



## SUCCESSFULLY IMPLEMENTING TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING PROGRAMMES IN SECONDARY SCHOOLS

 **Brendan Mitchell**<sup>1+</sup>

<sup>1</sup>Lingnan University, Hong Kong.

Email: [brendon\\_mitchell@hotmail.com](mailto:brendon_mitchell@hotmail.com)

 **Clare Gordon**

<sup>2</sup>Education Consultant, United Kingdom.

Email: [cgbuntic@gmail.com](mailto:cgbuntic@gmail.com)

**Buntic**<sup>2</sup>



(+ Corresponding author)

### ABSTRACT

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Technical and vocational education and training (TVET) plays a critical role in developing essential labour market skills. While the original goal of TVET, which is still prominent today, was to prepare youth to enter the workforce by training them to be work ready, the global technological revolution and innovations in science and technology demands higher levels of education and technological skills for the 21st century. TVET has evolved to meet the needs of industry and countries. Strengthening technical and vocational education at the secondary education level provides a wider transformational vision for students to have the opportunity to gain these skills. There are challenges, which are more prevalent in some countries than others. For example, perception and participation in TVET has traditionally been stigmatized in favour of white-collar jobs. Additional challenges include contemporary curriculum and facilities, training and development of staff, and financial strains, which many developing nations have. This article sets out to provide information and guidance on the implementation of TVET programmes and focuses on: strong or emerging global TVET practice, with a focus on the secondary school sector; key features of successful practice, in order to extract the most relevant lessons; and the most common global challenges in developing successful TVET programmes, and how these can be addressed. While the article focuses on secondary education it contextualises this within the wider TVET and vocational education systems.

**Contribution/Originality:** The contribution of this article is that it provides a model of what technical and vocational education and training programmes can look like in secondary schools. This can be particularly useful for developing countries seeking to provide further employment opportunities for their youth.

### 1. INTRODUCTION

While broadly, TVET focuses on workplace skills, definitions and conceptions of TVET have evolved over time along with the changing nature of work and industry. The original goal of TVET was to prepare youth to enter the workforce, and this remains prominent in many developing countries, and in countries with high levels of youth unemployment. TVET is an important part of the educational agenda. However, the global technological revolution and innovations in science and technology demands higher levels of education and technological skills for the 21st century. This includes TVET as the world transitions from the Industrial Age to the Information Age and the changing world of work (UNESCO, 2011; USAID, 2014b).

This evolution is highly relevant to education reform agenda. Importantly, in countries' envisaged future, the private sector will or should play a stronger role in driving countries' economies, with education transformation focused on developing skills in order to meet the demands of industry and the workplace. Critical to achieving this,

is the creation of stronger links between the higher and TVET education sectors, and the private sector, in order to ensure the relevance of education qualifications to current and future market trends and needs, and to improve the desirability of private sector jobs for young graduates. This is particularly relevant in developing countries where the public sector has been and still is seen to provide security and a job for life. Once upon time the same could be said for the Gulf countries. However, this trend has changed in recent years.

TVET is usually described as programmes or education which focus on the acquisition of skills and knowledge to prepare for the world of work, or employment (Hollander & Mar, 2009; Winch, 2013). Various terms exist to describe this form of education, such as vocational education and training (VET), apprenticeships, occupational or workplace training, technical education, workforce education, and work-based learning. The term TVET was adopted at the world congress on TVET, held in Seoul 1999, where delegates agreed TVET was the most comprehensive term to use. While broadly, TVET focuses on workplace skills, definitions and conceptions of TVET have evolved over time, along with the changing nature of work and industry as described by UNEVOC (2021). UNEVOC, a combination of UNESCO (the United Nations Educational, Scientific, and Cultural Organisation) and vocational education is UNESCO's global network of TVET institutions.

Originally, the direct preparation for work was the main goal of TVET, and this remains prominent in many developing nations. However, with the technological revolutions and innovations in science and technology, during the 20th century and 21<sup>st</sup> century, new domains of knowledge and new disciplines have become important at all levels of education and training. The current focus is increasingly upon preparing knowledge workers to meet the challenges posed during the transition from the Industrial Age to the Information Age, with its concomitant post-industrial human resource requirements and the changing world of work.

The purpose and goals of TVET are unique to each country based on their particular economic development goals and their current labour market conditions. There is, therefore a lot of variety in the way different countries structure secondary level TVET programmes. However, at a secondary level they generally consist of a combination of school-based and work-based learning, or apprenticeships, which can be done concurrently, such as Norway and Denmark, or in alternating periods (OECD, 2020b), such as Germany and Austria. The OECD is the Organisation for Economic Co-operation and Development, which has 38 member countries and the main goal of stimulating world trade and economic growth.

A TVET, or vocational qualification at secondary level is usually contrasted with an academic or general education qualification. While general education is seen to focus on developing students as individuals and citizens, vocational education is focused on readiness for work, and development of skills. However, successful TVET systems need to offer a more holistic approach, aligned to the broader purpose of education in producing not only skilled workers but also well-rounded, socially responsible citizens. Thus, argues Winch (2013) an important element in making TVET attractive rests on its having relatively porous boundaries with these other aspects of education. Where there is a perceived disconnect between general or academic education, and vocational education, this can make TVET less attractive. Successful TVET systems are embedded within a wider education system, not seen as a separate system or stream, where public education for all has a set of common goals which includes being economically active. While TVET qualifications have a stronger focus on vocational education, it should also have a strong foundation of general education goals and fundamentals.

In terms of its importance, TVET is conceptualised from different perspectives and theories; a human capital approach, sustainable development and social justice approach (Tikly, 2013). A human capital perspective, as reflected by the World Bank, sees TVET as needed to supply the labour market and support economic growth measured through a country's gross domestic product (GDP). A sustainable development perspective, as adopted by UNESCO, focuses on TVET as a means to support not only economic growth but to serve the goals of healthy and sustainable social, economic and environmental systems within countries and globally, including an emphasis on

equality. The importance of TVET is therefore considered as essential, globally, in supporting achievement of the Sustainable Development Goals (Billet, 2018).

At a national or state level, a key purpose of TVET is in supporting economic development and enabling a country to be globally competitive as well as reducing youth unemployment (OECD, 2020b). By extension, TVET can therefore be seen as a vehicle for upward mobility and poverty alleviation for families and communities, and is considered by UNESCO as key to achieving Millennium Development Goals and Education for All.

The primary aim of the research and article is to provide countries with developing and emerging TVET programmes at secondary school level with some models and ideas on how to develop and implement them as intended. The research and content of this article are practical in nature supported by references.

## 2. METHODOLOGY

This article's methodological approach was to address the key question and to select relevant scholarly, policy and practice-based evidence to address the question. The report analysed global practice in the TVET sector. It is important to note that TVET is a relatively under-researched area and that some data is still not as robust as other educational data (OECD, 2020b).

## 3. DISCUSSION

Education transformation is focused on developing skills in order to meet demands of industry and the workplace with an emphasis on the training of youth and supports the participation of youth in the labour market through skills development, in cooperation with the private sector and community organisations. Critical to achieving this is the creation of stronger links between the higher and TVET education sectors and the private sector, in order to ensure the relevance of education qualifications to current and future market trends and needs, and to improve the desirability of private sector jobs for young graduates.

Technical and vocational training strategies recommend those responsible for TVET and its successful implementation recommends those responsible to UNEVOC (2019):

1. Encourage more students to join TVET and participate in the pursuit of sustainable development;
2. Qualify and develop the national workforce in technical and vocational fields, according to labour market needs in terms of quantity and quality;
3. Deliver quality and efficiency-based training programmes that qualify the trainee to find an appropriate job in the labour market;
4. Successfully adapt to and deal with challenges and changes in the labour market, based on research and applied studies;
5. Build strategic partnerships with business sectors in order to implement technical and vocational programmes;
6. Raise the community's awareness of the importance of working in technical and vocational fields, as well as provide the appropriate environment for lifelong learning;
7. Create a safe and motivating environment for working and training at TVET institutions;
8. Encourage investment in private technical and vocational training;
9. Strengthening and integrating relationships with national educational and training institutions; and
10. Expand in areas of advanced training that support national plans, as well as participate in and develop the process of technology transfer.

The common aims in strong and developing systems for strengthening secondary vocational education are to:

- Foster youth employment and entrepreneurship (UNESCO, 2016);

- Acknowledge the changing nature of work and enhance status of technical and vocational education and training to meet these needs (for example, the demand for higher level skills as technology replaces some lower skilled work (World Bank, 2019);
- Consider how technology is shaping jobs and the demand for new skills (World Bank, 2019);
- Promote greater equality of opportunity and especially enhancing girls' and women's access to relevant technical and vocational education and training (UNESCO, 2016);
- Strengthen sustainable societies and greener economies through, for example, digital technologies (UNESCO, 2016);
- Focus on creating future national and global citizens, not just workers (Harbourne, 2012) and create young people's capacities, not simply their technical skills (DeFalco, 2016).

Some common key features of global TVET systems are:

- TVET system and provision are aligned to global developments and educate a whole person as well as a worker.
- TVET qualifications are well regulated and recognised, mostly through a National Qualifications Framework.
- There is sufficient curriculum blending, ladders and pathways, which enable students to make informed choices at various levels of their education.
- A variety of learning opportunities, including digital and on-the-job learning are available.
- Quality of TVET leaders and teachers is high and well regulated.
- Career Advice and Guidance is available for students at critical junctures.
- Partnerships with industry and the private sector are strong and vibrant.
- Financing of TVET at secondary level is sufficient and equitable.
- TVET is aligned with strong national economic policy and goals and there is a body to oversee merging need.

Whilst there are many successful TVET systems across the world, they all face challenges of one kind or another. An analysis of several global report (CEDEFOP, 2018; OECD, 2019, 2020a; UNEVOC, 2015; World Economic Forum, 2020) suggest that the following challenges are most common in implementing successful TVET programmes: increasing the attractiveness of TVET; improving the status and quality of TVET teaching; strengthening TVET teaching; providing pathways to tertiary education; ensuring qualifications have status and material relevance; addressing disconnects between educational programmes and industry needs; responding effectively to global trends and workplace changes; and COVID-19 in its disruption of 'hands on', work-based learning.

There are common key features globally of strong and developing systems for strengthening secondary vocational education.

1. TVET system and provision is aligned to global developments: Environmental sustainability and poverty alleviation are features of many strong systems globally.
2. A National Qualifications Framework: In most strong vocational education systems, the national recognition, respectability and clarity of vocational and technical qualifications are key. Qualifications vary and are most often benchmarked against international standard classification of education levels.
3. Curriculum blending, ladders and pathways: In many of the strongest systems there is a means to avoid narrowing choices permanently and ways of re-joining more general education streams, for example, or opting to pursue higher education routes if desired. In many systems, lower secondary education includes more work-related skills as part of general education for all. In some vocational upper secondary programmes, general skills are included to avoid narrowing a young person's education too early (USAID,

2014a). Throughout the world, TVET is rapidly being integrated into tertiary education and can provide further education options for students to continue their education.

4. A variety of learning opportunities, including digital and on-the-job learning: the strongest systems included opportunities to learn from technical experts in situ included work experience, internships and/or apprenticeships. Some systems provide distinct institutions for upper secondary vocational schooling, and others enable young people to visit workplaces for periods of learning from school (OECD, 2019). Some systems have developed strong digital and online components to TVET and this has been strengthened further during the COVID pandemic (OEP, 2021). OPE is Omnia Education Partnerships Ltd, a Finnish organisation established to offer Finnish education and training solutions around the world. There is a movement within global TVET to enhance digital skills (including artificial intelligence), both as a component of TVET, as well as a means of teaching vocational education. Some systems included a dimension of international learning in their TVET programmes (Yang, 2014) and the use of open education resources (OER) (OECD, 2019).
5. Quality of TVET leaders and teachers: In the most effective systems, teachers and leaders are central to vocational education and training. Vocational teachers require both pedagogical and industry/commercial knowledge to prepare young people for the labour market. Institutional leaders in vocational education play many important roles as strong secondary vocational systems need good governance and quality assurance systems (OECD, 2021).
6. Career advice and guidance: Good secondary vocational education systems provide effective career guidance from the early stages of students' study. This provides students with goals and career ambitions, and they know what is required to achieve core competencies. This results in students having more certainty about their future, increases commitment, and reduces drop-out rates. Partnerships with industry and the private sector: Working with the private sector, industry associations, non-profit organisations, educational institutions, and other non-governmental organisations (NGOs) is beneficial in the development of vocational secondary education. By bringing these stakeholders together to create skills councils information and research on labour market needs can be coordinated, and further partnerships established. These partnerships are essential to providing relevant, high quality training through any TVET system (USAID, 2014a).
7. Financing of TVET: There are three models available. First, government funded; second, private sector funding, be it through companies with their own facilities or private education providers; and third a mix. It must be noted that some developing countries have TVET programmes and institutions by donors, with the intention of these institutions becoming self-sufficient. USAID (2014a) suggests needs based mixed funding models work well.
8. Aligned with strong national economic policy and goals: Demand for these kinds of workplace skills and job opportunities are driven by clear national economic policy which emphasises and develops certain industries over others (Hollander & Mar, 2009). Successful TVET is aligned to economic policy to ensure a match between skills developed and skills in demand, ensuring opportunities for TVET graduates along with employer needs being met. In particular, responsive TVET systems play an important role during times of economic transition where a government may focus on developing or shifting from labour intensive to capital intensive and knowledge intensive industries. For example, South Korea's successful TVET system is seen as a result of it being aligned to responsive to national economic strategy (Tikly, 2013).

#### 4. RECOMMENDATIONS

A significant challenge experienced by many countries is the low image of TVET resulting in students and their parents preferring academic pathways, perceiving them as having higher status. The perceived low status of

TVET remains a challenge in high quality TVET systems. This continues even though the demand for skilled labour increases, demonstrating a mismatch between perceptions of education and skills needed for successful employment. Addressing the image of TVET is critical to a thriving and successful TVET system, for as, [Billet \(2018\)](#) describes:

The consequences of TVET having a low image can be profound. They include how governments, industry, enterprises and communities view, support, fund and engage with TVET programmes. A key and growing concern is that in an era of growing aspiration, this image has negative impacts on young people's and their parents' interest and participation in TVET (p. 5).

A historical barrier to the attractiveness of TVET is that, in many countries, education was only accessible to the elite, with the majority of citizens relying on work-place learning for lower paid jobs. Thus, vocational learning did not include many elements that a broader, general education would include. TVET has therefore been associated with 'non-elite' members of a country's population. TVET has then been associated historically with those classes of society who have to work for a living and who do not partake of the kind of education fit for the gentry, even if the greatest experience and ability is required in order to practise an occupation. Although this view of society and work is obsolete, there still exists an overhang in attitudes around TVET compared to general or academic education. However, with the expansion of education, providing access to all, alongside universal education goals, comes questions around the purpose of education. Education is no longer something that serves a minority elite but the majority, economically dependent population who need to work in order to earn a living.

Another barrier to the attractiveness of TVET emerges when there is a lack of demand from employers. Individuals need to be rewarded for their investment in TVET, they need to be placed in employment that reflects the level of training and skill acquired through a TVET programme. At the same time, employers need to demand and create a need for TVET qualifications. From a business or employer perspective, they are more likely to demand TVET if they find it worthwhile in terms of skill and effectiveness of employees. Investment in TVET by the private sector needs to be supported in their business strategy where they have a demand and can afford and retain high skilled employees. These issues can be overcome through close collaboration between government and the private sector, where companies can be motivated to invest in TVET through schemes such as state subsidy of TVET programmes, or through introducing a 'license to practice' system with minimum qualification requirements.

The symbiotic relationship between TVET systems and industry is particularly important when considering gender equality of opportunity and inclusion. Reforms within TVET can only take place if employers are equally on board. If there is reluctance to employ women and a continued lack of opportunity for them in the workplace, then this will hamper any plans for equality and inclusion through TVET.

Ways to improve the attractiveness of TVET is the focus of much research, policy development and reform projects. For example, at the 2018 UNESCO-UNEVOC (International Centre for Technical and Vocational Education and Training) conference ([Billet, 2018](#)) on the topic, participants stress the importance of stakeholders at all levels of the system being involved in supporting a positive image for TVET. In particular, governments need to ensure adequate resourcing for TVET, engaging stakeholders and reinforcing the employment opportunities it provides, and in ensuring quality teaching through investment in pre-service and in-service training. Community organisations and ci

vil society can play a role in promoting the importance and value of skills development, with connections being made between TVET institutions and local businesses.

The [Apprenticeship Toolbox \(2021\)](#) an alliance between several European countries recommends: marketing campaigns to target potential apprentices and their parents, as well as to potential employers, to communicate the value and benefits of apprenticeships; a focus on quality assurance and excellence; and raising the status of TVET teachers, which gives rise to a further set of challenges.

Evidence-based practices in policy development is also a recommendation, achieved through the identification of key data points through which to monitor and measure progress. As an example, the European Union's Education and Training 2020 strategic framework includes 36 indicators through which to measure progress against TVET goals, included are indicators focusing on student enrolment and completion of TVET programmes, overall and according to sector; TVET public expenditure; employment rate for TVET graduates along with those not in education, employment, or training (NEET) and unemployment rates; workers with skills matched to their jobs (Rawkins, 2018).

Raising the status of TVET teaching is seen as an important element in improving the image of TVET. However, many countries experience a number of challenges with regard to the quality of TVET teaching. These include retention and recruitment, pre-service and in-service training, working conditions. Recommendations and solutions to overcome these challenges again stress the need for stakeholder engagement and collaboration, along with adoption of international frameworks and teaching standards.

Here it is also important to recognise the difference in demands and expectations of TVET teachers compared to those in general or academic education streams. TVET teachers need to maintain close ties with their relevant industries and stay up to date with changing demands and conditions of the workplace, thus needing to be both industry and pedagogical experts. Stronger teacher training (pre-service and in-service) is needed, which recognises the multi-faceted role of the TVET teacher, and is informed by a clear and comprehensive set of standards, improved work conditions through representation within professional associations, facilitation of teachers in collaborating and connecting with wider stakeholders (Rawkins, 2018).

Most successful TVET countries have some kind of national qualification system that ensures that candidate and employers recognise technical and vocational learning. Where there are exceptions to this (for example, the USA) there is state level recognition of qualifications that have relevance and make the material difference to getting employment or not. Given the trend towards enhancing access to tertiary education globally, TVET qualification have suffered in terms of status. As discussed above this is a root cause of much of the lack of attractiveness of TVET and needs to be addressed.

Effective TVET systems rely on a close connect with industry and commerce. A key challenge therefore is maintaining a collaborative, connected system between all stakeholders, especially industry bodies and potential employers. Workplace training and apprenticeship systems, such as the dual system in Germany, is a key vehicle for maintaining this connection. The dual system includes time per week spent in school and in industry placement. Strengthening combined work-based, school-based programmes is recommended as key to TVET reform, bringing with its multiple advantages for state, employers, institutions and individuals (OECD, 2020b). However, finding new placements within industry can present a challenge. Some countries have increased apprenticeship placements through incentivising companies through tax reduction programmes (OECD, 2020b). Constant policy development and stakeholder engagement is required to maintain a quality apprentice system (Apprenticeship Toolbox, 2021).

Pathways to higher levels of learning are likely to be particularly important in the near future. VET students may be particularly at risk here. The OECD predicts that 14% of jobs are at high risk of automation and a further 32% are likely to change radically in the coming years. Recognising the importance of creating opportunities for further learning, many countries have created (or are in the process to create) pathways to higher levels of education for VET graduates.

It is therefore important for countries to consider tertiary education pathways, with secondary level TVET programmes providing eligibility for tertiary programmes. However, transitioning higher education from TVET can present challenges. In many countries tertiary, degree level, completion rates for those having come from a secondary TVET programme are much lower compared to those coming from general secondary education programmes. Some countries have overcome this, such as Iceland, Norway and Sweden, by providing non-tertiary post-secondary options such as one-year courses to increase technical specialisation. It is, however, recommended

that these provide eligibility for university entrance should students wish to move to a tertiary education programme rather than directly entering the labour market.

In their report on trends in new qualifications and competencies for TVET, [UNEVOC \(2021\)](#) note the challenges arising from global trends to which TVET institutions and systems need to respond. These global trends include increased digitisation of the workplace and the transition to sustainable economies, increased migration, growing focus on entrepreneurial learning.

In addressing these challenges through new qualifications and competencies, the following trends have been identified. First, involvement in a broad range of stakeholders, with particularly increased involvement in currently underrepresented groups including NGOs, civil society, youth organisations and individual experts. Second, anticipating and responding to the need for new qualifications and competencies in areas of supporting digitisation and greening, such as, for example, electric vehicle technicians and robot technicians, along with a need for 'non-routine' and higher order competencies.

## 5. COVID-19

While the current COVID-19 situation could be seen as a current exception, it is useful to note the ways that this global crisis has impacted on TVET in that it demonstrates the interdependent nature of TVET and the economy, and also provides lessons and considerations for dealing with any future, similar challenges. The closure of education institutions during lockdown presented particular challenges for vocational programmes where their practical nature is not amenable to online, distance learning. Lockdown also resulted in the disruption to work-placements and apprenticeships, which have further been impacted through economic slowdown with many employers no longer having the financial and human resources to offer apprenticeships. Overcoming these challenges to ensure continuity of learning and enabling students to complete their vocational studies requires proactive intervention from government. In the short term, solutions have included offering financial breaks and extensions to impacted students, offering wage support to apprenticed students and ensuring contact is maintained with their employers, and in exploring alternative ways that students can complete work-based components of their programme. In the long term, investment in TVET align to needs of the economy in recovering from the pandemic slowdown and in mitigating future skills shortages due to current disruptions to vocational programmes ([OECD, 2020b](#)).

The need for a digital policy and component to TVET is essential for two key reasons: increased digitization of the workplace requires a demand for employees with strong digital citizenship along with sector relevant digital skills; and as the COVID-19 pandemic has shown us, digital delivery can increase the robustness of a TVET system, enabling continuation of learning during disruptions and allowing a level of flexibility for students, particularly as they move between classroom-based and work-based learning.

Thus, a TVET digital policy should include a curriculum component where students have the opportunity to acquire necessary skills, as well as a learning delivery component where there is opportunity for students to access learning virtually. However, it is also important to note that a key challenge with TVET and digital learning is that in many courses a large part of the curriculum includes practical skills that cannot be taught or learned online. Hybrid or blended learning models are therefore recommended where online course delivery of some components is combined with site-based face-to-face sessions. It is also important to note that successful digital learning relies on the establishment of an enabling eco-system which requires medium to long term planning and investment. This includes ensuring necessary connectivity and infrastructure is in place, that students have connectivity and access to devices, and that teachers receive the necessary training and support. In addition, digital learning should be meaningfully built into the curriculum to avoid a digital for digital's sake force-fitting into existing programmes.

Finland provides a useful case study demonstrating how existing digital policies and practice enabled their TVET sector to quickly and effectively transition to digital learning in response to the 2020 COVID-19 institution



closures. Over the last decade, Finland has established a strong TVET digital learning ecosystem which includes: regular and consistent teacher professional development on effective digital learning methodology and classroom practices; encouraging TVET providers to develop digital strategies which included training, transitioning to cloud-based systems and device policy; and the development and use of online learning programmes and solutions.

There were limitations to the study. First, the word limit for the article. This contributed to the second limitation, which was not providing an investigation on countries with leading TVET in secondary schools' programmes. Such countries include Australia, Finland, Germany, America, and many European countries. Third, the researchers were not able to provide details on countries with emerging TVET in secondary schools' programmes. The second and third limitations provide prospects for further research including lesson learned by country.

## 6. CONCLUSION

The article pointed to a number of practical, achievable and, where relevant, scalable recommendations as outlined above. Within the recommendation are pointers to further research which will strengthen the impact of TVET on learner outcomes, life chances and the national vision, which is, after all, the purpose of the reform.

There are strong foundations upon which to build a strengthened TVET secondary system. Countries are not alone in facing challenges in developing this sector. TVET faces many challenges globally. However, countries with vision, governance, and planning documents allow for reforms and implementation of TVET programmes. has a head start. Perhaps the most challenging dimension of any TVET reform or implementation is to attract and maintain students within the sector. Hopefully global growth will begin to increase again in all countries, increasingly valuing advanced technical and vocational skills. This is a good time to place great emphasis – and status – on TVET skills and jobs. Gone are the days when TVET should be associated with low status blue collar work. Now is the time to place TVET at heart of education and human and economic development. The Fourth Industrial Revolution provides just that opportunity for all countries, particularly in developing and emerging countries.

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