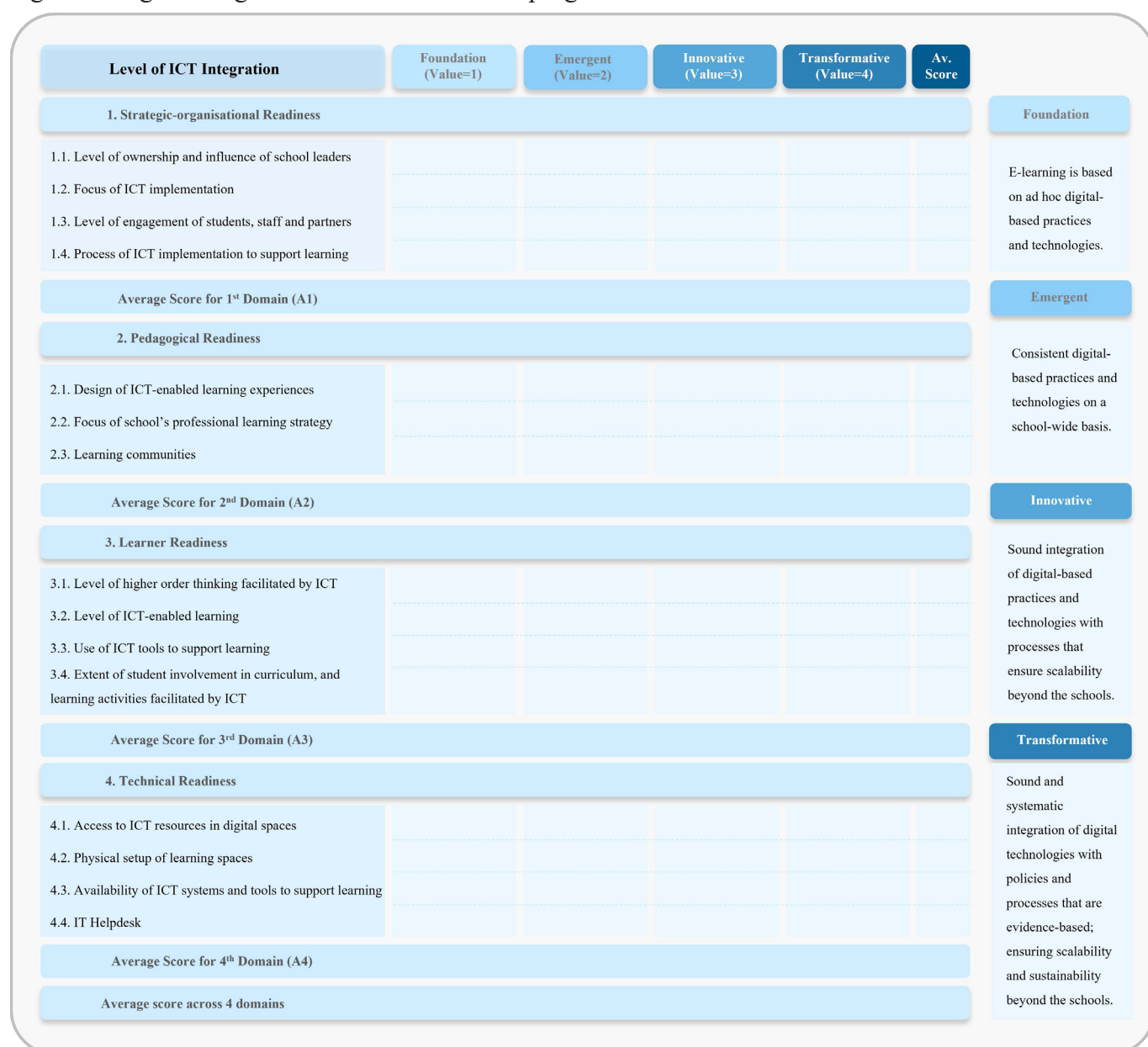
Source: Adapted from Yian and Park 2017

2021).

Methodology

This qualitative study is nested in a larger triangulation or convergent design of mixed methods study (Bun 2021), in which both quantitative and qualitative data were parallelly collected yet analysed separately before being merged for interpretation. Data was collected from five provincial training centres (PTCs) in the north-eastern provinces of Cambodia: Preah Vihear, Stung Treng, Mondulkiri, Ratanakiri, and Kratie.

PTCs come under the supervision of the Directorate General of TVET, which provides them with infrastructure, teaching, learning equipment and human resources. They also receive support from development partners, including Asian Development Bank, Agence Francaise de Développement, Swisscontact, Korea International Cooperation Agency, Bondos Komar, UNESCO, and PLAN International. To date such supports have included the provision of student dormitories, teaching and learning equipment, support packages for students to study or set up their own business, and professional development for teachers and managers. Thus, if large-scale and inclusive digitalisation in TVET is going to happen at all, it is likely to take place in these PTCs. Given that the assistance is transient, and that these PTCs are located in a remote region where basic infrastructure is underdeveloped and resources sporadic, in-depth exploration and assessment of their digitalisation progress would provide new insights into how education and training in disadvantaged areas are benefiting from advances in technology.

The study used semi-structured focus group discussions (FGDs) with two stimuli. First was a set of questions on digital integration in TVET, its benefits and challenges. The second was the digital integration matrix developed by Yian and Park (2017) (Figure 1). All participants were asked to rate their institution's level of readiness using the matrix and to explain their choice. Critical case sampling was used to select participants from each PTC. The total sample comprised 32 participants (five directors, five department heads, six technical teachers, 16 class monitors). Five online FGDs, one for each PTC, were conducted via Zoom and lasted between 75 and 125 minutes. All FGD recordings were translated from Khmer to English and transcribed directly into MAXQDA 2020 data analysis software. The average score for each domain was computed. The scores were then summed to determine the level of digital integration progress within each PTC.

Findings

Extent of digitalisation

Figure 2 summarises participants' responses to the digital integration matrix. Analysis revealed that digital integration in all PTCs was at the foundation stage, as the integration of digital-enabled practices was found to be inconsistent, unsound and disorganised. Participants pointed out that digital uptake during the Covid-19 related lockdown was ad hoc. Before the pandemic, online meetings with students, staff and partners were rarely organised, which could explain the technical problems some PTCs faced.

> For meetings, we have never had internal online meetings, only with external partners and only during this Covid-19 period. (CD2)

Figure 2: Level of digital integration across provincial training centres

PTC	Strategic-organisational	Pedagogical	Learner	Technical	Average score	Overall band
Kratie	1	1	1	1	1	Foundation
Stung Treng	2	1	1	1.5	**1.375**	Foundation
Preah Vihear	1	1	1	2	1.25	Foundation
Mondulkiri	1	1	1	1.5	1.125	Foundation
Ratanakiri	1.25	1.33	2	1	**1.395**	Foundation

Taking a recent example, we didn't get to join the meeting with the ministry because we couldn't install this particular application, Microsoft Team, on our computer or device. (CD4).

The FGDs also gave insights into the different aspects of digital integration at these TVET centres.

Strategic organisational readiness. Almost all of the participants were aware of the positive impacts of TVET digitalisation. Managers and instructors alike had started to use different types of digital technologies to support governance, teaching and learning. Even so, implementation tended to be loosely defined because digital uptake was not articulated in the PCTs' strategic plans. Technology adoption was likewise limited and driven mainly by uncontrollable events in society, particularly in response to Covid-19, but it was also stymied by the digital divide. However, managers were undertaking new initiatives to realise digitalisation, such as improving broadband speed and reliability as well as digital learning and teaching facilities.

Pedagogical readiness. All PTCs were making promising efforts in this regard. Various online platforms were being used to support online teaching and learning, from social media and entertainment applications such as Facebook, Telegram and YouTube to more sophisticated ones such as Zoom and Google Classroom. Teachers were recording instructional videos and sharing more e-learning resources with their students. It was also mentioned that the Directorate General of TVET had set up an online platform called E-learning, where all TVET cadres can upload, access and share digital teaching and learning resources. Teachers can also use this platform to monitor students' learning progress. New strategies for improving staff competencies, specifically digital competence, were also in progress.

Learner readiness. The majority of students do not own a computer or laptop, but an increasing number own a smartphone, which they use to access study materials and learn new things. YouTube and Google were the most popular platforms. Students tended to engage in digital learning activities that mostly helped them recall and understand information but had little chance of becoming involved in the application, evaluation and creation of new developments. Also being implemented were digital learning activities that encourage learner autonomy, though these did not yet promote reflective practice or collaborative learning.

Technical and operational readiness. The FGDs indicated more barriers than enablers for this domain. Most PTCs have only been able to provide teacher-directed digital learning activities through adapting their computer rooms. This learning, however, was exclusively for those studying ICT or business-related programs, with no sign of it being extended to other programs any time soon. There were not enough computers to go around, with one for every five to 10 students. The quality of those computers was deteriorating, and the software was outdated. Internet access was largely limited to managers, teachers and select students. Teachers were starting to use social media sites and platforms to upload learning resources and/or store and record students' work for assessment. However, these initiatives were unofficial and informal.

Benefits of digitalisation in TVET

All FGDs affirmed that TVET digitalisation benefitted learners, teachers and TVET leaders in a number of ways, as follows.

For learners. Students do not always need to attend class because they can study online. This reduces both the time and money they spend on traveling and their living costs, while allowing them to continue their learning, as echoed in the following.

It helps reduce expenses. We don't need to spend much on traveling anymore because we can just use our phone to search for information or to study. (CM10)

Furthermore, through institutional websites and social media sites, students can access a wide range of study resources instantly and conveniently. E-learning materials help to both enhance student understanding and initiate learner autonomy. Students seemed to be taking more ownership of their learning, exploring new topics and interests, and seeking new information; for example,

All the videos, lessons and documents that our teachers send to us can be found in a single place, so it's not hard for us to find them. (CM10)

It allows us to search for information that we wouldn't otherwise have known about and to study more by ourselves. (CM4)

Additionally, the incorporation of digital technology was discerned to enhance students' social engagement and prepare them for future employment. Socially, students were able to communicate and exchange ideas with their peers and other interest groups or engage in social activities within or outside of their own community. This also expanded their networks, instilled soft skills, and familiarised them with other digital skills.

I think it also helps us to become fast and flexible. It teaches us to be flexible and resilient to change and to learn new things, including how to use social media platforms or create or edit videos and so on. (CM16)

For teachers. Participants concurred that TVET digitalisation offered benefits for teachers in regard to lesson preparation, teaching, and monitoring student performance. Teachers were now able to access and use a wide range of online teaching materials to create better and richer lesson content, for example, through using videos from other training centres in Cambodia or other countries. Moreover, in light of Covid-19, teachers were now embracing digital technology more than ever in order to foster timely and adaptive teaching. For instance, teachers engaged in livestreaming online teaching via Facebook or Zoom. They also recorded and edited videos on both theory and practice and uploaded them for online student groups. Although beyond the scope of this study, some PTCs were using online formative assessment in the form of online quizzes and assignments to monitor student progress and performance. This helped them to both improve teaching and support students struggling with online learning. These advantages are reflected in the response below.

First, we have time to share the lesson, both videos and documents, with our students on time and quickly. As a matter of fact, it helped us get through the Covid-19 situation too. We didn't meet each other face-to-face, but we could meet online. Students learned both theoretical and practical lessons. If they were finding some things

difficult to follow, they could rewatch the videos we sent. (TT4A)

For TVET leaders. Digitalisation helped to provide timely and updated information within and between the PTCs and related institutions. This bolstered fast and efficient decision-making at the management level. Instead of sending and waiting for replies to physical letters or notices, managers can reach the target audience instantly online. Staff can also directly notify their colleagues or the management team of any problem or information, bypassing administrative procedure. Another benefit was highlighted as follows.

The management team can still govern and oversee the centre's activities and operations even when they're far away from the centre because there are CCTV cameras around the centre. (CD1)

Given the numerous online meeting applications and platforms, and open online courses, TVET leaders and their staff can join meetings from afar and continue pursuing higher degrees or related courses without postponing their work.

Barriers to digitalisation in TVET

Three main barriers were found to be hindering the progress of digitalisation in Cambodia's TVET sector.

Digital divide. Deficit of digital devices and support infrastructure, shortages of well-trained human resources, and irrelevant lesson content were frequently highlighted by respondents. The current internet structure in the north-eastern region remains underdeveloped and relies on just a few providers and is therefore in a precarious state. Despite its instability and poor coverage, broadband costs remain high, leaving most training centres struggling to afford or unable to provide internet access for all students. For example, "Some areas do not have internet broadband yet when some have unstable broadband connections. My school can only provide wi-fi connection to those studying computer science, not other subjects" (CM5).

Online TVET teaching and learning resources originate externally, so might not be relevant or applicable in Cambodia. Language barriers are a case in point. Accessing online teaching and

learning materials and tools is harder if English is not the user's first language. For instance, "If they have no foundation in English language at all, they might not be able to read and understand some terms when using the applications. It's even worse if their literacy is also limited" (CM16).

The dearth of human resources, both quantity and quality, is another perplexing issue inhibiting TVET digitalisation. In terms of quantity, the overall number of TVET instructors was meagre. This obliged almost all instructors and managers to take on multiple roles beyond their responsibility. TVET instructors' competency, especially digital competency, was also limited. Most of them were specialised in technical and vocational skills that have not yet been updated to integrate digital technology. Although development partners brought in new teaching equipment, it was so advanced that using it was beyond teachers' competence. This made teachers reluctant to explore those tools, suggesting there was little chance that students would learn how to use them either.

Low participation and motivation. Generally, there was a lack of understanding about the dynamic between digital technology and TVET. Some students and teachers still perceived that TVET is about occupational specialisation acquired through work-based training and practice and barely related it to technological integration. Teachers, particularly senior teachers and those teaching non-ITC subjects, seemed disinterested in updating their skills or using or integrating technology in their teaching. Even if their institution was promoting the use of technology, they were slow to change.

> Most of our senior lecturers, who are not specialised or familiar with information technology, find it hard to use or integrate digital technologies in their teaching. Besides this, most of the digital technologies or mobile applications are only available in English, and if their [lecturers'] language skills are limited, it further prevents them from trying to use those technologies. I think our students also face similar challenges, even worse for those whose family circumstances and living conditions are not favourable. (CD3)

Inadequate mediation mechanisms. Despite the many ministerial calls to revamp TVET using digital technology, there was a lack of walk-the-talk on putting inclusion and equity into practice. PTCs received meagre support compared to that provided to training centres in the capital city. Be it about finance or human resources, technical support and services, skills upgrading or reskilling, PTCs seemed to be low down on the priority list. It was difficult for them to gain even a little traction and attention from top managers, such that they started to doubt the worthiness and value of their centre's operations and achievements.

> It seemed like the ministry hadn't got to see or paid much attention to small provincial training centres located far away like us. They didn't get to see much of our centre's activities. The ministry seemed to pay attention or focus on those schools that have bigger activities. (CD4)

Conclusion

Analysis of strategic-organisational, pedagogical, learner, technical and operational readiness across the selected provincial training centres indicates that TVET in north-eastern Cambodia is at the foundation stage of digitalisation. Although good use of social media platforms for teaching and learning was observed, more unitary and sophisticated software programs such as Canvas (a web-based learning management system) should be deployed. Digitalisation was focalised around three aspects of TVET – learning, teaching and governance. However, the digital divide, inadequate stakeholder participation and motivation, and almost absent mediation have hindered the smooth and effective integration of digital technology in TVET.

Addressing the inadequacy of relevant and quality TVET infrastructure and instructors should be the first priority. Strategically, there should also be more coherent and genuine formation and application of digitalisation policies and guidelines across TVET centres. Any initiation or implementation of digitalisation in TVET should be equitably allocated and closely monitored. If proper remedial actions are taken to resolve the aforementioned issues, moving TVET digitalisation in Cambodia forward from the foundational stage to higher levels is a viable prospect.

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