

Vocational Education and Skill Training: Aligning Education with Industry Needs

*Dr. Archana Singh

Abstract

Vocational education is education that prepares people to a skilled craft as an **artisan**, trade as a **tradesperson**, or work as a **technician**. Vocational education can also be seen as that type of education given to an individual to prepare that individual to be gainfully employed or self-employed with requisite skill. Vocational education is known by a variety of names, depending on the country concerned, including career and technical education, or acronyms such as **TVET** (technical and vocational education and training) and **TAFE** (technical and further education). A **vocational school** is a type of educational institution specifically designed to provide vocational education. Vocational education can take place at the **post-secondary**, **further education**, or **higher education** level and can interact with the **apprenticeship** system. At the post-secondary level, vocational education is often provided by highly specialized **trade schools**, **technical schools**, **community colleges**, colleges of further education (UK), **vocational universities**, and **institutes of technology** (formerly called polytechnic institutes).

Keywords-vocational, education, skill, training, career, education, trade.

Introduction

Historically, almost all vocational education took place in the classroom or on the job site, with students learning trade skills and trade theory from accredited instructors or established professionals. However, in recent years, online vocational education has grown in popularity, making learning various trade skills and soft skills from established professionals easier than ever for students, even those who may live far away from a traditional vocational school. Trends have emerged in the implementation of **TVET** and **skills** development worldwide. From the late 1980s onwards a number of **governments** began to emphasise on the role of education in preparing learners effectively for the world of work. This school of thought, termed "new vocationalism", placed the skills needs of industry at the centre of discussions on the purpose of **public education**. TVET and skills development were viewed as an important component in promoting **economic growth** in general and addressing youth **unemployment** in particular. General education systems had not been effective in developing the skills that many **adolescents** and adults needed to secure employment in industry. The late 1980s and early 1990s saw the introduction and expansion of new vocational **curricula** and courses, often developed in collaboration with industry, and an increase in the variety of work-based learning routes on offer to young people.

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Opinions and models

[Wilhelm von Humboldt](#)'s educational model goes beyond vocational [training](#). In a letter to the Prussian king, he wrote: "There are undeniably certain kinds of knowledge that must be of a general nature and, more importantly, a certain cultivation of the mind and character that nobody can afford to be without. People obviously cannot be good craftworkers, merchants, soldiers or businessmen unless, regardless of their occupation, they are good, upstanding and – according to their condition – well-informed human beings and citizens. If this basis is laid through schooling, vocational skills are easily acquired later on, and a person is always free to move from one occupation to another, as so often happens in life. The philosopher [Julian Nida-Rümelin](#) criticized discrepancies between Humboldt's ideals and the contemporary European education policy, which narrowly understands education as a preparation for the [labor market](#), and argued that we need to decide between "[McKinsey](#)", to describe vocational training, and Humboldt.

Discussion

Finland

In [Finland](#), vocational education belongs to secondary education. After the nine-year comprehensive school, almost all students choose to go to either a [lukio](#) (high school), which is an institution preparing students for tertiary education, or to a vocational school. Both forms of secondary education last three years,[\[13\]](#) and give a formal qualification to enter university or [ammattikorkeakoulu](#), i.e., Finnish polytechnics. In certain fields (e.g., the police school, [air traffic control](#) personnel training), the entrance requirements of vocational schools include completion of the lukio, thus causing the students to complete their secondary education twice.

The education in vocational school is free, and students from low-income families are eligible for a state student grant. The curriculum is primarily vocational, and the academic part of the curriculum is adapted to the needs of a given course. The vocational schools are mostly maintained by [municipalities](#). After completing secondary education, one can enter higher vocational schools (ammattikorkeakoulu, or AMK) or universities. It is also possible for a student to choose both lukio and vocational schooling. The education in such cases lasts usually from three to four years.

Germany

Vocational education in [Germany](#) is based on the [German model](#). A law (the Berufsausbildungsgesetz) was passed in 1969 which regulated and unified the vocational training system and codified the shared responsibility of the state, the unions, associations and Industrie- und Handelskammer (chambers of trade and industry). The system is very popular in modern Germany: in 2001, two-thirds of young people aged under 22 began an apprenticeship, and 78% of them completed it, meaning that approximately 51% of all young people under 22 have completed an apprenticeship. One in three companies offered apprenticeships in 2003; in 2004 the government signed a pledge with industrial unions that all companies except very small ones must take on apprentices. From 2010 to 2022, the number of young people starting dual vocational

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training, has fallen. In recent years, Germany has invested a great deal of money to keep young people in the school system as long as possible.

Greece

In [Greece](#), vocational education and training (VET) is usually for [lyceum](#) (senior high school) graduates and is provided by public or private [Institute of Vocational Training \(IEK\)](#) (IEK, the Greek abbreviation for the Ινστιτούτο Επαγγελματικής Κατάρτισης). The IEK course offerings are [adult education](#) only, except at times when it is rarely offered a course for non-adult students. The duration of study is two-and-a-half academic years full-time, 2 ½ years. 4 semesters in-school education and 1 semester being known as curricular [practicum](#) or on-the-job placement or [internship](#), both involve a legal contract between the employer and the student-trainee on the job placement and provide a combination of school-based training and workplace practicum. Public IEKs are government-funded with [free education](#), and it can be attended without tuition fee.

Hong Kong

In [Hong Kong](#), vocational education is usually for post-secondary 6 students. The Hong Kong Institute of Vocational Education (IVE) provides training in nine different vocational fields, namely: applied science, business administration, child education and community services, construction, design, printing, textiles and clothing, hotel service and tourism studies, information technology, electrical and electronic engineering, and mechanical, manufacturing and industrial engineering.

Hungary

Normally at the end of elementary school (at age 14) students are directed to one of three types of upper secondary education: one academic track (gymnasium) and two vocational tracks. Vocational secondary schools (szakgimnázium) provide four years of general education and also prepare students for the maturata (school leaving certificate). These schools combine general education with some specific subjects, referred to as pre-vocational education and career orientation. At that point many students enroll in a post-secondary VET programme often at the same institution a vocational qualification, although they may also seek entry to tertiary education.

Vocational training schools (szakiskola) initially provide two years of general education, combined with some pre-vocational education and career orientation, they then choose an occupation, and then receive two or three years of vocational education and training focusing on that occupation—such as bricklayer. Students do not obtain the maturata but a vocational qualification at the end of a successfully completed programme. Demand for vocational training, both from the labour market and among students, has declined while it has increased for upper secondary schools delivering the maturata.

India

[Vocational training in India](#) historically has been a subject handled by the [Ministry of Labour](#), other [central ministries](#) and [various state-level organizations](#). To harmonise the variations and

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multiplicity in terms of standards and costs, the [National Skills Qualification Framework](#) was launched in December 2013.

The National Skills Qualifications Framework (NSQF) is a competency-based framework that organises all qualifications according to a series of levels of knowledge, skills and aptitude. These levels, graded from one to ten, are defined in terms of learning outcomes which the learner must possess regardless of whether they are obtained through formal, non-formal or informal learning. NSQF in India was notified on 27 December 2013. All other frameworks, including the NVEQF (National Vocational Educational Qualification Framework) released by the [Ministry of HRD](#), stand superseded by the NSQF.

In November 2014 the new Government in India formed the [Ministry of Skill Development and Entrepreneurship](#). Articulating the need for such a Ministry, the Prime Minister said, "A separate Ministry, which will look after promoting entrepreneurship and skill development, would be created. Even developed countries have accorded priority to promoting skilled manpower".

As a continuation of its efforts to harmonise and consolidate skill development activities across the country, the Government launched the 1st [Skill India](#) Development Mission (NSDM) on 15 July 2015. Also launched on the day was the National Policy for Skill Development & Entrepreneurship. Today all skill development efforts through the Government ([Directorate General of Training](#)) and through the Public Private Partnership arm ([National Skill Development Corporation](#)) are carried out under the Ministry, through the Skill India Mission. The Ministry works with various central ministries and departments and the State government in implementing the NSQF across all Government funded projects, based on a five-year implementation schedule for complete convergence.

The involvement of the private sector in various aspects of skill development has enhanced access, quality, and innovative financing models leading to sustainable skill development organisations on the ground. The short-term skill development programs (largely offered by private organisations) combined with the long-term programs offered by the Indian technical institutes (ITIs) complement each other under the larger framework. Credit equivalency, transnational standards, quality assurance and standards are being managed by the Ministry through the National Skill Development Agency (an autonomous body under the Ministry) in close partnership with industry-led sector-specific bodies (Sector Skill Councils) and various line ministries. India has bilateral collaboration with governments including those of the UK, Australia, Germany, Canada, and the UAE, with the intention of implementing globally acceptable standards and providing the Indian workforce with overseas job mobility.

Israel

[Israel](#) offers a post-high school college education system for technical occupations and engineering, aimed at high-school graduates of technological tracks. Students demonstrating technological potential in schools supervised by the [Ministry of Labor, Social Affairs, and Services](#) (MOLSA) may avail themselves of the MENTA Program, which provides scholastic, emotional, and social support throughout their high school and college studies. This support helps students meet the scholastic

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challenges and demands of the vocational track and, via the program, strives to expand both the number of youth continuing through college Grades 13-14 and the percentage eligible for a diploma at the end of their studies. The program was formulated by JDC-Ashalim in cooperation with the HEZNEK organization, the [Ministry of Education](#), the [Ministry of Economy](#) (and subsequently, MOLSA), and by education networks operating schools. A 2016-17 formative evaluation of MENTA found that the program was successful in helping students complete their matriculation, strengthen their sense of [self-efficacy](#), and create for themselves a picture of the future. At the same time, the findings suggested that program better clarify the target population, improve the supports for transition to college, and more clearly define the scope of the coordinators' role.

Japan

[Japanese](#) vocational schools are known as senmon gakkō. They are part of Japan's [higher education](#) system. They are two-year schools that many students study at after finishing high school (although it is not always required that students graduate from high school). Some have a wide range of majors, others only a few majors. Some examples are [computer technology](#), [fashion](#), and [English](#).

South Korea

Vocational high schools offer programmes in five fields: agriculture, technology/engineering, commerce/business, maritime/fishery, and home economics. In principle, all students in the first year of high school (10th grade) follow a common national curriculum, in the second and third years (11th and 12th grades) students are offered courses relevant to their specialisation. In some programmes, students may participate in workplace training through co-operation between schools and local employers. The government is now piloting Vocational Meister Schools in which workplace training is an important part of the programme. Around half of all vocational high schools are private. Private and public schools operate according to similar rules; for example, they charge the same fees for high school education, with an exemption for poorer families.

The number of students in vocational high schools has decreased, from about half of students in 1995 down to about one-quarter today. To make vocational high schools more attractive, in April 2007 the Korean government changed the name of vocational high schools into professional high schools. With the change of the name the government also facilitated the entry of vocational high school graduates to colleges and universities.

Most vocational high school students continue into tertiary education; in 2007 43% transferred to junior colleges and 25% to university. At tertiary level, vocational education and training is provided in junior colleges (two- and three-year programmes) and at polytechnic colleges. Education at junior colleges and in two-year programmes in polytechnic colleges leads to an Industrial associate degree. Polytechnics also provide one-year programmes for craftsmen and master craftsmen and short programmes for employed workers. The requirements for admission to these institutions are in principle the same as those in the rest of tertiary sector (on the basis of the College Scholastic Aptitude Test) but candidates with vocational qualifications are given priority in the admission

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process. Junior colleges have expanded rapidly in response to demand and in 2006 enrolled around 27% of all tertiary students.

95% of junior college students are in private institutions. Fees charged by private colleges are approximately twice those of public institutions. Polytechnic colleges are state-run institutions under the responsibility of the Ministry of Labour; government funding keeps student fees much lower than those charged by other tertiary institutions. Around 5% of students are enrolled in polytechnic colleges.

Malaysia

Skills training are no longer depicted as second-class education in [Malaysia](#). There are numerous vocational education centres here including vocational schools (high schools to train skilled students), technic schools (high schools to train future engineers) and vocational colleges all of them under the Ministry of Education. Then there are 33 [polytechnics](#) and 86 community colleges under the Ministry of Higher Education; 10 MARA Advanced Skills Colleges, 13 MARA Skills Institutes, 286 GIATMARAs under Majlis Amanah Rakyat (MARA) and 15 National Youth Skills Institutes under Ministry of Youth and Sports. The first vocational institute in Malaysia is the [Industrial Training Institute of Kuala Lumpur](#) established in 1964 under the Manpower Department. Other institutes under the same department including 8 Advanced Technology Training Centres, one Centre for Instructor and Advanced Skill Training, one Japan-Malaysia Technical Institute and the other 21 ITIs.

Mexico

In [Mexico](#), both federal and state governments are responsible for the administration of vocational education. Federal schools are funded by the federal budget, in addition to their own funding sources. The state governments are responsible for the management of decentralised institutions, such as the State Centres for Scientific and Technological Studies (CECyTE) and Institutes of Training for Work (ICAT). These institutions are funded 50% from the federal budget and 50% from the state budget. The state governments also manage and fund "decentralised institutions of the federation", such as CONALEP schools.

Compulsory education (including primary and lower secondary education) finishes at the age of 15 and about half of those aged 15-to-19 are enrolled full-time or part-time in education. All programmes at upper secondary level require the payment of a tuition fee. The upper secondary vocational education system in Mexico includes over a dozen subsystems (administrative units within the Upper Secondary Education Undersecretariat of the Ministry of Public Education, responsible for vocational programmes) which differ from each other to varying degrees in content, administration, and target group. The large number of school types and corresponding administrative units within the Ministry of Public Education makes the institutional landscape of vocational education and training complex by international standards.

Vocational education and training provided under the Upper Secondary Education Undersecretariat includes three main types of programme:

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"Training for work" (formación para el trabajo) courses at ISCED 2 level are short training programmes, taking typically three to six months to complete. The curriculum includes 50% theory and 50% practice. After completing the programme, students may enter the labour market. This programme does not provide direct access to tertiary education. Those who complete lower secondary education may choose between two broad options of vocational upper secondary education at ISCED 3 level. Both programmes normally take three years to complete and offer a vocational degree as well as the bacculaureate, which is required for entry into tertiary education.

The title "technical professional - bacculaureate" (profesional técnico — bachiller) is offered by various subsystems though one subsystem (CONALEP) includes two thirds of the students. The programme involves 35% general subjects and 65% vocational subjects. Students are required to complete 360 hours of practical training. The programme awarding the "technological bacculaureate" (bachillerato tecnológico) and the title "professional technician" (técnico profesional) is offered by various subsystems. It includes more general and less vocational education: 60% general subjects and 40% vocational subjects.

Netherlands

Nearly all of those leaving lower secondary school enter upper secondary (vocational) education (Middelbaar BeroepsOnderwijs, MBO), and around 50% of them follow one of four vocational programmes; technology, economics, agricultural, personal/social services & health care. These programmes vary from 1 to 4 years (by level; only level 2, 3 and 4 diplomas are considered formal "start qualifications" for successfully entering the labour market). The programmes can be attended in either of two pathways. One either involving a minimum of 20% of school time (apprenticeship pathway; BBL-BeroepsBegeleidende Leerweg) or the other, involving a maximum of 80% schooltime (BOL -BeroepsOpleidende Leerweg). The remaining time in both cases is apprenticeship/work in a company. So in effect, students have a choice out of 32 trajectories, leading to over 600 professional qualifications. BBL-Apprentices usually receive a wage negotiated in collective agreements. Employers taking on these apprentices receive a subsidy in the form of a tax reduction on the wages of the apprentice. (WVA-Wet vermindering afdracht). Level 4 graduates of senior secondary VET may go directly to institutes for Higher Profession Education and Training (HBO-Hoger beroepsonderwijs), after which entering university is a possibility. This co-existence of upper secondary (MBO) and higher professional (HBO) education creates opportunities for further education and development, as well as a tension in the labour market because many vocations can be studied at various levels, and employers may prefer higher educated employees. The social partners participate actively in the development of policy. As of January 1, 2012 they formed a foundation for Cooperation Vocational Education and Entrepreneurship (St. SBB – stichting Samenwerking Beroepsonderwijs Bedrijfsleven; www.s-bb.nl). Its responsibility is to advise the Minister on the development of the national vocational education and training system, based on the full consensus of the constituent members (the representative organisations of schools and of entrepreneurship and their centres of expertise). Special topics are Qualification & Examination, Apprenticeships (BPV-Beroepspraktijkvorming) and (labourmarket) Efficiency of VET. The Centres of Expertices are linked

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to the four vocational education programmes provided in senior secondary VET on the content of VET programmes and on trends and future skill needs. The Local County Vocational Training (MBO Raad www.mбораad.nl) represents the VET schools in this foundation and advise on the quality, operations and provision of VET.

New Zealand

[New Zealand](#) is served by 11 Industry Training Organisations (ITO). The unique element is that ITOs purchase training as well as set standards and aggregate industry opinion about skills in the labour market. Industry Training, as organised by ITOs, has expanded from apprenticeships to a more true lifelong learning situation with, for example, over 10% of trainees aged 50 or over. Moreover, much of the training is generic. This challenges the prevailing idea of vocational education and the standard layperson view that it focuses on apprenticeships. One source for information in New Zealand is the Industry Training Federation. Another is the Ministry of Education. Polytechnics, Private Training Establishments, Wananga and others also deliver vocational training, amongst other areas.

Nigeria

The educational system or structure of [Nigeria](#) has been changing over time. In the 1970's, the Nigerian educational system was 6-5-4. This changed as time passed, between 1980 and 2005, it was changed to 6-3-3-4. 2008 saw another educational system review to 9-3-4 system of education. All these reviews are shown in the National Policy on Education. Due to the type of education Nigeria inherited from her colonial masters, education in the 1960's were more book oriented.

Conclusions

Knowledge concerning occupational practices (i.e. non-teaching) also requires a base of disciplinary or theoretical know-how that may be explicit and a process of application to specific work contexts and the environment it operates in (Bernstein 1996; Loo 2012). This occupational knowledge base also includes knowledge of procedures, skills (e.g. interpersonal and intrapersonal ones which are usually tacit), techniques, transversal abilities, project management abilities, personal capabilities and occupational capacity/awareness (Eraut 2004; Winch 2014). This knowledge base is a wider spectrum than a pedagogic one.

These two forms of knowledge – pedagogic and occupational – may be applied through the processes of recontextualization (Bernstein 1996; van Oers 1998; Barnett 2006, Evans et al. 2010, Loo 2012, 2014). The knowledge forms can be changed through selecting, relocating and refocusing aspects when used in another setting. In particular, the recontextualization processes regarding content (relating to specifications of a programme), pedagogic (relating to teaching activities), occupational (relating to working activities), and work (relating to the systems and processes that are specific to a workplace or organisation). From the initial teaching and occupational dimensions, the final modified know-how of Occupational Pedagogic Knowledge or Occupational Teachers' Capacities is formed via content recontextualization, pedagogic recontextualization, occupational recontextualization, and integrated applied recontextualization (IAR). There are also relevant concepts that offer insights to the application of teaching and occupational know-how. These include knowledgeable practice

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(Evans 2016), practice architecture (Kemmis and Green 2013), and Systems 1 and 2 (Kahneman 2012). For a detailed description of the theoretical framework, please refer to Chapter 4 in *Teachers and Teaching in Vocational and Professional Education* (Loo, 2018). The conceptual framework of the occupational pedagogy of teachers is illustrated on page 50 (Loo 2018).

The analysed empirical data is discussed in the separate sections of TVET, higher and professional education courses, five case studies of fashion and textiles, airline industry, dental hygiene, clinical training in emergency medicine and doctors, and a comparison chapter. These chapters offer critical understandings of how pedagogic and occupational know-how are acquired and applied in highly contextualized pedagogic and occupational contexts culminating in the use of teaching strategies/approaches in teaching sessions.

The observations from this investigation include (Loo 2018): 1. There are programme pathways to occupational work 2. Occupational pathways are more direct for work-related provisions at higher academic levels than those at the TVET level 3. Two strands of practices exist at the outset: teaching and occupational where "basic" disciplinary or theoretical knowledge is used to provide occupational relevance to pedagogic and work-related areas 4. IAR process provides a critical understanding of how the modified teaching, occupational and work capacities are combined to inform the application of appropriate teaching strategies to specific pedagogic settings 5. Users acquire the occupational capacities over the course duration, and they include abilities, capabilities, dispositions, experiences, judgement, knowledge, protocols, skill sets and techniques 6. Deliverers require the relevant occupational experiences to teach on work-related programmes, and continuous professional development is needed for deliverers to maintain their ongoing professionalism in the two practice strands of teaching and work

Finally, this investigation has implications for teachers, managers and policymakers of occupational courses. For teachers, these include insights of the sources and types of knowledge that are acquired, recontextualized and applied for teaching and working in the related occupational areas. Managers need to empathise with the deliverers and support their professional needs, and policymakers need to acknowledge the complexities of teaching in occupational programmes and that the curriculum, professional staff and institution are adequately supported (Loo 2018).

***Associate Professor
Department of Business Administration
Government College, Jaipur (Raj.)**

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