

## COMMENT

# Reshaping technical and vocational education and training schools and institutions through digital transformation for sustainable development

Libing Wang\*

UNESCO Regional Office, Bangkok 10110, Thailand

Technical and vocational education and training (TVET) has gained prominence within the context of sustainable development goal 4 (SDG4). Specifically, among the nine targets outlined in SDG 4, two, namely, SDG targets 4.3 and 4.4, are directly pertinent to TVET. This highlights the pivotal role that TVET plays in fostering a country's economic and social development.

The conventional perception of TVET as a second-rate choice is waning in many countries. The evident economic and social advantages TVET offers individuals and societies alike have compelled governments, parents, and students to prioritize this learning pathway for the future.

The 17 SDGs continue to be essential benchmarks for TVET schools and institutions, ensuring alignment with their TVET programs and activities. Moreover, the emergence of digital transformation, as affirmed at last year's Transforming Education Summit (TES) held at the United Nations (UN) Headquarters in New York, profoundly shapes the present and future of TVET provisions at various levels.

## ALIGNING WITH THE SDGS

TVET provisions are closely linked to a country's overall development needs and the specific industry distribution in different locations. Consequently, learning programs at TVET schools and institutions should inevitably be

tailored to meet the demands of the societies and communities they serve.

Therefore, national and local TVET policies and frameworks are the principal reference points for alignment within TVET schools and institutions. These policies, along with tools such as National Occupational Catalogs and Occupational Quality Standards, play a vital role in informing the development of learning programs by TVET schools and institutions.

When government regulations on program content and orientations are limited, TVET schools and institutions can collaborate directly with industries and local communities to design and implement their learning programs jointly.

The SDGs, a globally agreed-upon set of development goals, offer significant value as they provide TVET schools and institutions with a comprehensive framework to assess their learning programs. Conducting SDGs-relevance checks enables the identification of gaps and opportunities for improvement.

SDGs-relevance checks also extend to other activities of TVET schools and institutions, including applied research, community engagement and outreach, partnerships with industries, as well as institutional governance and management. These checks are vital in ensuring that all institutional activities align with and support the SDGs.

### \*Corresponding Author:

Libing Wang, UNESCO Regional Office, 920 Sukhumvit Road, Bangkok 10110, Thailand. Email: l.wang@unesco.org  
Received: 5 February 2024; Revised: 28 February 2024; Accepted: 28 February 2024  
<https://doi.org/10.54844/vte.2024.0539>

 This is an open access article distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License, which allows others to copy and redistribute the material in any medium or format non-commercially, as long as the author is credited and the new creations are licensed under the identical terms.

## DIGITALIZING INTERNAL WORKFLOWS

In various countries, including China, TVET schools and institutions have successfully implemented robust intra-networks to streamline online workflows, supported by numerous embedded apps. This has led to a paperless working environment, dramatically curbing the consumption of stationery supplies and promoting sustainability.

The digitalized workflows can cover a wide range of institutional activities, including but not limited to teaching and learning, research and development, human resources management, resource mobilization, missions and leaves management, collaboration with external stakeholders, international cooperation, community engagement and outreach.

These online digital working platforms represent essential infrastructure that demands increased government investment. TVET schools and institutions must prioritize this in their institutional budgeting plan and proactively mobilize public and private resources to establish and continuously update such platforms.

By digitalizing internal workflows, TVET schools and institutions can enhance internal transparency and accountability while reducing bureaucratic red tape. This, in turn, contributes significantly to their sustainable development.

## INSTITUTIONAL DIGITAL DATABASES

The ethical use of artificial intelligence (AI) is the future across all sectors, including the TVET sector. However, realizing this potential requires several prerequisites, such as solid computing power, efficient algorithms, high-speed internet transmission, and the establishment and proper functioning of various databases.

While all the others remain part of common public infrastructure, the development and maintenance of various databases fall within the responsibility of TVET schools and institutions. The data collected through these databases can then be used to support the operation of different AI tools for various purposes.

Databases should focus on critical institutional activities, including teaching and learning, governance, management, community engagement, and outreach. TVET schools and institutions should align their database development with their national statistical frameworks and address any gaps that may arise.

TVET schools and institutions are substantial daily generators of big data. They have immense potential to

establish robust institutional database systems, allowing institutional leaders, administrators, teachers, students, and other TVET actors and stakeholders to effectively utilize the data for progress monitoring, gap identification, and informed decision-making.

## FLEXIBLE LEARNING FOR TVET STUDENTS

SDGs are not only related to knowledge and content that informs the development of learning programs in TVET schools and institutions, but they also embody values and attitudes that can inspire the creation of innovative pedagogies.

Sustainability requires flexibility to accommodate diverse learning approaches, which in turn enhances the quality and relevance of learning programs. Digital technologies are crucial in increasing learning flexibility by offering expanded learning spaces beyond traditional venues and modalities.

Given the nature of their learning programs, TVET schools and institutions are increasingly compelled to expand their learning venues to include community-based, workplace-based, and experiential learning. If not already, partnerships with industries and communities will be even more critical in the future.

Another important point concerns the roles of online and blended learning in delivering TVET programs. While the emphasis on hands-on knowledge and skills in TVET programs may prioritize in-person learning, online and blended learning can also hold significant value. Virtual reality and simulation-based learning, in particular, can offer unique benefits.

## NURTURING DIGITAL-NATIVE TVET TEACHERS

The continuing professional development (CPD) of TVET teachers will be increasingly crucial, particularly considering the rapid advancement of digital technologies. However, the existence and effectiveness of CPD systems for TVET teachers vary significantly among countries.

TVET schools and institutions should implement their national CPD requirements for TVET teachers if applicable or enhance their institutional CPD programs with a strong focus on improving their ICT competencies.

In the future, TVET teachers will likely be digital natives due to early exposure to ICT before entering to teach at TVET schools and institutions. However, they will still

need to participate in CPD programs, perhaps in the form of micro-credential programs, to stay abreast of the latest developments in digital technologies.

Furthermore, TVET schools and institutions can integrate teachers' CPD with their human resource management systems to shape annual CPD objectives, performance evaluations, and career advancement opportunities. This integration will motivate TVET teachers to engage in CPD activities within these cohesive systems actively.

## **PARTNERSHIPS**

TVET schools and institutions should avoid working in isolation. Instead, they are integral components of a larger ecosystem, where they have the opportunity to collaborate and form partnerships with diverse actors and stakeholders.

Regarding institutional governance and management, TVET schools and institutions can identify areas where they have space for institutional innovations while adhering to national regulatory frameworks. Collaborating with government authorities can provide them with a certain level of autonomy and government support. Ideally, a combination of top-down and bottom-up processes should be employed to ensure their complementary nature.

Sharing teaching and learning resources among different TVET providers can serve as another critical area for partnerships. UNESCO advocates for adopting three overarching concepts—Massive Open Online Courses (MOOCs), Open Educational Resources (OERs), and micro-credentials—to facilitate inter-institutional collaborations within or between countries.

Partnerships also extend to industries, professional bodies, local communities, international collaborators, and other stakeholders to jointly develop and implement occupational quality standards and concrete TVET learning programs, mobilize resources, exchange experiences, build capacity, and scale up promising practices, among other endeavors.

## **WRAPPING UP**

Sustainable development and digital transformation are closely linked, with the latter serving as a means to achieve the former. These connections also extend to and significantly influence the TVET sector in numerous ways.

The SDG-relevance check will offer a comprehensive framework to assess all the activities conducted by TVET schools and institutions. Consequently, it will guide the TVET sector towards actively contributing to realizing SDGs.

To effect meaningful change, digital transformation must be concretely implemented at the institutional level, covering institutional governance and management, institutional databases development and utilization, teaching and learning practices, teachers' CPD, and partnership building, among other aspects.

Through these efforts, TVET schools and institutions can significantly enhance their ability to contribute to more inclusive and prosperous societies.

## **DECLARATIONS**

### ***Author contributions***

Wang LB: Conceptualization, Writing—Original draft, Writing—Review and Editing.

### ***Source of funding***

This research received no external funding.

### ***Ethical approval***

Not applicable.

### ***Conflict of interest***

The author has no conflicts of interest to declare.

### ***Data availability statement***

No additional data.