



# EXCELLENT

The Way to Be Outstanding

Technological and Vocational Education in Taiwan, Republic of China, 2016

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## Foreword by the Minister



Cultivating excellence plays a crucial role in national development. Technological and vocational education (TVE) has played a major role in training the skilled workforce to develop national infrastructure, driving economic development in step with social development and the industrial upgrading of our country, and contributing greatly to Taiwan's economic miracle. The goal of TVE is to give students the knowledge and practical skills that enable them to help industry bring innovative ideas to life, and create value.

The Ministry of Education began implementing Phase 1 of the Technological and Vocational Education Reform Program in 2009. Phase 2 began in 2013 and will continue on to 2017. Its ten key strategies are designed to further advance TVE; connect what's learnt on campuses with actual workplace practices and needs; create regional industry-academy cooperation centers providing industry communication platforms and partnering mechanisms; and accelerate the commercialization of the results of R&D undertaken by TVE educational institutions.

The Technological and Vocational Education Act was promulgated by the President and came into effect on January 14, 2015, a new milestone. Our hope is to build a TVE environment that nurtures people's learning capacity, mobility, and employability. This is a cornerstone of ongoing national economic development and innovation, and the development of useful practical expertise is therefore the major training focus of TVE. To meet this goal, TVE higher education institutions are being encouraged and assisted to develop more practical courses, improve their admission channels for students, and have their teaching staff undertake advanced industry-specific workshops. The quality of vocational and technological teaching and learning is constantly improving. Excellent TVE college and university environments are being created, and universities of science and technology are providing environments for industry innovation and R&D. An improved assessment system for TVE institutions of higher education — which differ from general universities — is allowing them to develop their distinct strengths, and improve the overall competitiveness of technological and vocational education.

A key focus of Taiwan's 12-year Basic Education program and our TVE is counseling and guiding students to help them understand and identify their own aptitudes and interest, and to select the best education pathway to bring out their potential and prepare them for a suitable future career. A diversified range of education pathways and programs is provided to cater to and develop students' different capacities. The Ministry of Education also asks educational institutions to put in place clear curriculum planning mechanisms, and provide 'practical teaching, practice, and 'hands-on' learning, in order to achieve the goal of learning useful practical skills.

The Ministry of Education has published "Excellence – The Way to Be Outstanding" to give people from all walks of life a complete picture and a fuller appreciation of what TVE in Taiwan encompasses, and the direction of our future policy in this vital area. We hope that more students with technical skills and aptitude will pursue some form of TVE, in accordance with their own interests, aptitude, and abilities. And we encourage and welcome more partners from the business and industry sector to join us and work together, innovating and advancing TVE in Taiwan, so that it will continue to scale higher peaks.

Minister of Education

*Wen Chung Pan*

## Foreword by the Director General



Taiwan's technological and vocational education (TVE) system has been moving continuously forward for more than half a century now. The development of TVE has provided the high-quality skilled workforce for Taiwan's economic development, and it is widely recognized as the driving energy that helped create Taiwan's economic miracle, and social progress and prosperity. On one hand, the content and teaching methodologies of Taiwan's TVE need to constantly advance and stay in step with our changing times. On the other hand, TVE needs to always be aware of and responsive to the requirements of its social environment so it can best achieve the objective of being equipping students with skills that are practical and applicable.

In recent years, we have been reengineering every aspect of TVE — including overall system adjustment; curriculum revitalization; and strengthening its employment focus— to ensure our TVE graduates are competitive in the job market. We are also vigorously promoting industry-academia programs, where the industry and TVE sectors link hands to achieve a genuinely seamless integration of their strengths, and the results of education are directly 'put to work' in industry settings.

Our annual implementation objectives are to focus on shortening the gap between learning and practical application, to train and educate the future technological and vocational skilled professionals, and to construct learning environments that integrate industry, study, and research, and thereby give impetus to local economic growth, connect internationally, and interact more closely with Southeast Asia.

This booklet presents a concise outline of the historical development of Taiwan's TVE and details its current status, its distinctive features and focal areas, and what we see for Taiwan's TVE sector as we look forward. It provides useful information for readers, and an understanding of the unstinting efforts and dedication of my TVE colleagues. I believe that the general public's appreciation of the importance of TVE and their advice are the greatest source of encouragement for us to continue working hard on elevating the quality of TVE in Taiwan.

Wishing you all the best!

Director General,  
Department of Technological and Vocational Education,  
Ministry of Education

*Yang Yu-Huei*





## An Overview of Technological and Vocational Education

Taiwan's government attaches very great importance to technological and vocational education (TVE), given the strong ties between TVE and economic development, and is working to boost the significant contribution that TVE can make to Taiwan's economic development and prosperity.

### Development of Technological and Vocational Education in Taiwan

Taiwan's economic planning and development is closely related to the development of TVE (see Table 1).

The government began to press forward economic development plans in the 1950s, starting with advancing sweeping improvements in agricultural production technologies, and actively developing labor-intensive essential goods industries. At that time TVE's primary role was providing agriculture-related and business-related

Years	Economic Development Focus	Technological and Vocational Education Developments	Student Enrollment Ratio between Vocational High Schools and Regular High Schools
1950s	<ul style="list-style-type: none"> <li>Successful land reform</li> <li>Increased agricultural production</li> <li>Development of labor intensive essential goods industries</li> </ul>	<ul style="list-style-type: none"> <li>Agriculture &amp; Business were the core education focus</li> <li>Major emphasis on Senior Vocational Schools</li> </ul>	4 : 6
1960s	Expansion of foreign trade development	<ul style="list-style-type: none"> <li>Development of industry &amp; business related vocational education</li> <li>Nine-year compulsory education implemented</li> <li>Increased number and range of vocational education departments</li> <li>Five-year and two-year junior college education started</li> </ul>	4 : 6
1970s	<ul style="list-style-type: none"> <li>Ten major construction projects implemented</li> <li>Development of capital and technology-intensive industries</li> </ul>	<ul style="list-style-type: none"> <li>Technical, vocational, and junior college education improved</li> <li>Institutes of technology established</li> </ul>	6 : 4
1980s	<ul style="list-style-type: none"> <li>Development of High-tech Industries</li> <li>Development of petrochemical industry</li> </ul>	Overall quality and scale of technical, vocational, and junior college education enhanced	7 : 3
1990s	<ul style="list-style-type: none"> <li>Development of knowledge-based economy</li> <li>Planning of Asia-Pacific Regional Operations Center</li> </ul>	<ul style="list-style-type: none"> <li>Start of comprehensive high schools</li> <li>Additional institutes of technology</li> <li>Junior colleges with outstanding performance restructured into institutes of technology</li> <li>Outstanding institutes of technology with become universities of science and technology</li> </ul>	5 : 5
2000s	Development of Two Trillion and Twin Star Industries	<ul style="list-style-type: none"> <li>Comprehensive development of Technological and Vocational Education</li> <li>Internationalization of Technological and Vocational Education</li> </ul>	5 : 5
2010s	Promotion of: <ul style="list-style-type: none"> <li>Six major emerging industries</li> <li>Ten major service industries</li> <li>Four major intelligent industries</li> </ul>	Development of students' aptitudes to produce a skilled adaptable workforce to meet business demand	6 : 4

Table 1 Economic Development and Technological & Vocational Education Developments

programs at vocational schools. The focus was on training the people with entry-level technical workplace skills needed for the country's growing economic development.

In the 1960s, Taiwan's economy entered a period of export expansion. Small and medium enterprises were flourishing and there was a great demand for skilled workers for both industry and business. This led to fewer students attending agricultural vocational schools and a substantial increase in the numbers of students at industrial and commercial vocational schools.

Taiwan began implementing nine-year compulsory education in 1968. Junior vocational schools were abolished but the number of vocational schools at senior secondary level rapidly expanded. In order to meet the needs of the industry sector upgrading underway, the Ministry of Education also encouraged the setting up of private vocational schools and private junior college level education, to provide an adequate mid-level skilled labor force for Taiwan's economic transformation.

In the 1970s, the transition of traditional industries into capital and technology-intensive industries began. This development was accompanied by an ongoing demand for an expanded workforce with increasingly high quality skills.

To further improve the quality of post-secondary TVE, the Ministry of Education established its Department of Technological and Vocational Education in 1973, and National Taiwan Institute of Technology, Taiwan's first institute of technology was established in 1974. This was the beginning of the current comprehensive TVE sequence: vocational high school → junior college → institute of technology.

In the 1980s, the government gradually increased the ratio between the number of students undertaking senior secondary vocational education and the number of students at general senior high schools, reaching its goal of 7 : 3. The vocational high schools (all at senior secondary level) trained large numbers of workers, allowing Taiwan's economy to grow rapidly. In the mid-1980s, economic development began facing tremendous

challenges from internationalization and the open market, and the demand for workers with higher level technological and vocational skills increased dramatically. In response, in 1996 the government encouraged outstanding junior colleges to change their institutional status and become institutes of technology, and encouraged outstanding institutes of science and technology to rename themselves as universities of science and technology to facilitate the work of training highly skilled people to meet the needs of industry and ongoing developments of the times.

In 2009, the government began actively promoting further R&D and innovation, increased value of industries, and greater international competitiveness in the services sector, in the following areas: 1. Six key emerging industries: biotechnology, culture & creation, green energy, high-end agriculture, medicine & health care, and tourism; 2. Four key smart industries: cloud computing, intelligent electric cars, intelligent green buildings, patenting and commercialization of inventions; and 3. Ten key service industries: Chinese e-commerce, exhibitions and conventions, health care internationalization, higher education export, innovation and venture capital, international logistics, internationalization of Taiwan's cuisine, pop music and digital content, urban renewal, and WIMAX. TVE cooperates with industry and fully supports industry development being focused on by the country by training and educating highly skilled professionals with key competencies that can be put to work to help create a new wave of national prosperity.

### Technological and Vocational Education Administrative System

The Executive Yuan is the highest body in charge of the administration of Taiwan's education system (see Figure 1). Under the Executive Yuan, the Ministry of Education is the body in charge of national education, and the Department of Technological and Vocational Education is the unit within the Ministry of Education, responsible for administration of Taiwan's TVE. It is directly in charge of supervising all universities of science and technology, institutes of technology, and junior colleges. The Department of

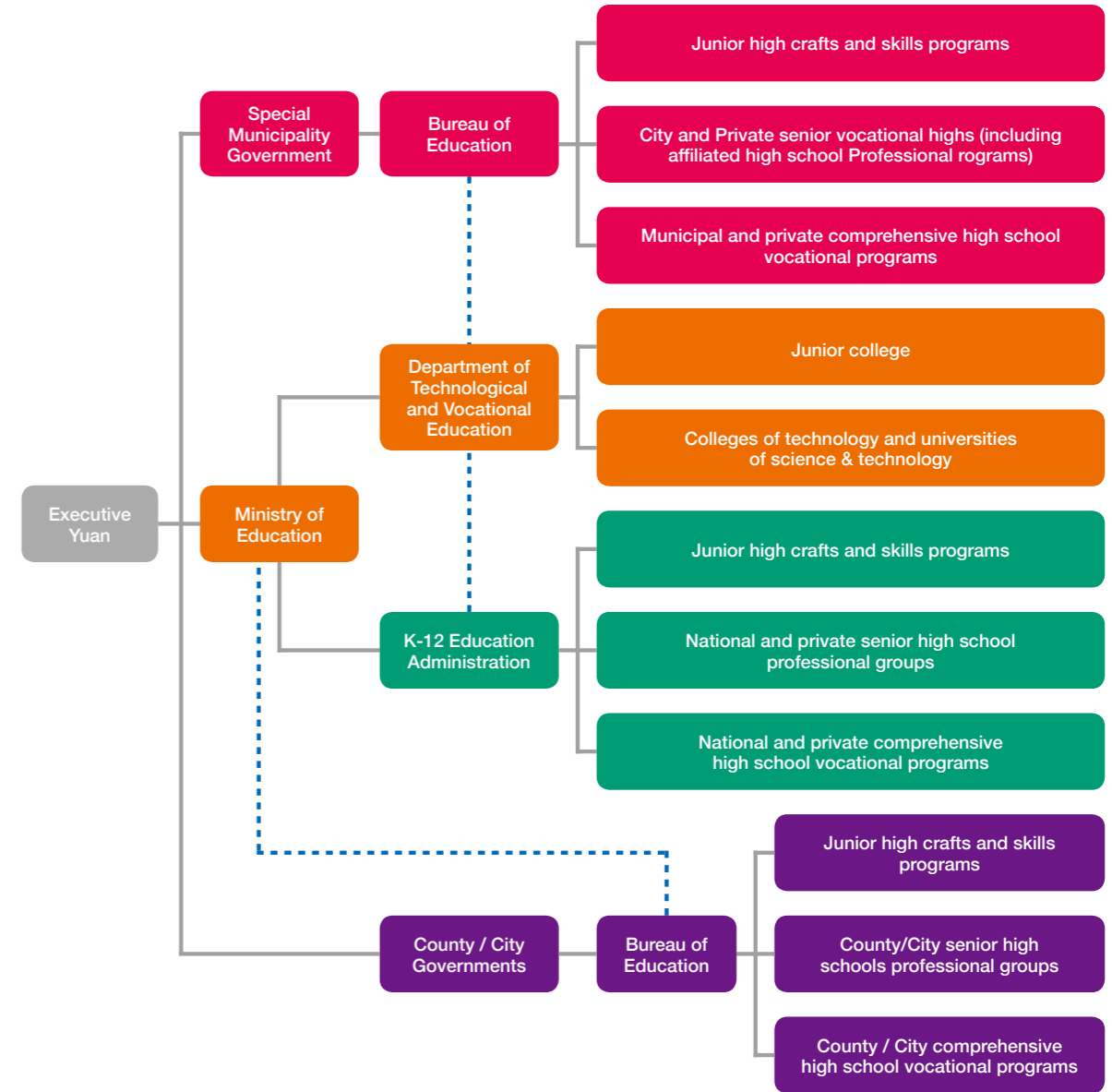


Figure 1 The Administrative Structure of TVE

Education of each special municipality government (special municipalities are directly under the Executive Yuan) is responsible for the supervision and management of secondary TVE matters within its jurisdiction. TVE at secondary education level, the K-12 Education Administration of the Ministry of Education is responsible for the supervision of the national senior high schools, junior high schools affiliated with

national schools, and private senior high schools of municipalities (not including schools in the so-called 'special municipalities' which are under the Executive Yuan). Each county or city has a Department of Education that is responsible for the supervision of the vocational education at the senior high schools, technological skill education, and associated matters within its jurisdiction.

**Taiwan's Technological and Vocational Education System - Figures and Tables**

Above the junior high school level, Taiwan's education system is divided into two major categories: a general education system and the TVE system (see Figure 2). TVE is divided into two stages: secondary-level TVE and "higher TVE" at the post-secondary level. Skills education is provided in junior high schools, and at the senior secondary level, TVE is provided by vocational high schools, by vocational area divisions affiliated to a general senior high school, and by vocational programs at comprehensive senior high schools. At the post-secondary higher education stage TVE is provided by

junior colleges, institutes of technology, and universities of science and technology.

**The Distribution of TVE - Figures and Tables**

The government has put great emphasis on actively developing Taiwan's TVE. There are currently 257 senior high schools which offer vocational skill area programs, 13 junior colleges, 74 institutes of technology, and universities of science and technology, making a total of 344 educational institutions providing TVE. The numbers of schools, colleges, and universities in each region are shown in Figure 3.

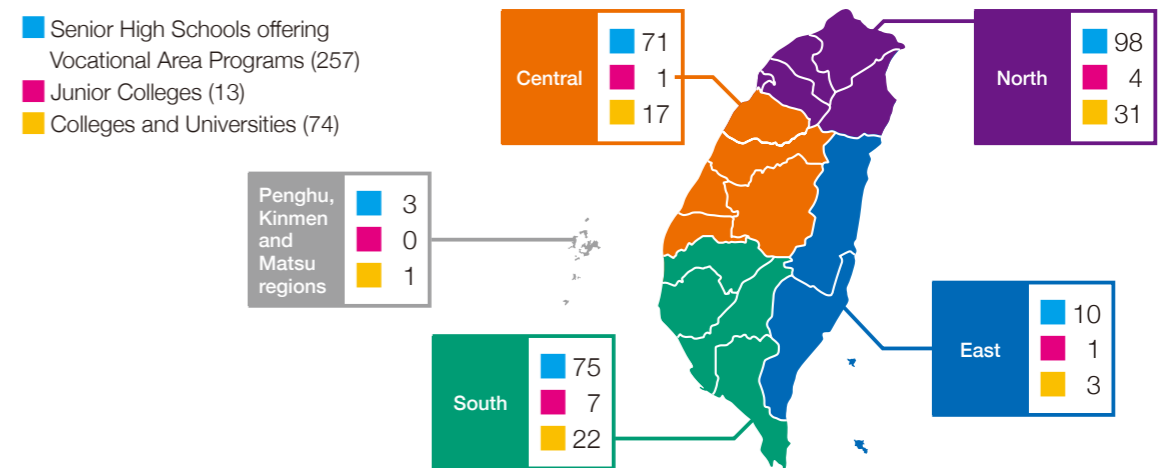


Figure 3 Distribution of Technological and Vocational Schools and Institutions in the 2016 Academic Year

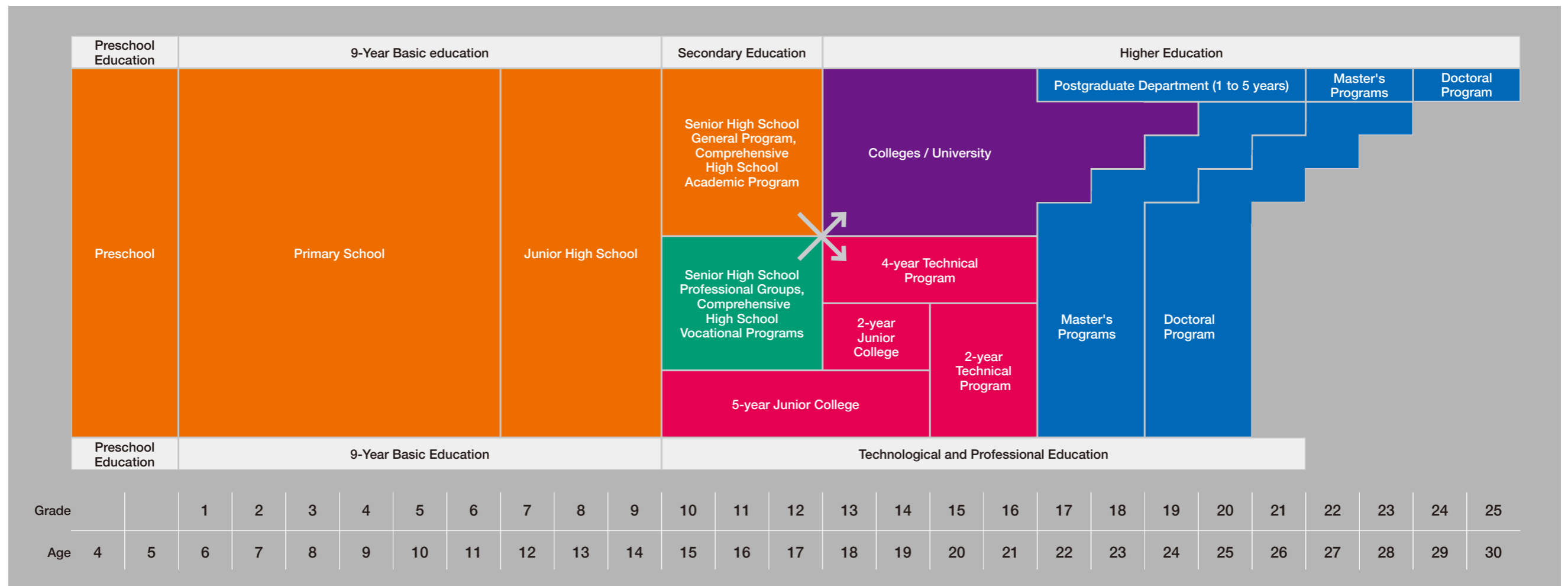
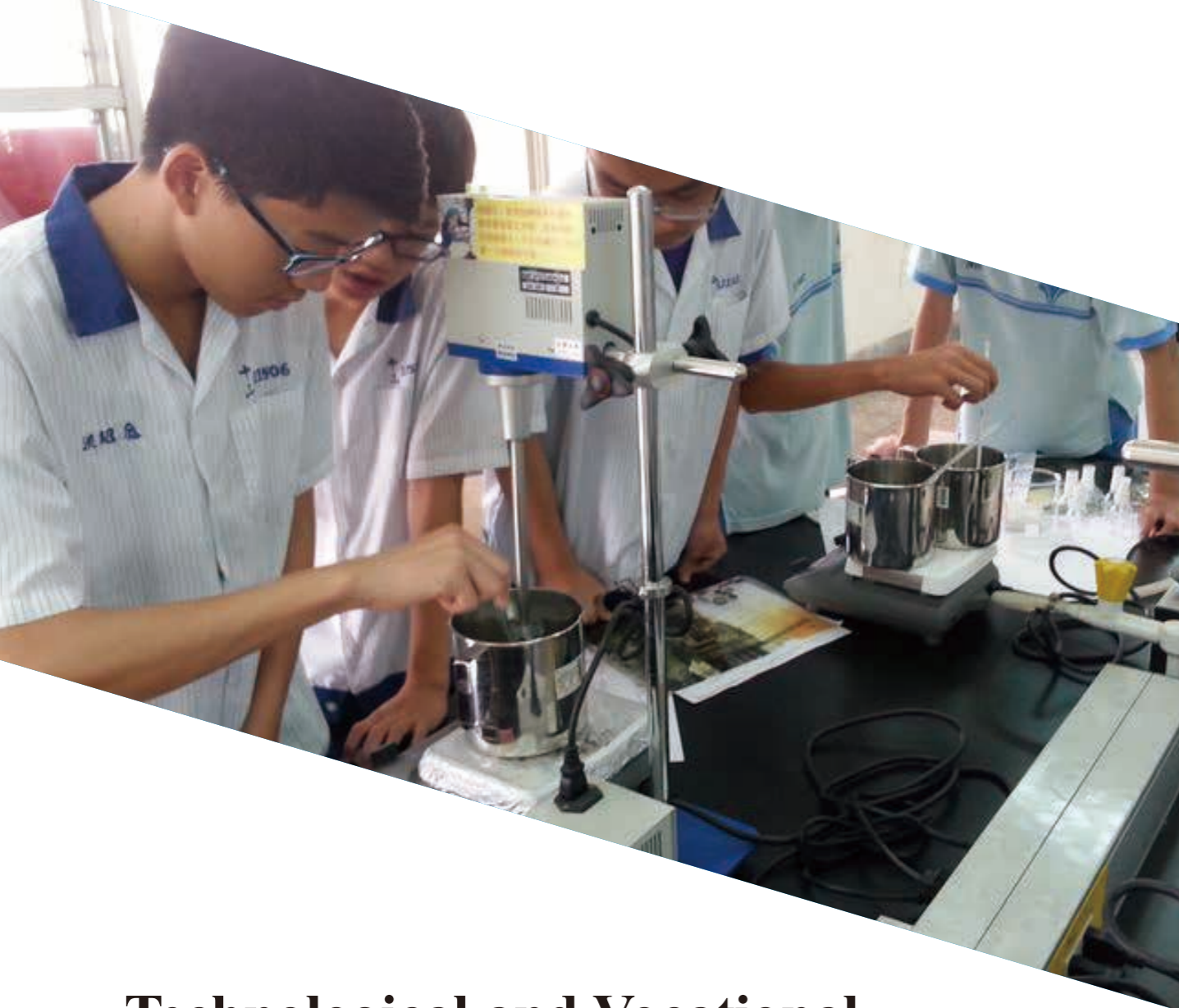


Figure 2 Current Education System





# Technological and Vocational Education

Secondary TVE in our country is often thought of as being provided by skills-based senior high schools but it encompasses junior high technical education (also called "practical arts education"), and at senior secondary level by: vocational high schools (also called "skills-based senior high schools"), vocational divisions of general senior high schools, and vocational area programs at comprehensive senior high schools.

## Taiwan's Secondary Level Technological and Vocational Education

### 1. Junior High School Technical Education

Junior high school technical education (also called "practical arts education") presents 3rd grade junior high school students a curriculum of vocation exploration. It gives students an awareness of the careers available, especially students with an aptitude for and interest in technical learning.

Junior high schools must provide elective

TVE courses in from one to four vocational skill areas to provide technical education for their students. Students can select a course from the group of courses available at their school in 1 or 2 vocational areas to study in the first semester and in the second semester. Classes are timetabled in one of two ways: participating students not in their normal class groups attend from 3 to 12 sessions each week; students in specially arranged classes for their entire normal class group attend from 7 to 14 sessions each week.

After completing junior high school, students who selected technical education courses may be given preferential placement to do a practical skills program at a skills-based senior high school. They may also enter a skills-based senior high school, a vocational division of a general senior high school, or a comprehensive senior high school that offers vocational programs through diversified admission channels.

## 2. Vocational Senior High Schools, and Vocational Area Divisions of General Senior High Schools

The vocational senior high schools and the vocational area divisions affiliated to general senior high schools (hereinafter referred to as "senior high school vocational area programs") all recruit students who have graduated from a junior high school or have an equivalent educational level. They study for three years then obtain a senior high school diploma.

There are also extension program divisions, cooperative education programs, comprehensive occupational skill departments, and practical skill programs, to meet the different requirements of special students. The practical skill programs are student centered, and focus on the diverse range of aptitudes and development of different students. They provide a learning environment designed





for students who have technical leanings, want to find employment, and have developed skills in a particular area. The ultimate goal is to help all disadvantaged students who need care and assistance to study and master vocational skills without worry, and give these young people a vocational skill that will also help to provide society with a stable skilled workforce.

The vocational area programs senior high schools may offer are classified into six broad categories: agriculture, industry, business, marine products, everyday life sphere, and art. Since the 2006 academic year, the curriculum framework has grouped 86 course curricula into 15 distinct vocational areas, based on the vocational area being catered to and organizing associated subjects into clusters. The programs are credit-based, and 160 credits are required for graduation. Curriculum planning is school-based and schools design the curriculum for the programs they offer to meet the rapidly changing needs of industry, and develop students' core competencies, and enhance their hands-on practical learning.

After graduating from a particular vocational area program at a senior high school students may then seek employment, startup a business, or go on to higher education. They can apply to do a program at a two-year junior college, an institute of technology, or a university of science and technology.

### 3. Comprehensive Senior High Schools that Offer Vocational Programs

Comprehensive high schools offer vocational programs to assist students who had had career counseling and guidance and will benefit from further development in a specific vocational area. Comprehensive high schools offered pilot vocational programs in the 1996 academic year, and these programs were incorporated into the formal education system in 1999.

Comprehensive senior high schools recruit students who have graduated from junior high schools or who have an equivalent educational

level. They offer both academic programs and vocational programs for students to select between that begin in the second year of the three years at senior high school. Students can select the type of program that best suits their own interests, and aptitudes, and they are assisted to understand the program features and plan their life and explore potential vocations and careers. The academic programs prepare students to enter a general university. The vocational programs prepare students to enter the workplace or a two-year junior college program or four-year institute of technology program. The programs are credit-based and 2/3 of the credits are in particular subject areas that the school features.

Students who graduate from a comprehensive senior high school have a very flexible range of choices for the future, in accordance with their aptitudes and the programs they have studied so far. Students who want to go to a general university can take the general university entrance examination. Students who want to undertake a two-year junior college program, an institute of technology program, or a university of science and technology program can take the unified entrance exam for these programs. Other options are direct employment, or attending a short-term training course for a particular work area at a vocational training unit, and then taking up employment.

### Secondary Technological and Vocational Education Chart

Taiwan's secondary TVE is provided by 257 senior secondary schools which offer programs in one or more vocational areas: 94 national schools, 21 special municipality government schools, three county or city government schools, and 139 private schools. These schools enrolled a total of 445,413 students in 2015.

Please see Figures 4 to 7 for details of the numbers of students undertaking secondary TVE programs in different categories of schools in recent years.

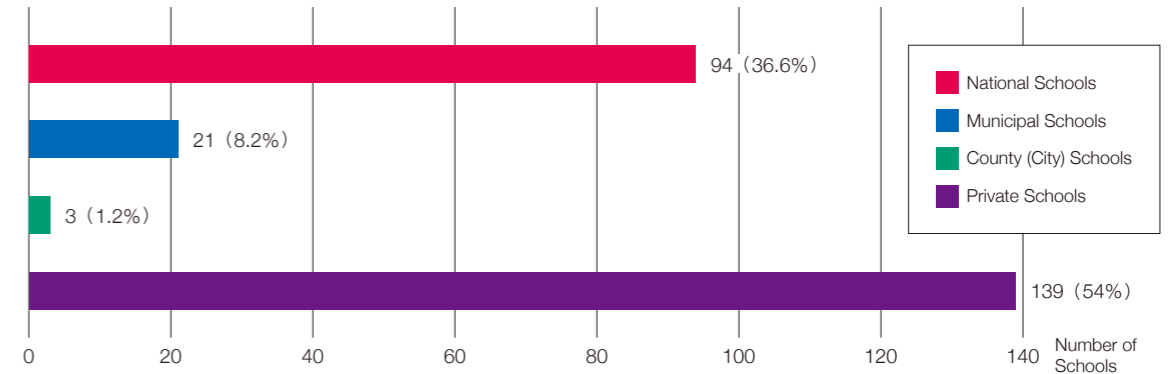


Figure 4 Comparison of numbers of public and private schools for senior secondary technological and vocational education system in academic year 2015

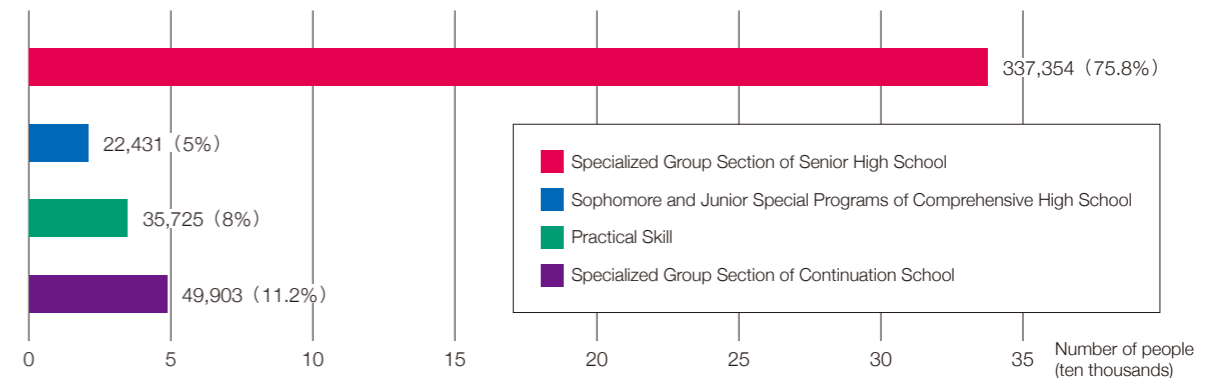


Figure 5 Number of students of senior secondary technological and vocational schools in academic year 2015

※ Description: Number of students is calculated by a method used by various circles conventionally: "High school freshmen are included in high school students, sophomore and junior academic program students are included in high school students, and special programs students are included in vocational high school students."

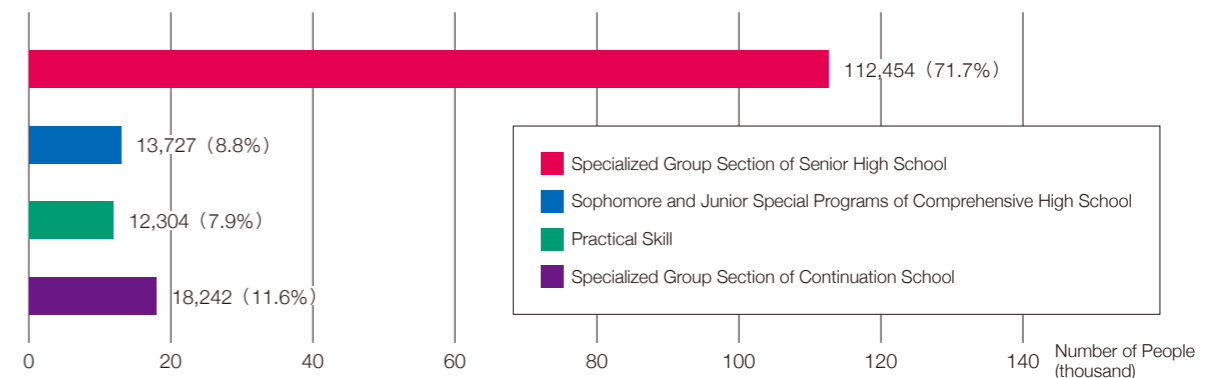


Figure 6 Number of students who graduated from senior secondary technological and vocational schools in academic year 2014

※ Description: The number of students is calculated by a method used by various circles conventionally: "High school freshmen are included in high school students, sophomore and junior academic program students are included in high school students, and special programs students are included in vocational high school students."

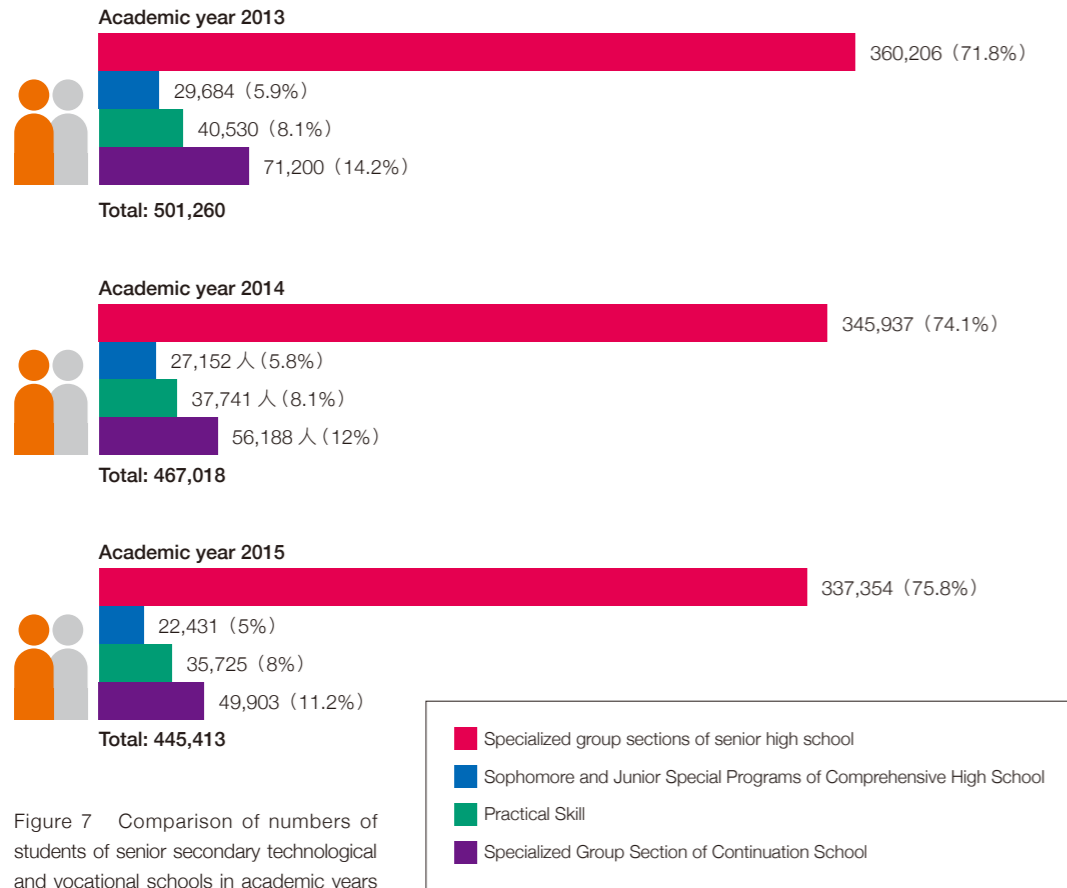


Figure 7 Comparison of numbers of students of senior secondary technological and vocational schools in academic years 2013 to 2015

※ Description: The number of students is calculated by a method used by various circles conventionally: "High school freshmen are included in high school students, sophomore and junior academic program students are included in high school students, and special programs students are included in vocational high school students."

## Features of Secondary TVE Development

Secondary TVE in Taiwan stands up well when compared to other countries in the world. It has the following features:

### 1. Comprehensive robust system

Taiwan's secondary TVE is a comprehensive system, covering the junior high school stage, senior high school vocational area programs, and junior colleges. It allows young people still in school and people in the community at any stage of learning who want to do further learning to find a channel that is suitable to their current level.

### 2. More private school students than public school students

At the senior secondary stage, there are more private TVE schools than public TVE schools. In the 2015 academic year, 61.4% of senior secondary TVE students (273,560 students) were studying in private schools, far more than the 38.6% of TVE students studying in public schools (171,853 students).

### 3. A wide range of programs catering to different aptitudes & skills

In addition to the vocational area programs at senior high schools (vocational high schools, general

high schools with vocational studies divisions, and comprehensive senior high schools offering vocational area programs), secondary TVE also includes skills education at junior high schools, and practical skill programs and cooperative education programs at vocational senior high schools. The education system is diversified and helps students who want to do further of study and those wanting to find employment. A very wide range of courses in different vocational area categories are designed to cater to students' different aptitudes and develop their skills and provide the people with the different skills required in the business and industry sector.

## 4. Employment-oriented vocational courses

From the 2014 academic year, adjusting curriculums and planning to include "employment-oriented vocational courses" in students' final year at any senior high school offering vocational education has been promoted. Schools are encouraged to set up cooperative partnerships with industry institutions, training institutions, or higher education institutions and jointly plan employment-oriented vocational courses that have practical skill learning as their core. Students go into and experience workplaces, do internships in business organizations, receive training at training institutions, and experts from the industry sector are appointed to take part in collaborative teaching, to enhance students' practical skills and their employability. This assists students developing their future life (career) paths, and at the same time is constructing mechanisms for skills development through academic-industry cooperation.

## Emphasis on secondary TVE

Taiwan's secondary TVE continues to advance and develop, guided by government policy, and through the efforts of the schools. Key aspects of development are outlined below:

### 1. Look after disadvantaged students well

In order to achieve the vision of a 12-year Basic Education and to reduce the economic burden on parents, measures providing 1. tuition free education

at vocational and senior high schools (and in the first three years of five-year junior college programs), and 2. uniform tuition charges at public and private senior high schools for students from families with an annual income below NTD 1.14 million began in the 2011 academic year. In the 2014 academic year, free tuition began to be gradually implemented for all students doing vocational programs in vocational and senior high schools (and in the first three years of five-year junior college programs), beginning with students beginning first year that year.

Other measures to take care of and assist disadvantaged students (such as students from low-income families and middle-income families, children or grandchildren in families in special circumstances, physically and mentally disabled people and their children, aboriginal students) to study include: various tuition and miscellaneous fee exemptions, work-study grants, and student loans which provide support to economically disadvantaged students. The "Help Dreams" website was also created to act as a window giving students information about the various scholarships and grants and assistance available for them to realize their study dreams. This makes a substantial contribution to identifying achievable study pathways for disadvantaged students. (<http://helpdreams.moe.edu.tw/>)

## 2. Non-exam based admission and selective screening

### (1) Vocational area programs at senior high schools and vocational programs at comprehensive senior high schools

These schools mainly recruit students who have graduated from a junior high school. Non-exam based admission and selective screening are the usual admission methods.

Non-exam based admission does not require students to sit for an entrance test. Students may select directly proceeding to the next stage or be admitted into a school in their school district that matches their aptitude, interests, and aspirations. Their school assessment for junior high school



learning fields is not taken into consideration, and they do not have to take a senior high school entrance test. During their junior high school education students receive aptitude exploration and counseling to identify suitable options, to help them select a senior high school. Recommendations are provided for future development based on each student's aptitude, interest, and abilities.

Selective admission for a school or department refers to students being admitted based on particular technical, artistic or academic skills. Technical and artistic skills are subject to a screening process, for example to assess musical or drawing ability. Academic skills are subject to an examination testing process.

## (2) Five-year junior college programs

Five-year junior college programs mainly recruit students who have graduated from junior high school. Admission became non-exam based in the 2015 academic year and there is now a diverse range of non-exam based channels.

On-site registration and admission are based on consideration of such things as: a diverse range of learning results, good technical skills, belonging to a disadvantaged group, balanced learning, suitability counseling, the Comprehensive Assessment Program for junior high school students, and other items that individual schools determine.

## 3. Actively enhancing teaching quality

### (1) Equal Access to Adaptive Education and Community Educational Resources for Senior Secondary Schools Implementation Plan

This equal access plan was launched in 2009 to ensure that all senior secondary schools enjoy equal opportunities to develop their educational resources. The purpose is to encourage individual senior secondary schools to reorganize the ranges of courses in distinct subject areas that they offer and for the schools to develop their strengths in those areas. A key focus of work is to further improve the educational competitiveness of schools in each

community. Senior secondary schools in each community are given guidance and assistance to maintain the horizontal integration and links that they already have and to extend their vertical links, and establish partner relationships with junior high schools and with junior colleges, institutes of technology, and universities to effectively share educational resources, such as trained teachers, curriculum resources, and equipment. This will also strengthen the recognition and standing that the senior secondary schools in each community have in the minds of the students and their parents.

### (2) Vocational High School Excellence Program Subsidies

To promote building the foundations for implementing the 12-year Basic Education program, a number of pilot projects were gradually formulated. This was done using the approach of identifying the areas of education which are at the forefront, and selecting vocational high schools with development potential in these areas to receive key aid, and

generate more high quality schools in areas with relatively weak learning outcomes. In conjunction with the ongoing promotion of the 12-Year Basic Education program, since the 2007 academic year, public and private vocational senior high schools all over the nation have been able to submit proposals and apply for a subsidy under the Vocational High School Excellence Program Funding Scheme for their school. The scheme is competitive program: proposals are subject to an initial examination and review, followed by some schools being selected to receive aid. In the 2015 academic year, 190 schools received a subsidy under this funding scheme.

### (3) Equipment Updates

Equipment Update is Strategy 5 of Phase 2 of the Technological and Vocational Education Reform Plan. The K-12 Education Administration of the Ministry of Education formulated the Directions for Subsidizing Senior High School Equipment Updates. It is essential to carefully consider overall planning to use equipment funding to promote the





enrichment of basic teaching and practical learning in the vocational category courses in senior high schools, and help each school to develop the equipment it needs for the distinct vocational subject area(s) that it specializes in offering courses in, so that it can meet the goal of training and educating students who are well-equipped with the practical technical and professional skills needed in the workforce to meet industrial development, and who will be competitive in the job market. The content of the equipment update subsidy directions is outlined below:

a. Ensure Excellent Basic Teaching and Practical Learning Equipment:

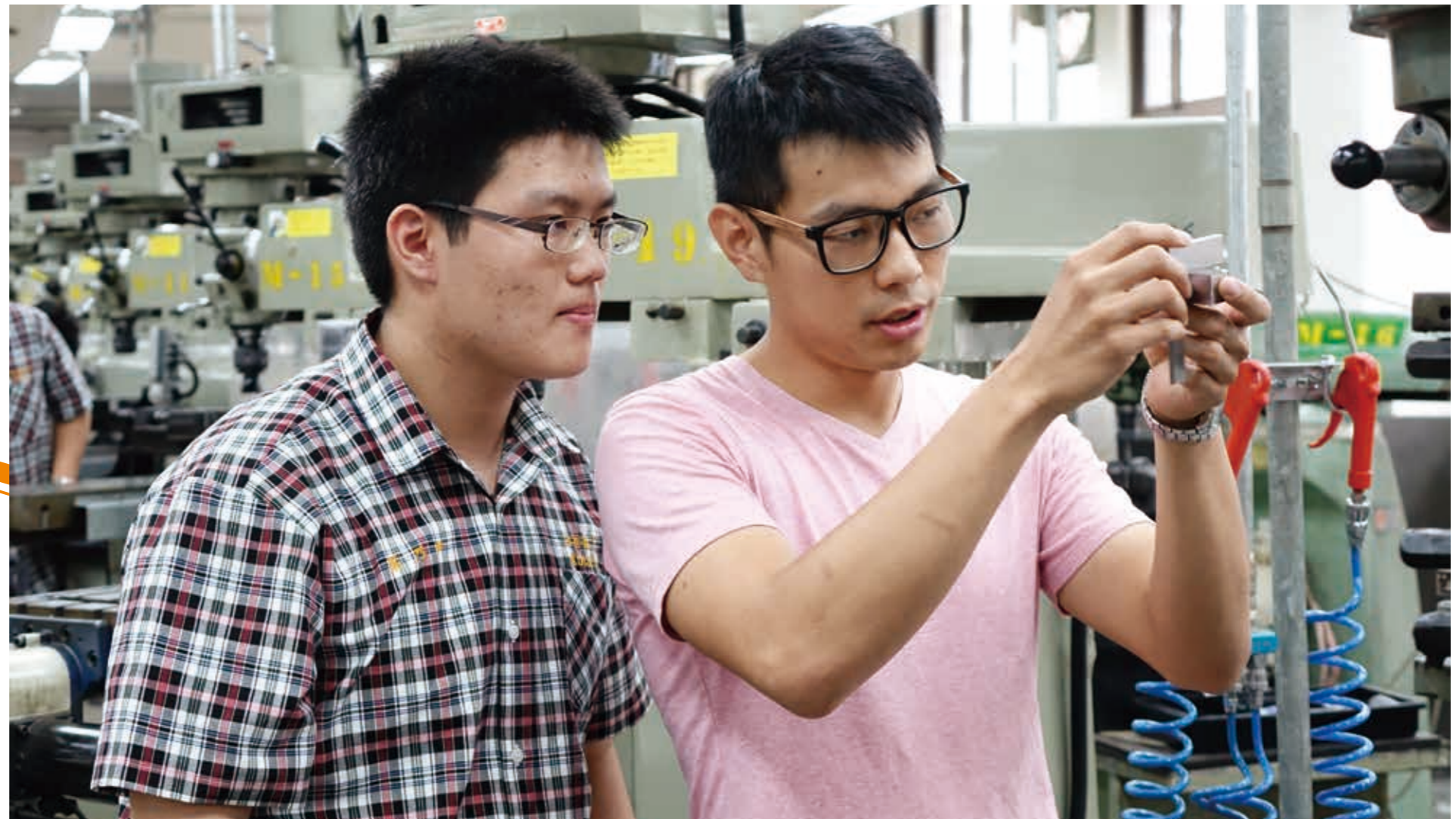
Schools must regularly make an inventory of their teaching equipment in accordance with the Vocational School Study Area Course Outlines and Equipment Standards, and the Established Basic Teaching Equipment Reference Table for Schools formulated by the Vocational School Study Areas Center, and must submit a School Enrichment of Basic Teaching and Practical Learning Equipment Plan and a priority list of teaching equipment requirements in accordance with the principles of the High Cost Teaching Equipment Addition Required for the Manufacturing Industry or Key Industry Category.

b. Develop Equipment for Feature Courses: Schools must plan the vocational area(s) courses that they feature in accordance with the Directions Governing Subsidies for Senior High Schools to Develop Courses Teaching Useful Practical Skills, formulated by the Ministry of Education K-12 Education Administration. Schools that have their submission approved can be issued the required feature course equipment the following year.

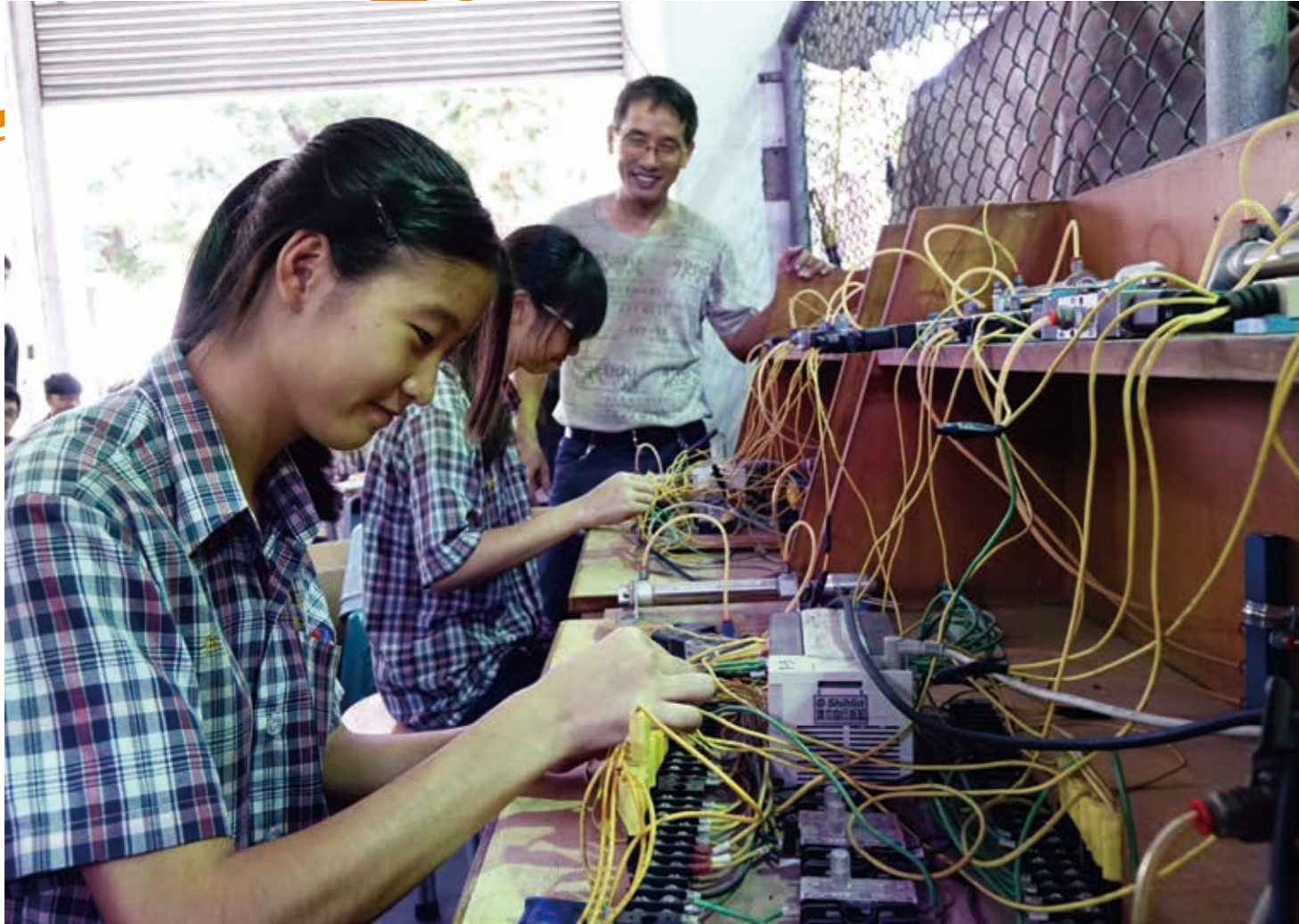
c. Technical Education Center Equipment: Every technical education center must identify and submit a request for equipment in accordance with business and industry development needs.

**(4) Collaborative teaching**

Since 2010, vocational senior high schools have been encouraged to adopt collaborative teaching







with experts from industry to help them train and educate a workforce with advanced professional and technical skills, able to put their skills to work and find employment. In the collaborative team-teaching model, one of the teachers is an expert from the industry that is being studied. This strongly enhances the connection between TVE and industry and improves students' employability after they graduate. Since 2014, 400 people from industry have been appointed for collaborative teaching, and the annual growth rate to provide collaborative teaching in the period 2015 to 2017 is 40%.

Additionally, since 2010, the Ministry of Education K-12 Education Administration Subsidies

for Full-time Teachers of Vocational Programs of Senior High Schools to Participate in Seminars Held by Public and Private Institutions have been available, and the K-12 Education Administration encourages full-time teachers of vocational area courses at senior high schools to take part in workshops and seminars held by public and private institutions in Taiwan to enhance their practical experience and improve teaching quality.

**(5) Encourage students to participate in competitions**

In order to meet the goals of vocational high school education with respect to developing the



ability of students to enter industry for employment, K-12 Education Administration, Ministry of Education cooperates with municipal level education bureaus to hold technical competitions, which are divided into 5 categories including industry, agriculture, business, housework and marine products, for nationwide senior high school students every year in terms of what they have learned by the students receiving three years of education in vocational high schools. In addition to providing encouragement and affirmation to students with excellent skills, skill teaching results of various schools are also exhibited. Moreover, various vocational high schools are encouraged to apply for participating in nationwide

skill competitions held by the Ministry of Labor in order to strive for qualification to join international competitions as national representatives. There have been excellent performances over the years.

**4. Promoting Vocational School Assessment**

In conjunction with the promotion of the 12-year Basic Education program, and improvement of the education quality and performance of senior high schools, the School Assessment Plan Phase III is being implemented between 2015 and 2019. A school must receive development counseling and assess where its weaknesses lie to improve its performance if its results are in any of the following



Program Category	Cooperation Partners	TVE Education Pathways
Industry–Academia Cooperation Programs	<p>There are two broad models: The "3 in 1" model brings together the resources of:</p> <ol style="list-style-type: none"> <li>vocational high schools</li> <li>junior colleges, and</li> <li>cooperating enterprises</li> </ol> <p>The "4 in 1" model brings together the resources of:</p> <ol style="list-style-type: none"> <li>vocational high schools</li> <li>junior colleges, and</li> <li>cooperating enterprises, and</li> <li>regional branches of the Workforce Development Agency of the Ministry of Labor</li> </ol>	<p>Four vertical pathways have been developed:</p> <ol style="list-style-type: none"> <li>"3+2": 3 years at vocational high school, then a 2-year junior college program.</li> <li>"3+2+2": 3 years at vocational high school, then a 2-year junior college program, then an institute of technology 2-year program.</li> <li>"3+4": 3 years at vocational high school, then an institute of technology 4-year program.</li> <li>"5+2": a 5-year junior college program, then an institute of technology 2-year program.</li> </ol>
Practical skills programs	Each curriculum focuses on learning skills, and developing students' employability.	
Cooperative programs	Three-year tuition-free programs. Programs are delivered in Rotation mode (students spend regular time in workplaces), the most common, and Step-by-step mode (student go into workplaces after a certain stage).	
Vocational area programs at senior high schools	Three-year tuition-free and miscellaneous fee exempt programs. Eligible schools receive subsidies to update teaching equipment and materials for learning 'hands-on' skills.	

Table 2 Flexible Range of Programs & Education Pathways for Secondary TVE Students

categories when it is assessed:

- Three school affairs items are graded C or lower
- Two school affairs items are graded D grade.
- School affairs overall is graded C or lower.
- In the vocational programs section, four items in any subject category are graded C or lower.
- Vocational programs section overall is graded C.

## 5. Develop people with excellent technical skills

### (1) Industry-academy professional training programs

There are four types of professional programs or courses for skills-based senior high schools incorporating cooperation and interaction between the "industry sector" and the "academic sector" (shown in Table 2). This close cooperation between industry and schools is designed to provide industry with the skilled people they require.

The educational system has developed four vertical pathways for 'hand-in-hand' industry-academic cooperation: "3+2", "3+2+2", "3+4", and "5+2" (the numbers represent the number of years at a particular educational stage). These give students in TVE programs at senior secondary, junior college, and tertiary level a balanced experience of "study" and "employment". On one hand, they go through screening and selection to be admitted to study in a TVE educational institution taking part in such cooperative education, and on the other hand they experience being employees of the companies taking part.

### (2) Off-campus internships for students

The Implementation Regulations Governing Practical Skills Programs in Senior High Schools were formulated to achieve the teaching goals of senior



high school practical skills curricula. The internships are based on theory and knowledge specific to different professional areas and provide hands-on practical learning to develop students specialized skills, and their understanding of vocational ethics, and associated safety and health concepts. This improves students' knowledge and skills, whether for employment or further study, and it also encourages schools to make use of industry-based resources, and thereby effectively combine theory with practical experiences. As well as improving students' specialized skills, this will increase their interest in learning. From 2014, the Operation Guidelines Governing Ministry of Education K-12 Education Administration Subsidies for Industry Internships and Workplace Experience for Senior High School Students, have been used to encourage senior high school students to do practically oriented off-campus internships and experience workplaces in the industry sector, to increase their practical knowledge and skills, and to achieve the goal of aligning what is learnt in schools with industry practices and needs.

## 6. Emphasis on innovative industry-academia R&D

### (1) Creative local fabrication program

In the face of the impact of the latest wave of new technologies, the Ministry of Education has developed a Senior High School Creative Local Fabrication Promotion Program. The program is primarily based on the 3D printing technology that Taiwan is developing. Senior secondary schools can act as bases and develop plans for promoting

and popularizing programs in connection with individual schools' curricula. The program includes each school's having access to creative local fabrication equipment, seed teacher training, student competitions, setting up additional local fabrication Fab Labs, and mobile experimental vehicles (called "Fab Trucks"). These strategies and hands-on engagement with creative local fabrication and stimulate teachers and students alike and develop their creativity and skills.

### (2) Creative project competitions

Creative project competitions encourage Taiwan's senior high school vocational area programs to offer special project courses, and this develops innovative thinking models, and improves students' ability to apply practical skills, integrating scientific knowledge. It also enhances students' interpersonal communication and cooperation skills, and stimulates their interest in creative innovation, and their imagination, and untapped innovative ability, and nurtures their inventive and research spirit. Creative project competitions and courses help popularize research and invention among students, and this creates a foundation for technology R&D. The teachers of Taiwan's senior high school vocational area programs who understand the value of teaching special project courses can develop opportunities for students to participate in competitions that gradually become more advanced as a way to broaden students' horizons and nurture their enthusiasm for learning. This will bring the purpose of the curricula to life.





## Higher Technological & Vocational Education

Taiwan's TVE at the higher education level (hereinafter referred to as "higher TVE") is primarily provided by five-year junior college programs at the post secondary level, and at the tertiary level by two-year junior college programs, institutes of technology, and universities of science and technology. Junior colleges, institutes of technology, and universities of science and technology are collectively referred to below as "TVE higher education institutions".

### Taiwan's Higher TVE System

#### 1. Junior Colleges

Junior colleges offer two programs: 5-year programs, and 2-year programs. The 5-year junior college programs enroll students who have graduated from a junior high school or have an equivalent qualification, and the classes are only available in the daytime. The 2-year junior college programs enroll students who have graduated from a vocational senior high school or vocational high school

division, or who completed a vocational program at a comprehensive senior high school, or who have an equivalent qualification. The two-year junior college programs may be available in the daytime, and classes may also be available in the evening (in a continuing education division), or at a college of continuing education.

Students undertaking a five-year program are required to complete 220 credit hours, and two-year program students are required to complete 80 credit hours, to be eligible to graduate, and after graduating, students receive an associate degree.

Apart from the teachers who obtained their teaching qualifications at university, people with practical working experience may also be recruited from the business community to teach in junior college, in accordance with the Regulations Governing the Screening and Appointing of Professional and Technological Teachers for Junior Colleges.

Junior college graduates can seek employment, start their own business, or continue their studies by taking a 2-year institute of technology program in a suitable department. They can also take a transfer student exam to do further studies in a program at a regular university. After they have acquired some actual work experience, graduates can also take an exam to be admitted into a two-year in-service professional program. These programs for working people are available in the daytime, or at night (in a continuing education division) and at other continuing education institutions that offer two-year junior college programs.

#### 2. Institutes of Technology and Universities of Science and Technology

Institutes of technology, and universities of science and technology are all established in accordance with the provisions of the University Act, for the purpose of training people who have high-level professional and practical work skills. Institutes of technology, and universities of science and technology may recruit students to undertake associate's degree programs, bachelor's degree programs, master's degree programs, and doctoral degree programs. Students who want to undertake an associate degree program at these institutions must meet the same admission criteria as people wanting to do a two-year junior college program which are set out in the first paragraph under the previous heading, and they must complete 80 credit hours, to be eligible to receive an associate degree.

Students may undertake a four-year bachelor's degree program, or a two-year bachelor's degree program if they already have an associate degree. These programs are available in the daytime, and also in the evening, and in the evening (in a continuing education division), or at a college of continuing education. Individual institutes and universities may establish in-service professional degree programs if individuals' personal work experience, and requirements are suitable. Student intake: four-year institute of technology programs and two-year junior college programs both enroll students who have graduated from a secondary TVE program of some sort, or who have an equivalent qualification. The two-year programs at institutes of technology enroll students who have graduated from a junior college after completing a two-year or five-year program, or who have an equivalent qualification and pass an

entrance exam. Students are awarded a bachelor's degree after they graduate from a four-year bachelor's degree program, or from the shorter two-year bachelor's degree program students with an associate degree can go into.

Curriculum: The system is credit-based. Students in a four-year program must complete 128 credit-hours, and students in the two-year bachelor's degree programs must complete 72 credit hours before they can graduate. Students undertaking a professional master's degree program must complete 24 credit hours and submit a master's thesis, and students in a doctoral program must complete at least 18 credit hours and submit a doctoral dissertation before they can graduate.

As well as appointing qualified university-trained teacher, people with practical working experience may also be recruited from the business community, in accordance with the Regulations Governing Appointment of Professional and Technological Personnel for University Teaching.

### Taiwan's Higher Technological and Vocational Education - Figures and Tables

Taiwan currently has 87 educational institutions offering higher TVE: 13 junior colleges, and 74

universities of science and technology. The total number of students in these colleges and universities was 633,859 in the 2015 academic year.

The statistics on the different categories of higher TVE educational institutions and the numbers of students in each are set out in Figure 8, Figure 9, and Figure 10.

### Features of Taiwan's Higher TVE

Higher TVE in Taiwan stands up well when compared to other countries in the world. It has been developed with a focus on the following features:

#### 1. Flexible Transition Pathways, Unimpeded Recurrent Education

At the higher education level our TVE is provided by a comprehensive system from junior colleges, institutes of technology, and universities of science and technology to graduate schools offering master's degree and doctoral degree programs. Equal importance is placed on vertical articulation and having flexible horizontal transition pathways between different parts of the system, and having clear and smooth links with recurrent education channels, so that young students and

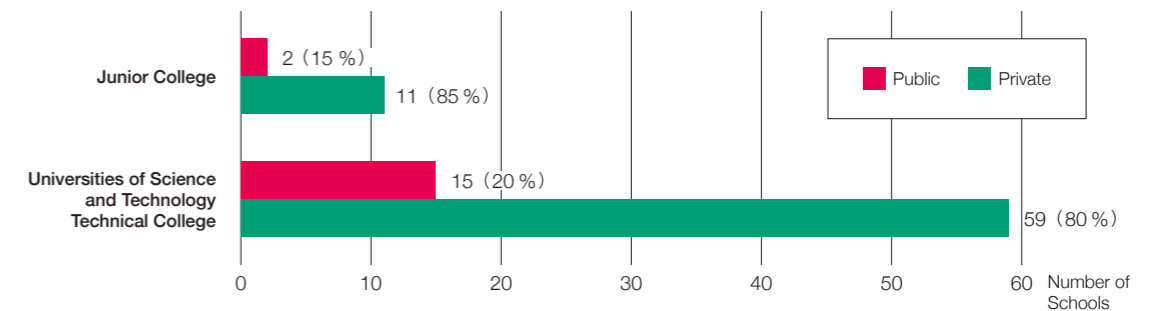


Figure 8 Comparison of number of Public and Private Schools of Higher Technological and Vocational Education System in School Year 2016

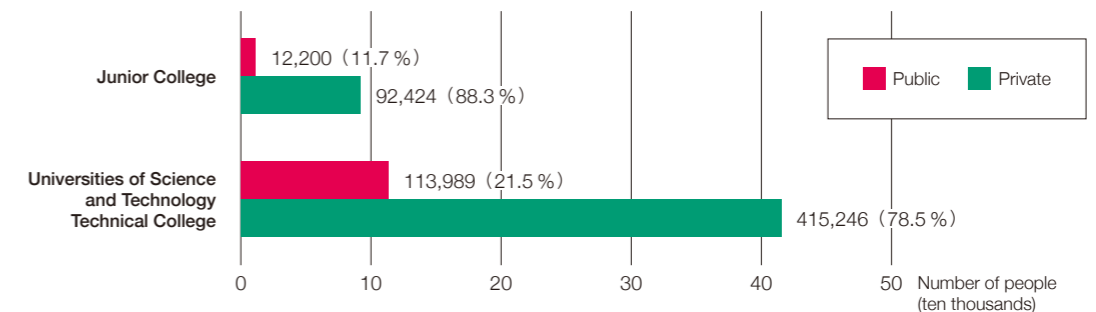


Figure 9 Number of Students in Higher Technological and Vocational Schools in School Year 2015

- Sources of Data:
  - Reference Basis Statistical Forms: "Database of Higher Technological and Vocational Education" "Table 4-2 Actual Student Attendance of Each School Grade".
  - Data Starting and Ending Time: Basis of Data provided is according to the Second Semester of the School Year 2015.
  - Data Captured Date: August 3, 2016.
- Content of Data:
  - Data is primarily based on the actual enrollment of students attended school with official school registration of the current school year.
  - Includes the transfer students, delayed graduation students of current school year; does not include leave of absence students, withdrawal students, non-degree students, credit class students, non-registered students and students with reserved admission.
  - Includes spring and fall semesters recruited students; does not include number of students in special classes.
  - Universities of Science and Technology, Institute of Technology do not include number of students in Junior College Division, Junior College includes the number of students enrolled in the Junior College Division of the Universities of Science and Technology and Institute of Technology.

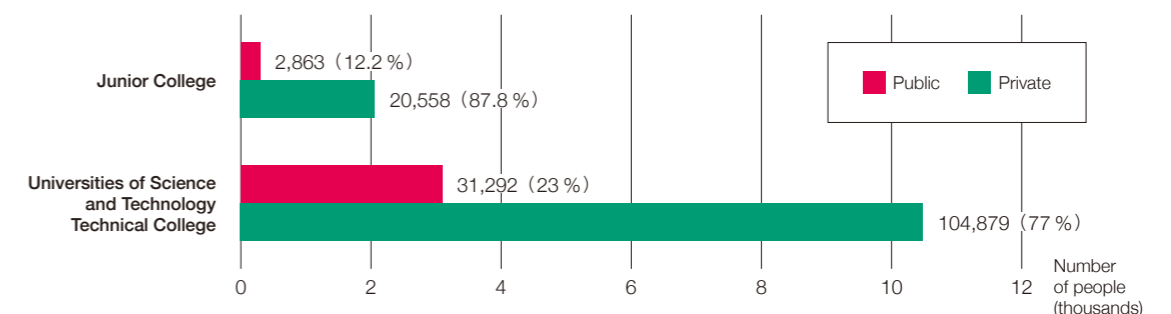


Figure 10 Number of Graduates of Higher Technological and Vocational Schools in School Year 2015

- Sources of Data:
  - Reference Basis Statistical Forms: "Database of Higher Technological and Vocational Education" "Table 4-1 Number of Graduated Students Data Sheet", "Table 4-2 Actual Student Attendance of Each School Grade".
  - Data Starting and Ending Time: Basis of Data provided is according to the School Year 2014.
  - Data Captured Date: August 3, 2016.
- Content of Data:
  - Data is primarily based on the actual graduated students whom have completely qualified for the graduation requirements of the school.
  - Includes winter vacation study graduates, summer vacation study students; does not include special class graduates.
  - Universities of Science and Technology, Institutes of Technology do not include the number of graduated students in the Junior College Division; Junior College includes the number of graduated students in the Junior College Division of the Universities of Science and Technology and Institute of Technology.



the working public can find an education channel suitable to their personal level at any stage.

## 2. High Quality Private Sector Education

Private sector education is an important component of the development of Taiwan's TVE system. The number of private sector TVE colleges and universities in Taiwan in the TVE higher education sector is higher than the number of public sector TVE colleges and universities (see Figure 8). Similarly there are more students attending a private sector junior college, or institute of technology, or university of science and technology, than the respective numbers of students attending a public junior college, institute of technology, or university of science and technology (see Figure 9 for the statistics for 2015). Academia-industry cooperation between private sector TVE colleges and universities and the business community has led to a closer integration between TVE and the needs of business community.

## 3. Diverse Range of Courses Suiting Industry Needs

The higher TVE system is very diverse and flexible. In addition to the junior colleges, institutes of technology, and universities of science and technology (and their graduate schools), the higher TVE system also includes continuing education divisions, in-service professional programs, and colleges of continuing education. In addition to the traditional agricultural, industrial, and business related subjects, these colleges and universities at all levels are developing and offering courses closely aligned with the Five Major Innovative Industries (smart machinery, Taiwan as Asia's Silicon Valley, biotech & pharmaceuticals, green energy, and national defense related business), new agriculture, high value materials and circular economies, the digital economy, and other industry policies, that can fully meet students' needs to find employment.

## 4. Outstanding Industry-Academia Cooperation

The TVE system emphasizes industry-academia

cooperation, which focuses on coordinating fully educating students and working with industry to meet industry needs. It is currently promoting the Two-track Training Flagship Plan, the Industry-Academia Cooperation Plan, and the Programs Supporting Industry projects, so that students can be employed immediately after graduation. A number of multi-faceted industrial park industry-academia cooperation programs are being actively promoted, to encourage teachers to work with the business community, to undertake innovative research. This has win-win results: teachers improve their practical teaching ability and industry competitiveness is improved. Six Regional Industrial-Academia Cooperation Centers have been established to promote comprehensive industry-academia cooperation and intellectual property management, and incorporate the research achievements into teaching.

## 5. Effective Practical Usefulness

TVE first emphasizes the spirit of 'practical use'. There are channels for admission that encourage students with superior technical skills to study a TVE program, such as skill based selective admission, and the entrance examination subjects are also based on practical professional subjects. The curriculum design emphasizes special project courses and practical learning, and students are encouraged to obtain professional experience and professional certificates and licenses. Appointing teachers with practical experience and professional certificates and licenses, and selecting people based on their technical expertise or skills to be appointed to teach professional skills is stressed, and teachers are encouraged to submit technological reports for review and promotion are among the various measures emphasizing 'practical use'.

## 6. Excellent Results in International Competitions

"Learning by Doing" is a key characteristic of TVE institutions. Practical activities increase the effectiveness of learning and their experience, both of theory and practical aspects. Since 2005, the program has been expanded to encourage students

of technological colleges and institutes, and TVE teachers and students to participate in international arts and technical skills competitions.

The Outstanding Technical and Vocational Education Award program was started in 2005. The awards recognize the performances of outstanding teachers and students in each technical and vocational field as Technical and Vocational Models. Details of how candidates for an Outstanding Technical and Vocational Education Award are selected and their outstanding and honorable achievements are registered on the "It's Show Time!!" website. Final results are announced after screening and selection by a committee. (<http://me.moe.edu.tw/award/>)

## Strengthening the Key Aspects of Higher TVE

Taiwan's higher TVE is continuously developing and advancing with government guidance and the efforts of the higher education institutions. The development focuses are set out below:

### 1. Adequate Care for Disadvantaged Students

To assist disadvantaged students successfully receive formal education, in the 2005 academic year Taiwan implemented assistance measures

for disadvantaged students to attend colleges and universities. These were replaced two years later (2007) by the Plan for Assisting Disadvantaged Students to Attend Colleges and Universities which included more measures. Its four assistance measure programs address: study costs assistance, living assistance, emergency relief assistance, and preferential access to dormitory accommodation. Details of each are set out in Table 3.

Other measures to take care of and assist disadvantaged students (such as students from low-income families and middle-income families, children or grandchildren in families in special circumstances, physically and mentally disabled people and their children, aboriginal students) to study include: various tuition and miscellaneous fee exemptions, work-study grants, and student loans which provide support to economically disadvantaged students. The "Help Dreams" website was also created to act as a window giving students information about the various scholarships, grants, and assistance available for them to realize their study dreams. This makes a substantial contribution to identifying achievable study pathways for disadvantaged students. (<http://helpdreams.moe.edu.tw/>)

### 2. Regulating Enrollment Numbers and Multiple Entry Channels

Assistance	Details
Financial Assistance	Public and private colleges and universities assist students whose family has an annual income of less than NTD 700,000, to reduce the burden of tuition
Living Assistance	Students from economically disadvantaged families receive a monthly amount from their college or university to cover living expenses and help them to develop their independence and employability after graduation.
Emergency Relief	Colleges and universities students will assist students with a newly or recently experienced low income or family emergency situation according to the actual situation.
Accommodation Assistance	Low-income household students receive free accommodation; mid and low-income household students receive priority accommodation.

Table 3 Assistance Measures to Help Disadvantaged Students to Attend Colleges and Universities



**(1) Total Quantity Management**

In order to ensure that the enrollment quotas of each of the various TVE higher education institutions reflect the number of students enrolled, social development needs, and the number of highly skilled graduates needed by the nation overall, the Ministry of Education has boosted the setting up of departments and sections and admission quota control mechanisms, based on the revised Standards for Student Admission Quotas and Resources at Institutions of Higher Education. In addition, the numbers of people with various skillsets educated and trained in the TVE system are compared with the industry workforce structure, to provide reference data for the Adjustment of Departments of Technological Colleges and Universities.

**(2) Separation of Examinations and Enrollment System**

Since the 2000s, the Ministry of Education has promoted the Multi-Track Admission to Technological Colleges and Universities Program to help to achieve the "skilled workforce development" goal. This program allows educational institutions to use a variety of enrollment methods. Currently 4-year institutes of technology and 2-year junior college have multiple admission channels. Admission by selection, joint registration assignment, high school student admission by application, guaranteed admission for students with outstanding skill, outstanding skill validation admission, and the Star Plan for college and university of science and technology entrance system facilitate students' choice of a study pathway that best suits them. The main channels for admission to TVE higher education institutions through the Multiple Entrance System are shown in Figure 11.

**3. Positive Enhancement of Teaching Quality**

**(1) Enhancing Teaching Quality at Junior Colleges**

Each junior college must submit a plan, based on its circumstances, resources, development, and vision, for review and approval to receive a budget subsidy to use to enhance the teaching quality of

its teachers, strengthen the effectiveness of student learning, and thereby improve the overall quality of education.

**(2) Awarding Teaching Excellence in Universities of Science and Technology and Institutes of Technology.**

The College and University of Science and Technology Teaching Excellence Plan was launched in 2006, to improve the quality of university teaching, and develop a Teaching Excellence Model for Taiwan.

**(3) Strengthening teachers' practical teaching ability, integrating industry resources, and collaborative teaching.**

a. Teachers of professional and technological subjects appointed by a junior college, institute of technology, or university must have at least one year of practical working experience in industry.

b. Full-time teachers, professional and technological personnel, and professional and technological teachers teaching professional and technological subjects for TVE higher education institutions must be assigned to perform at least six months of study or research with an organization that cooperates with their TVE higher education institution or with an industry related to their teaching field(s), after every six years they spend teaching.

c. Subsidize teachers in TVE higher education institutions to undertake study or research in industry settings.

d. Encourage TVE higher education institutions and vocational high schools to adopt team-teaching where two teachers (a full-time teacher and an industry expert) deliver programs collaboratively, to strengthen the integration of TVE and the industry sector.

**(4) Updating Equipment in TVE Higher Education Institutions & Optimizing Practical Work Area Spaces**

a. TVE higher education institutions are being encouraged to integrate 'department adjustments'

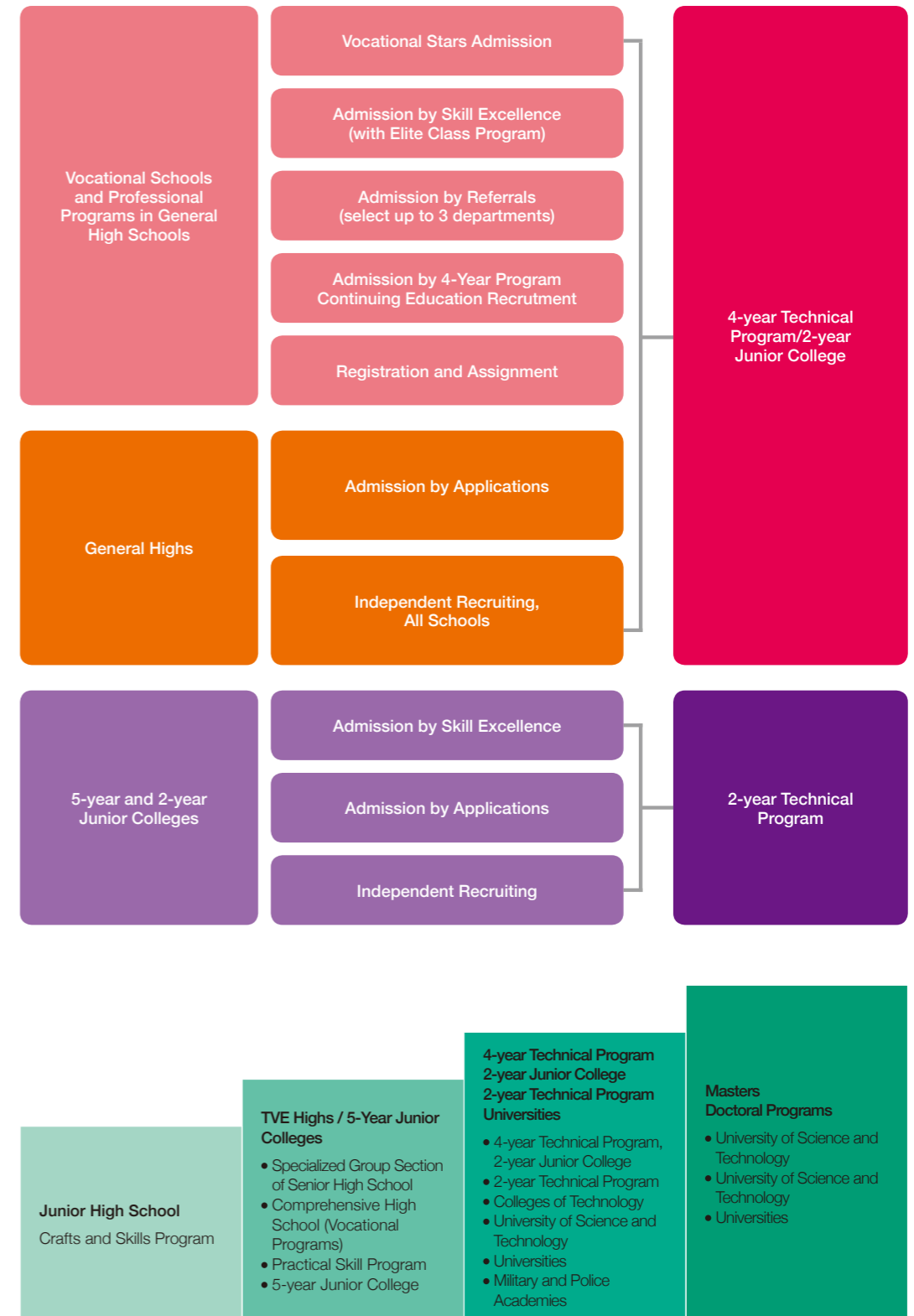


Figure 11 Main Channels of Technological College, Institute, University Multiple Entrance System

to assist them to improve their teaching environments, and to update the equipment used for teaching students, to minimize the differences between the equipment students use to learn and practice on, and the equipment used in industry. This will cultivate their practical technical and professional work skills and train the skilled workforce needed for industrial development. And promote the Junior College, Institute of Technology and University Equipment Update – Rebuilding Technology Excellence Plan.

b. Strengthen students' practical work skills and improve the teaching equipment used for practical work courses, to develop students' ability to operate such equipment independently, and significantly increase the practical work content of courses, in conjunction with the teaching equipment updates.

#### 4. Promoting Evaluation of TVE Higher Education Institutions

For many years, the Ministry of Education used a "rating" system to conduct performance reviews of TVE higher education institutions. The approach was primarily accountability oriented and the emphasis was on examining each institution's performance and results. A new system with a positive reinforcement quality-oriented "approval" approach has been

adopted, starting from the current evaluation cycle (from the 2014–2018 academic years for universities of science and technology, and from the 2015–2019 academic years for institutes of technology). The new system is designed to help TVE higher education institutions use the assessment process to strengthen their own independent improvement and quality assurance mechanisms. It is anticipated that endorsing and approving improvements that VCE colleges, institutes, and universities already undertaken will stimulate them to continue innovatively improving quality.

The Educational Institution Business Management and Department Evaluation Criteria for this evaluation cycle were published in April 2013. Comprehensive evaluations of 7 universities of science and technology were undertaken in the 2014 academic year. The results of the comprehensive evaluations of eight universities of science and technology and of five institutes of technology for the 2015 academic year were published in June 2016.

#### 5. Cultivating People with High-Quality Technical Skills

**(1) Industry–Academia Professional Courses: interactive industry-academia collaborative TVE programs provide the skilled workforce needed by industry**

a. Industry–Academia Cooperation Plan: Academia and industry link resources to provide cooperative education and a range of vertical articulation pathways have been developed between vocational high schools and 5-year junior colleges, and TVE higher education institutions: "3+2"; "3+2+2"; "3+4"; and "5+2" (the numbers represent the number of years at a particular educational stage). Students have a balanced experience of "study" and "employment". They enroll in the TVE higher education institution and at the same time work as employees of a partnering business. b. Professional Master's Degree in Industry programs: To encourage industry-academia cooperation to train people with the required master's degree high level of technology skill, or people with innovative and interdisciplinary skills, each professional master's degree in industry program incorporates practical hands-on engagement in the industry and learning the knowledge and skills needed by industry, and this helps ensure that the programs are constantly up-to-date. The industry partner commits to employing at least seventy percent of the graduates of the special classes, and

these collaborative programs help ensure that what students are learning more closely reflects the needs of the market. This creates a more effective education system for the workplace, and it is hoped that this will help the further development of Taiwan's industries.

#### (2) Students Off-Campus Internships

TVE higher education institutions are encouraged to set up both core and elective credit courses that give students opportunities to do internships in actual workplaces before they graduate, and thereby help them to form good attitudes and make them work-ready. The off-campus internships are arranged by the institutions and departments according to their curriculum development and the professional skills being nurtured. Internship programs fall into four categories: summer programs, semester programs, academic year programs, and overseas internship programs.

#### (3) Postgraduate Second-Major Bachelor's Degree Programs



Program Category	Cooperation Partners	TVE Education Pathways
Industry–Academia Cooperation Programs	<p>here are two broad models: The "3 in 1" model brings together the resources of:</p> <ol style="list-style-type: none"> <li>1. vocational high schools</li> <li>2. junior colleges, and</li> <li>3. cooperating enterprises</li> </ol> <p>The "4 in 1" model brings together the resources of:</p> <ol style="list-style-type: none"> <li>1. vocational high schools</li> <li>2. junior colleges, and</li> <li>3. cooperating enterprises, and</li> <li>4. regional branches of the Workforce Development Agency of the Ministry of Labor</li> </ol>	<p>Four vertical pathways have been developed:</p> <ol style="list-style-type: none"> <li>1. "3+2": 3 years at vocational high school, then a 2-year junior college program;</li> <li>2. "3+2+2": 3 years at vocational high school, then a 2-year junior college program, then an institute of technology 2-year program;</li> <li>3. "3+4": 3 years at vocational high school, then an institute of technology 4-year program; or</li> <li>4. "5+2": a 5-year junior college program, then an institute of technology 2-year program.</li> </ol>
Professional Master's Degree in Industry programs	The cooperating industry or business partner enterprises are invited to jointly plan the curriculum and give employment guidance, to nurture students' high-level skills, and to ensure TVE is aware of the latest industry developments and needs,	

Table 4 Flexible Higher TVE Pathways Provided by Industry–Academia Cooperation

These programs are for people with at least a bachelor's degree (male applicants need to have completed their military service or non-military service obligation). The emphasis is on professional practically-oriented and interdisciplinary learning. Course requirements correspond to industry needs and may incorporate content that crosses traditional departmental and professional fields to boost students' subsequent employability and strengthen job market skills. The programs are 1–2 years long, although a particular program may be extended depending on its nature. They are designed by each tertiary institution to help students obtain a professional certification license, practical internship experience, or strengthen their foreign language capabilities.

#### (4) Programs Supporting Industry

TVE higher education institutions are encouraged to organize and implement Programs Supporting Industry credit programs and/or degree programs. They all focus on organizing professional programs to give the participating students knowledge and skills that precisely meet the workforce needs of the cooperating businesses, and the practical courses and on-site practical

internships are jointly planned and effectively articulate practical training for employment with study programs. The students can be employed by the cooperating businesses after completing their program.

### 6. Emphasis on Industry-Academia Innovative R&D

#### (1) Establishment of Regional Industry-Academia Cooperation Centers

Six Regional Industry-Academia Cooperation Centers were established to assist the regional partner tertiary institutions to promote industry-academia cooperation, enhance the synergy that can be created, and provide the participating businesses with forward-looking vision, and apply research and development results. They are establishing management and application mechanisms for industry-academia resources cooperation, processes, and accomplishments, and a professional field information platform, to integrate the resources sharing window of the industry, government, academia, and research sectors.

#### (2) Promote Innovative Entrepreneurship

The goals are: to inspire and develop the creative

thinking and innovative ability of students in the TVE higher education institutions, to encourage TVE higher education institutions to promote innovative entrepreneurship courses, to enhance entrepreneurship and associated knowledge and skills, to identify and support outstanding student entrepreneurial teams, to have them take part in innovative entrepreneurship competitions, to provide students with entrepreneurial business plan selection and in-depth counseling to assist them become successful entrepreneurs, and to promote commercialization of the work of outstanding student teams that win awards in an international competition.

### 7. Development of Model Universities of Science and Technology

For a 4-year period (2013–2016), the Ministry of Education implemented the Model University of Science and Technology Program and subsidized twelve institutions to be developed to become a Model University of Science and Technology. The purpose was to help the universities of science and technology to construct innovative industry-focused research and development environments, lead industry-academia cooperation to train and educate a highly skilled workforce, reap the benefits of intellectual property added-value, and further balance the gap between higher education funding and higher TVE funding. The Ministry also subsidized four universities to establish industry-academia research and development centers (with total funding of NTD 5.0935 billion), to guide TVE teaching staff, programs, and the positioning of TVE in the education market to be in compliance with the core value of practical use, and promote practically oriented teaching.

### 8. Promotion of Phase 2 of the Technological and Vocation Education Reform Program

The second phase of the Technological and Vocational Education Reform Plan is being promoted from 2013 to 2017, to build further on the foundation work of the first phase. It has a total budget of NTD 20.2895 billion to address the three major aspects listed below, using nine

strategies. Its three objectives are: 1. All graduates of a vocational senior high school program, junior college, institute of technology or university of science and technology are able to be immediately employed, 2. Fully provide the quality workforce needed for industrial development, and 3. to completely change the general public's perception of TVE.

Aspect 1: System adjustment - through policy integration, department adjustment, and appointing people with practical skills.

Aspect 2: Curriculum revitalization - through flexible curriculum, equipment upgrades, and energizing practical hands-on learning.

Aspect 3: Employment improvement - through employment connections, innovative entrepreneurship, certification in sync with actual ability.

### 9. Launching International Cooperation and Exchanges

#### (1) Encouraging Internationalized Campuses

Connecting with the world is an urgent task if we want to expand the macro perspective of students in TVE higher education institutions. TVE higher education institutions are being encouraged to build the foundations for internationalizing their campuses. Important associated objectives worked on in recent years include:

- Enrichment of internationalized hardware and software environments of campuses.
- Overall enhancement of the foreign language abilities of teachers and students.
- Construction of a Regional English Teaching Resource Network.
- Strengthening the quality and quantity of international cooperation undertaken by each higher education institution.
- Taking into account TVE 'input' and TVE 'output': Learn from those with the best expertise, and pass on the best knowledge and skills.

Statistics on the international cooperation undertaken by TVE higher education institutions for the academic years 2011–2014 can be seen in Figure 12.





**(2) Encouraging each TVE Higher Education Institution to Engage in International Cooperation**

Since 2004, the Ministry of Education has allocated an annual subsidy for each TVE higher education institution to implement its international cooperation program. Items that can be subsidized are teacher exchanges and student exchanges, sending students abroad to study and do internships, students undertaking dual-degrees, managing cooperative exchanges with foreign academic and cultural organizations, and other

international cooperation projects. Enrollment figures are shown in Figure 13.

**(3) Hosting APEC International TVE Conference**

APEC advocates educational cooperation and promotes the development of cross-border mobility of human resources, and the strengthening of the interconnectivity between APEC member economies to achieve economic prosperity and sustainable development within the APEC region. The Ministry of Education submitted proposals to

APEC and received support from APEC member economies to host the 2014 APEC Forum on Technological & Vocational Education & Training (TVET), and then the 2015 Industry-Academia Collaboration Models in Technological and Vocational Education and Training Workshop

The establishment of exchange networks between academia and industry and across borders, allows Taiwan to discuss the effects of TVE on

society and the economy together with other APEC economies. Topics include solving the education and skills gaps by education policy, and sharing experiences in the TVE sector. This gave Taiwan an opportunity to demonstrate some successful empowerment practices to different economies and gave all participants a forum to explore possibilities for viable industry-academia promotion and international cooperation in the future.

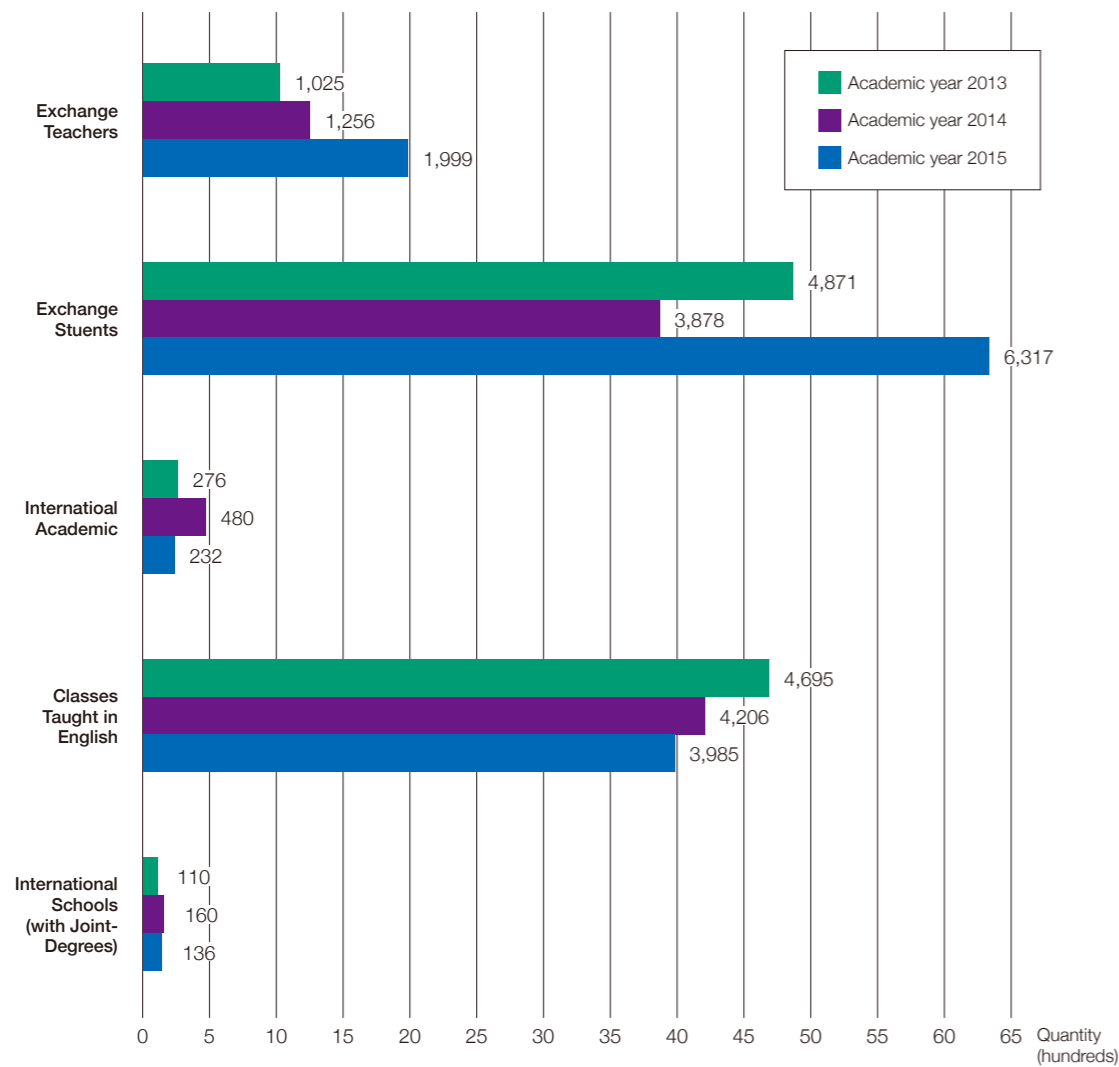


Figure 12 International Cooperation Situations of Technological and Vocational Junior Colleges, Institutions and Universities for School Year 2013 - 2015 (Statistics as of June 2016)

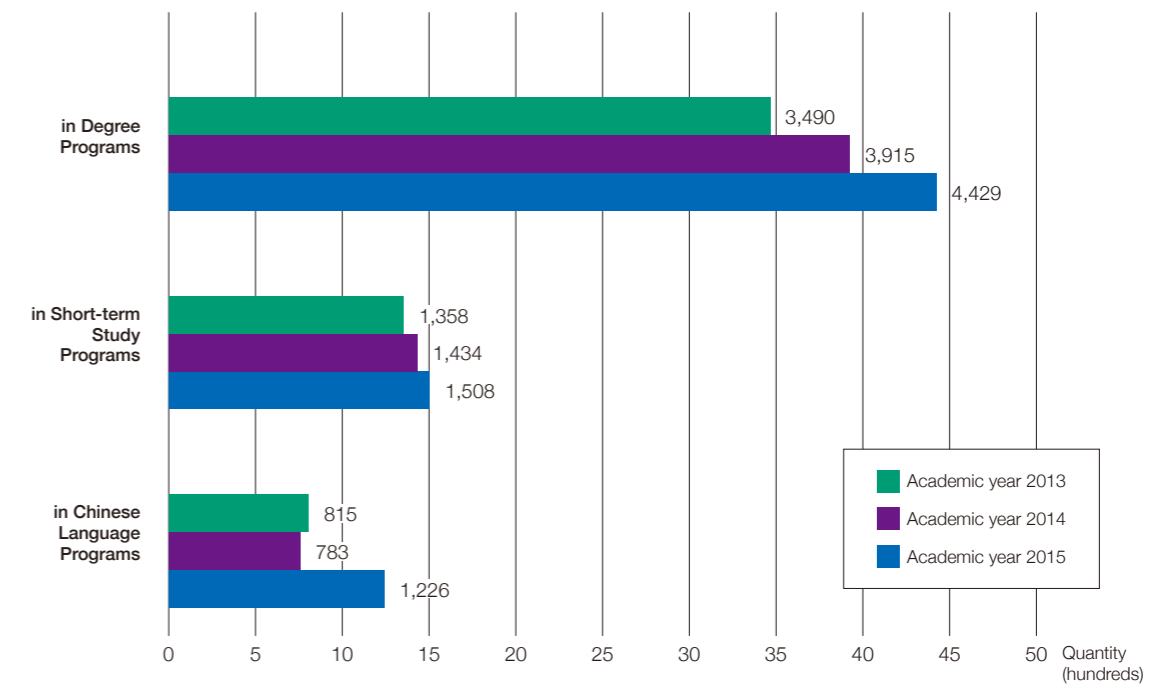


Figure 13 Number of Foreign Students Enrollment by Technological Junior Colleges, Institutions and Universities in School Year 2013 - 2015



## Technological and Vocational Education – Looking Forward

Looking forward, Taiwan's secondary and higher level TVE will continue focusing on providing useful practical work-oriented courses to equip people with the knowledge and key competencies needed for the job market. The TVE sector will integrate with local industries and train and educate people with appropriate specialized skills to promote local development. It will also engage in more international exchanges and cooperative projects with the TVE sectors in other

countries. In addition, Taiwan will continue boosting career awareness and exploration programs for elementary and junior high school students to nurture young students' interest in technological and vocational fields.

### Begin Career Exploration Early

Articles 9 and 10 of the Technical and Vocational Education Act state that the elementary and junior high school curricula of must incorporate "vocational



knowledge" and exploration content, and junior high schools must arrange visits to businesses and industry workplaces for their students. Junior high schools may work with TVE institutions and vocational training organizations to provide practical arts education as part of the career information education that junior high schools provide, and the junior high schools must promote and develop exploration and assessment tools when designing the courses and arranging the activities. Private sector resources can be brought in and "vocational knowledge" activities can be organized working jointly with private sector organizations. This will enhance the attractiveness of technological and vocational education.

### Remain Practically Oriented, Strengthen Professional Competencies

The European Union and UNESCO both strongly advocate and promote work-based learning. This form of learning is based on 'hands-on' practice to master technological skills, and its core spirit is to closely reflect actual workplace practices. It can also be described as an approach to learning that integrates industry resources, and brings to life the concept of industry and academia

working together, to provide and continually improve TVE together. This greatly facilitates students' understanding and mastery of the high-level skills needed in workplace settings.

Taiwan's current policies are oriented in the same direction, and we will continue working to enhance the learning effectiveness of TVE and if necessary, pass further legislation to refine the regulatory system.

### Localization of TVE and Continuing Education

Promotion of regional TVE must connect with local industries, to cultivate people with the particular skills they need and further drive the development of local industries. In addition, local TVE institutions must lead the way and offer relevant courses and subjects and provide channels and opportunities for local skilled people to continue studying in their particular technological and vocational areas. This will also facilitate social harmony.

TVE content is closely related to industry, but with the rapid development of emerging industries, a person's career development is no longer a simple path with an end. Even more emphasis now needs to





be placed on nurturing the transversal competencies of people currently in employment and people who want to transfer to other work or employment. This will make them better able to respond to changes in the future, and nurturing students' entrepreneurial spirit will help them to face challenges. Given this, occupational continuing education must be more strongly promoted, and the courses for people currently in employment and people who want to transfer to other work or employment, and the associated recruitment and assessment, must all be designed with a key focus on flexibility and practicality.

### Interact with Southeast Asia and the Wider International World

TVE related international cooperation and exchanges can be expanded at the national level, at the local level, and at the individual educational institution level.

At the national level, data about a potential exchange partner region or country can be systematically collected and analyzed, to identify the excellent features of its TVE system, operational patterns, course materials, and learning assessment, and understand how an exchange partnership could benefit Taiwan, before then establishing a formal cooperative relationship.

At the local level, smaller scale TVE exchanges can be undertaken between local industries and

their counterpart industries overseas.

At the school, college, and university level, students in Taiwan will be encouraged and provided with more international exchange opportunities. This international mobility is primarily designed to expand student's world view and develop their potential. International student exchanges will also strengthen the cooperative relationships between educational institutions in Taiwan and overseas and further serve to market Taiwan as a quality study destination and increase international student enrollments. In addition, Taiwan can establish its own qualification framework which uses learning result indicators as tools to identify different categories of qualification. This will make it possible to establish correspondences between different types of credentials and different academic degree levels issued in overseas regions and countries with those issued in Taiwan, and transparently present the standards, levels, and results of each. This will greatly assist learners with different educational backgrounds undertake further study, and it will also facilitate international employment mobility and international advanced professional learning.

In conjunction with the New Southward Policy, in 2017 the Ministry will begin increasing the training and education of technological and vocational professionals from ASEAN and South Asian countries, encourage two-way exchanges

of skilled professionals, and promote the following training projects: 1. Industry-Academia Cooperation Professional Courses for Foreign Students from ASEAN and South Asian Countries, 2. Short-Term Technical Training for Foreign Youth from ASEAN and South Asian Countries, and 3. Technical Teacher Training Degree Program Completely Taught in English for ASEAN and South Asian Countries. Taiwan can offer the strengths of our TVE higher education institutions to attract young students from these countries, and work with the ASEAN and South Asian countries to help train and educate the skilled people needed for ongoing development. In addition, more subsidies will be available for TVE higher education institutions to engage in

more international cooperation, and to improve their foreign language skills programs; establish more courses on the languages, business, and industries of Southeast Asia; and international trade and business elite intensive training courses for students from Taiwan (including second-generation new residents). The goal is to train professionals equipped with ASEAN South Asian languages skills, professional level English proficiency, an international worldview and perspective, business management skills, and other professional expertise required by the business and industry sector, who will be at the vanguard of Taiwan's initiative to foster sustainable, closer, mutually beneficial ties relationships with ASEAN and South Asian countries.







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