

2015

**TECHNOLOGICAL
& VOCATIONAL**
EDUCATION IN TAIWAN, ROC



Ministry of Education
September, 2015

Technological and Vocational Education in Taiwan, Republic of China

MINISTRY OF EDUCATION

SEPTEMBER, 2015

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Message of the Minister

For a long time, Technical and Vocational Education (TVE) has been an essential component of Taiwan's social development and upgrading of industry, equipping people with the technological skills needed. TVE has played a decisive role by nurturing the range of human resources required for our basic national infrastructure and for promoting economic development, and contributed enormously to bringing about what has been acclaimed as Taiwan's "economic miracle".

The purpose of TVE is not simply to pass on knowledge; even more, it hopes to teach students the practical application of knowledge and skills, making them able to transform vague abstract concepts into creative ideas, and transform these further into something tangible – valuable ideas are metamorphosed into commercial productivity. The Ministry of Education launched the Technological and Vocational Education Reform Project in 2009, setting out ten key strategies, and in the following year, during the National Education Conference, many tangible measures focusing specifically on nurturing human resources and industry development for the knowledge economy were explored. The implementation of Phase 3 of the Teaching Excellence Project has seen subsidies and resources provided to universities and colleges, and raised the quality of teaching in the higher education sector.

Building on the foundations laid by Phase 1 of the Technological and Vocational Education Reform Project, the Ministry of Education is now implementing Phase 2 (2013–2017) of the Reform Project. Its goals are: to ensure that graduates from all TVE institutions are all able to take up employment immediately; to comprehensively provide the highly-skilled high quality technological work force, adequately equipped with the diverse range of skill-sets needed for industry development; and to reshape society's image of TVE. These are all components of our goal of raising the overall competitiveness of TVE.

The policy of 12 years of basic education and the direction that TVE is taking both emphasize promoting adaptive learning and counselling to help students understand their own aptitudes and interests, with the key aim of preparing students well for their future participation in society and a suitable career. A variety of channels are provided to cater to students with a diverse range of abilities and prepare them to find an ideally suitable career in the future.

The excellence of today's Technological and Vocation Education is the result of our predecessors and society at large cautiously and conscientiously exerting their collective efforts, and we cherish this legacy. The Ministry of Education has published this introductory booklet to give people from all walks of life a clearer more comprehensive view of TVE in Taiwan and the directions our future policies are taking. We hope it will inspire even more technologically and practically inclined students to choose TVE. These students will be able to pursue studies in a field matching their personal interests, aptitude, and abilities. Choose TVE, put in your best efforts, your future prospects are sound! I encourage each of you in the TVE sector to continuously innovate and forge ahead and help spur TVE in Taiwan to new heights.



Se-Hwa Wu, PhD
Minister, MOE

Foreword by the Director General

Taiwan's Technological and Vocational Education (TVE) started in earlier times with the passing on of knowledge and skills in master-apprentice relationships or within families. We have now had a systemized approach to TVE for more than half a century. TVE has trained the enormous number of people who provide the skilled workforce behind Taiwan's economic development, and it has been recognized as a critical driving force behind social progress and prosperity.

To keep in step with the times, TVE must ensure that both the educational content and its delivery are always kept up to date, advancing together with modern developments, and genuinely achieve its goal of teaching practical skills and applicable knowledge. We must also never cease being responsive to the needs of our own social environment. This will represent fully integrating the goals of educational philosophy and that of teaching what industries actually require.

We are restructuring all aspects of TVE to ensure that the quality of TVE will constantly improve. This restructuring includes adjusting the overall system, vitalizing the curricula, and promoting employment related aspects. TVE trained graduates will be more competitive in the employment market. We are also encouraging the establishment of industrial colleges and academia-industry collaboration programs to facilitate the direct use of what students learn in industry settings, and generate a truly seamless alignment of academia and industry.

This booklet briefly outlines the historical development of TVE in Taiwan and its current situation, and comprehensively presents its distinctive features, major goals, and what lies ahead. Readers will find a wealth of useful information, and hopefully gain a deeper appreciation of the efforts and attentive approach of our TVE colleagues. Many many highly talented people are throwing all their energy into ensuring Technological and Vocation Education excellence and thereby Taiwan's economic development. I applaud their efforts.

Above all I believe that the general public's interest and comments will always be our greatest source of motivation to work hard to constantly enhance the quality of TVE.



Sophia Hsiang-Ping Ma, PhD
Director General,
Department of Technological and Vocational Education, MOE



1 Overview of Technological and Vocational Education

Our government has placed great emphasis on Technological and Vocational Education (TVE), especially in strengthening the ties between TVE and economic development. As a result, TVE has contributed greatly to Taiwan's economic prosperity over the years.

Taiwan's economic development has been tightly interwoven with the TVE development (Table 1). The government began to press forward with economic development plans around the 1950s, starting with advancing sweeping changes in agricultural production technologies while actively developing labor-intensive essential goods industries. TVE's primary domain at that time was agriculture- and business-related programs in senior vocational schools, focusing on providing the budding economy with sufficient direly needed entry-level workforces.

In the 1960s Taiwan moved into an expansion period of import-export businesses, witnessing a rapid growth in the number of small and medium enterprises that were, in the industry and business alike, all thirsting for skilled labors. In 1968, Taiwan started the nine-year basic education, abolished the junior vocational schools and instead rapidly expanded the senior vocational schools and junior colleges. Also, to meet the needs of advancing scale and quality of industries, the Ministry of Education (MOE) encouraged private sectors to participate and establish their own schools in these areas to provide even more middle-level labor force.

Table 1: Economic Development and TVE Development

Year	Focus of Economic Development	TVE Development	Student Ratio, TVE Highs vs. Traditional Highs
40	<ul style="list-style-type: none"> Successful Land Reform Increased agricultural productivity Developing labor-intensive essential goods industries 	<ul style="list-style-type: none"> Education in agriculture and commerce Attention to senior-level vocational schools 	4:6
50	<ul style="list-style-type: none"> Expanding import-export businesses 	<ul style="list-style-type: none"> Developing industrial and commercial vocational education Launching nine-year basic education Expanding the vocational education program and the number of schools and students Starting the 5-year and 2-year junior college systems 	4:6
60	<ul style="list-style-type: none"> Initiating the Ten Major Constructions Expanding capital- and technology-intensive industries 	<ul style="list-style-type: none"> Improving industrial vocational education and junior college education Establishing technological institutes 	6:4
70	<ul style="list-style-type: none"> Developing high-tech industries Developing petrochemical industries 	<ul style="list-style-type: none"> Overall upgrading the quantity and quality in industrial vocational education and junior college education 	7:3
80	<ul style="list-style-type: none"> Developing knowledge economy Planning Asia-Pacific Regional Operations Center 	<ul style="list-style-type: none"> Establishing comprehensive high schools Increasing colleges of technology Upgrading meritorious junior colleges to colleges of technology Upgrading meritorious colleges of technology to universities of science & technology 	5:5
90	<ul style="list-style-type: none"> Developing the Two Trillion & Twin Star Industries 	<ul style="list-style-type: none"> Maximizing the overall TVE Internationalizing the TVE 	5:5
100	<ul style="list-style-type: none"> Developing Six Emerging Industries, Ten Major Services Industries, and Four Major Intelligent Industries 	<ul style="list-style-type: none"> Focusing on matching the industries' workforce demand and student aptitude 	6:4



After the 1970s, Taiwan's traditional industries began with the transition into capital- and technology-intensive industries, and the demand for quality labor began to intensify. In order to elevate the quality of higher-level technological and vocational education, the MOE established the first technological college (Taiwan Institute of Technology) which is the forerunner of a now comprehensive TVE system that consists of vocational high schools, junior colleges, and colleges/ universities of technology.

At the beginning of the 1980s, the government gradually increased the ratio between senior vocational schools and general high schools, finally reaching the goal of 7:3. The vast amount of graduates from these senior vocational schools supplied the needed labors to the thirsting industry and allowed Taiwan's economy to quickly expand. By mid-1980s Taiwan faced tremendous pressure from internationalization and open market, and the demand for higher level of technological and business personnel also increased tremendously. The government thus encouraged quality junior colleges to upgrade to colleges of technology and quality junior colleges to universities of technology.

In addition, starting in 1986, more Comprehensive high schools (i.e., consist of both TVE and general high school curricula) were added to the system, and the aforementioned ratio was adjusted downward every year, finally reaching 6:4 in 2013. This ratio mirrored more closely to the needs of the market and time, indicating a more effective education system.

Starting 2009, the government began to promote a series of economic policies – including Six Emerging Industries, Four Major Smart Industries, and Ten Major Services Industries – aiming to induce R&D innovation, increase the value of industries, and strengthen the competitiveness of services sectors. TVE joined these efforts with all its resources to educate and train practical professionals according to their aptitudes and capabilities, so that TVE can once again contribute to the next wave of Taiwan Miracle.

The Educational Administrative Structures

TVE's administrative structure for Taiwan's education can be seen in Figure 1. The highest level of the entire structure is the Executive Yuan. MOE, directly under Executive Yuan, is responsible for all education-related matters in Taiwan.

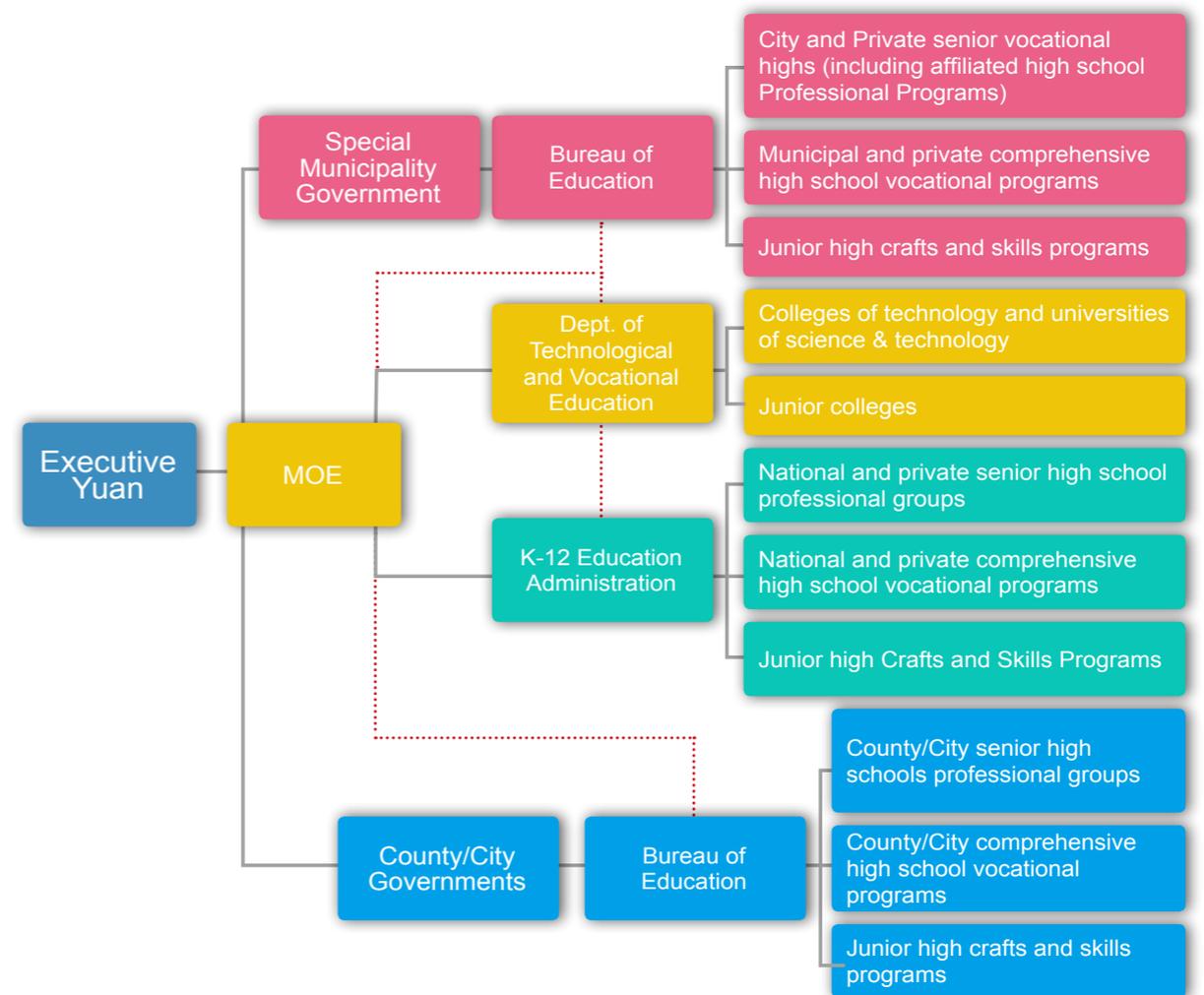


Figure 1: The Administrative Structure of TVE

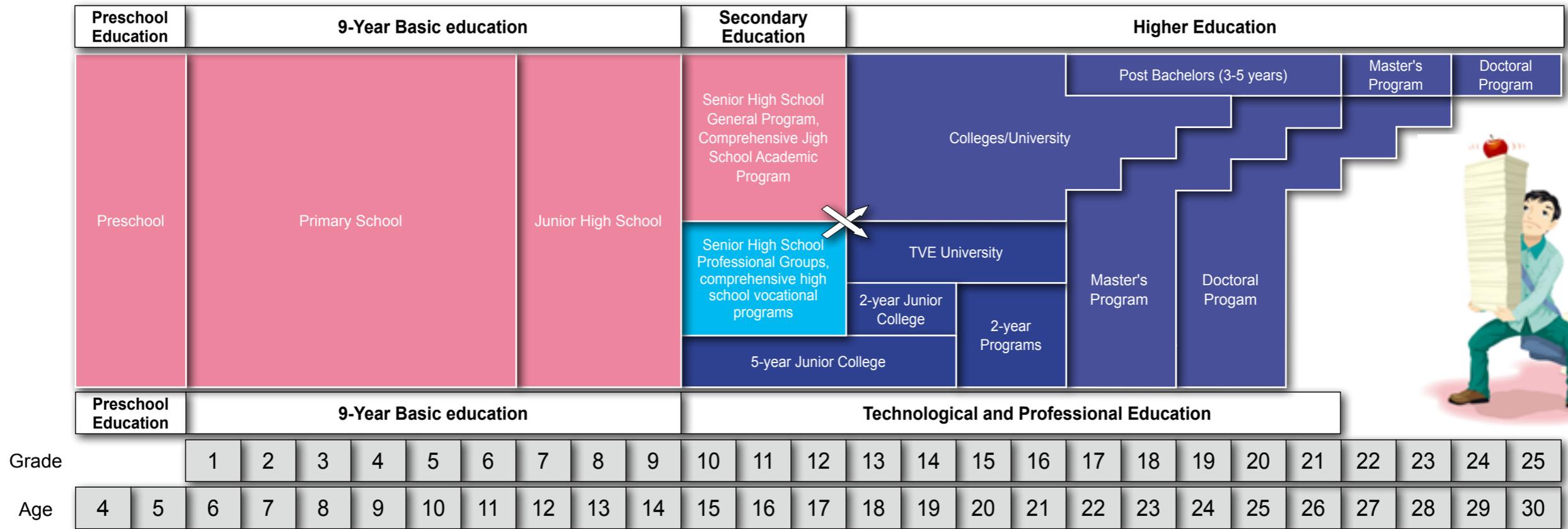


Figure 2: The Current System



The current education system (Figure 2) -- above junior high school level -- diverts into two major pathways: the general education system and TVE system. The TVE system consists of middle-level TVE and higher-level TVE. The middle-level TVE includes junior high crafts and skills programs, senior high school professional groups, and comprehensive high school vocational programs.

With the government's proactive attention to TVE's development, there are currently 155 senior vocational high schools, 14 junior colleges, and 74 universities/colleges of science & technology – totaling 243 – in operation. Details are shown in Figure 3.

- TVE High Schools (155)
- Junior Colleges (14)
- Colleges and Universities (74)

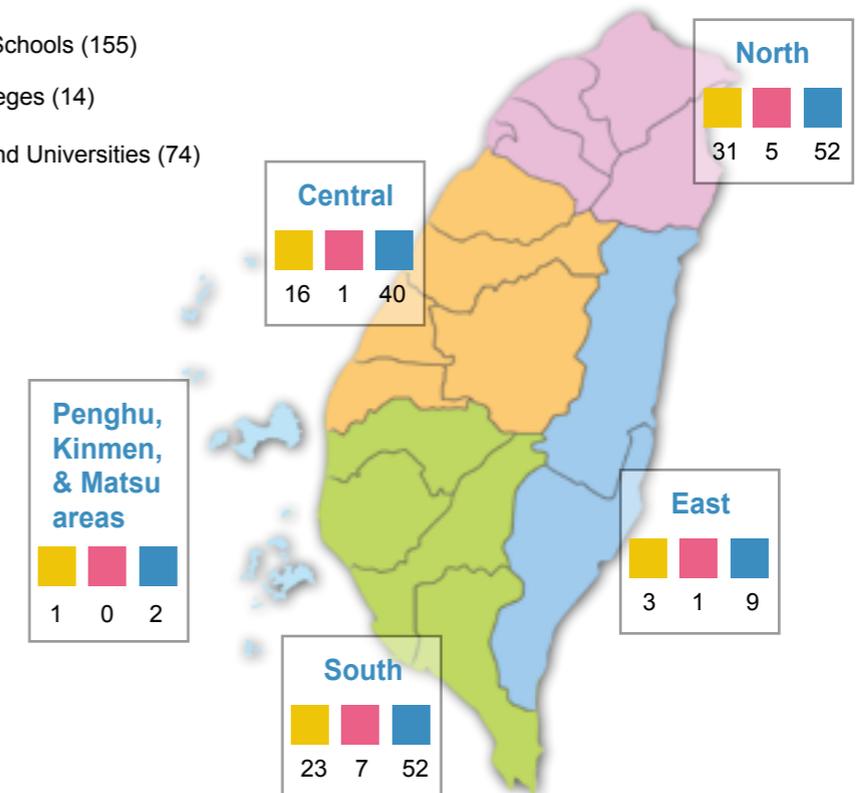


Figure 3: Number and Distribution of TVE Schools



2 Technological and Vocational Education Today

The current status of the two major levels of TVE (Middle- and Higher-level TVE) is described below.

Middle-Level TVE

The middle-level TVE consists of crafts and skills programs in junior high schools, professional groups in senior high schools, and vocational programs in comprehensive high schools.

Crafts and Skills Programs in Junior High Schools

Crafts and skills programs are career path courses offered to ninth graders who have aptitude and inclination in learning crafts; they are designed to enhance career exploration for students. Middle schools should offer one to four professional group(s) as electives for crafts and skills program students. Students may select one or two professional groups each at their first and second semesters to study. Those who choose “pull-out” mode may take 3-12 hours per week, and those who choose “special program” mode may take 7-14 hours per week. Students who selected crafts and skills programs will be allowed priority-entry to senior high school practical skills programs; they may also enter – through the multiple education paths – senior high school professional groups or comprehensive high school vocational programs.

Professional Groups in Senior High Schools

“Senior High School Professional Groups” is a three-year program and admits students with junior high school diploma or equivalency; upon successful completion of the program, students receive senior high school diplomas. To meet the diverse needs of students, additional programs for continuing education, cooperative work experience education, special education experiment classes, and Practical Skills education are also offered. Among these programs, practical skills education takes a student-centered approach and is concerned with diverse aptitude and appropriate development for each student; this program is designed especially for those students who show interest in learning technical skills and seeking a job in which these skills can be applied. The ultimate goal of the practical skills program is to allow all economically disadvantaged students to have a comfortable environment to learn specialized technical skills, as it provides the students with a major skill for life, and the society a stable source of technical labor force.

The professional groups include six categories: agricultural, industrial, business/commercial, marine/fishery, domestic science, and arts. Beginning in 2006, the curricula of 86 departments have been merged according to the professional attributes and job clustering into 15 career clusters. The program uses credit system by semester, and students are required to complete 160 credit hours. The program is a school-based program that places emphasis on providing students with core competence through practical learning to meet the rapid changing needs of the industries. The graduates from professional groups may choose to either continue on to higher education, to get a job, or to start their own business. If a student chooses to attend college, he or she may apply either to two-year junior colleges, colleges of technology, or universities of science & technology.





Vocational Programs in Comprehensive High Schools

To allow students more time to consider their track choices and to find the most suitable direction for their personal development, the Comprehensive High Schools were initiated in 1996, and it was incorporated to become part of the formal education system in 1999.

Comprehensive high schools admit students with junior high school diploma or equivalent. In order for students to fully understand their personal interest, aptitude, and the features in curriculum, and to be able to have an opportunity in career exploration and to make better career plans, both academic curricula (for college-bound students) and vocational programs (for job-bound students and those who prefer TVE higher education) are available in their junior years. The program uses credit system by semester. To highlight the schools' specialties, about two-thirds of the credit hours are planned by the schools themselves.

Students from comprehensive high schools have a broader path selection upon their graduation. According to their own interest and/or personal situations, they may choose to take the regular entrance examinations to enter general colleges, to take TVE entrance examination to enter two-year colleges, colleges of technology, or universities of science and technology; they may also participate in short intensive training offered by vocational training agencies before stepping into the job market.



Higher-Level TVE

The higher-level TVE can be classified into two strata of junior colleges and colleges of technology/universities of science & technology.

Junior Colleges

The junior colleges consists of two-year and five-year junior colleges. The two-year junior colleges have regular day-time programs and evening (continuing education) programs; five-year junior colleges, however, are day programs only. Two-year junior colleges admit students who have a diploma (or equivalency) from senior high school professional groups or comprehensive high school vocational programs. In either case, students from junior colleges receive an Associate Degree upon graduation.

The programs use credit system by semester; each school may create its own curriculum according to its special features and directions. The five-year junior college students are required to complete 220 credit hours to graduate, while students in two-year junior colleges are required to complete 80 credit hours. Instructors in these schools are appointed following the same process as universities, but experienced internship practice from the industries may also be recruited as instructors through *Regulations Regarding the Selection and Appointment of Specialized Technical Personnel at Junior Colleges*.

Junior college graduates may choose to start their own business, seek employment, or to continue education through two-year or four-year programs at universities/colleges of technology, or to take test to become transfer students to regular, non-TVE universities/colleges. Graduates also have the option of obtaining employment for a period of time and then return to higher education as In-Service Education students.



Colleges of Technology and Universities of Science & Technology

Colleges of technology and universities of science and technology were both established following the *University Act* which was legislated for cultivating highly professional and practical talents. Colleges of technology and universities of technology are both authorised to offer associate, bachelor, master, and Ph.D. degrees. The academic requirements for associate degree as well as the sources of students are the same as that of Special Skill schools. Bachelor's degrees are offered through four-year and two-year programs at universities/colleges of technology, both in turn are segmented into day program, continuing education program, and through Colleges of Continuing and Extension Education program (two-year). Each school may set its own admission requirements in terms of work experience and seniority at work, etc., for its In-Service Education student programs. The four-year programs and two-year junior colleges admit students from vocational schools and comprehensive high schools (or equivalency), the two-year programs admit students from two-year or five-year junior colleges (or equivalence). Students who finish two-year or five-year programs would be granted bachelor degrees.

In terms of curriculum, both two-year and five-year programs use credit system by semester. Four-year programs require student to complete 128 credit hours to graduate while the requirement for two-year programs is 72 credit hours. For graduation, the master's degree program students are required to complete 24 credit hours and a thesis, and the Ph.D. students must complete at least 18 credit hours and a dissertation. Instructors in these schools are recruited following the same process as universities, but professionals with enterprise-related and practical experiences may also be recruited as instructors through *Employment Guidelines for Professional Technicians Teaching at Universities*.





Statistics on TVE Schools

As of the 2014 academic year, overall there are 243 schools in the TVE system, totaling 1,007,131 students. The statistics on the number of students and schools is shown in Figures 4-7.

Figure 4: Comparison of Public and Private Institutions (2014 Academic Year)

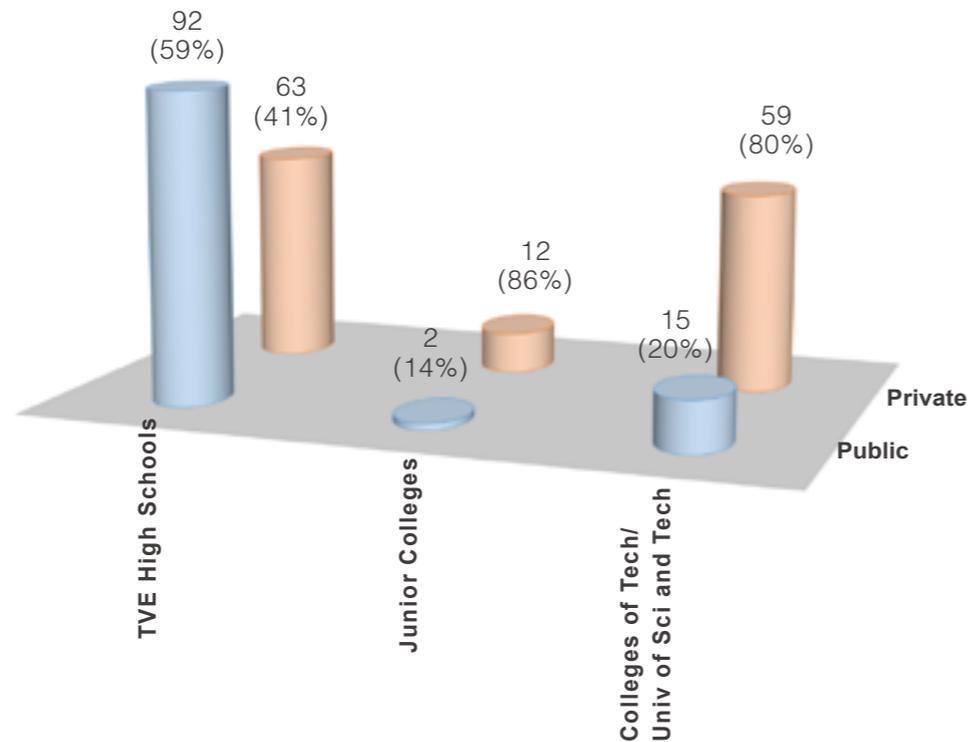


Figure 5: Number of Students Attending TVE Institutions (2014 Academic Year)

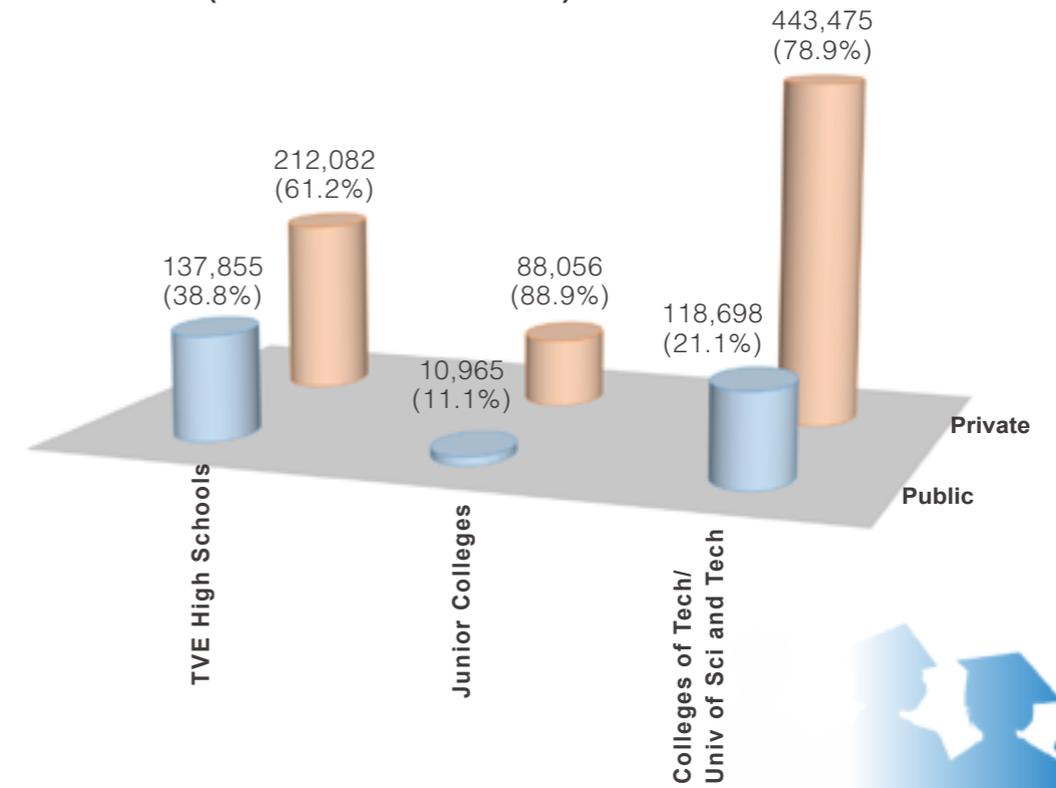


Figure 6: Number of Students Graduated from TVE Institutions (2013 Academic Year)

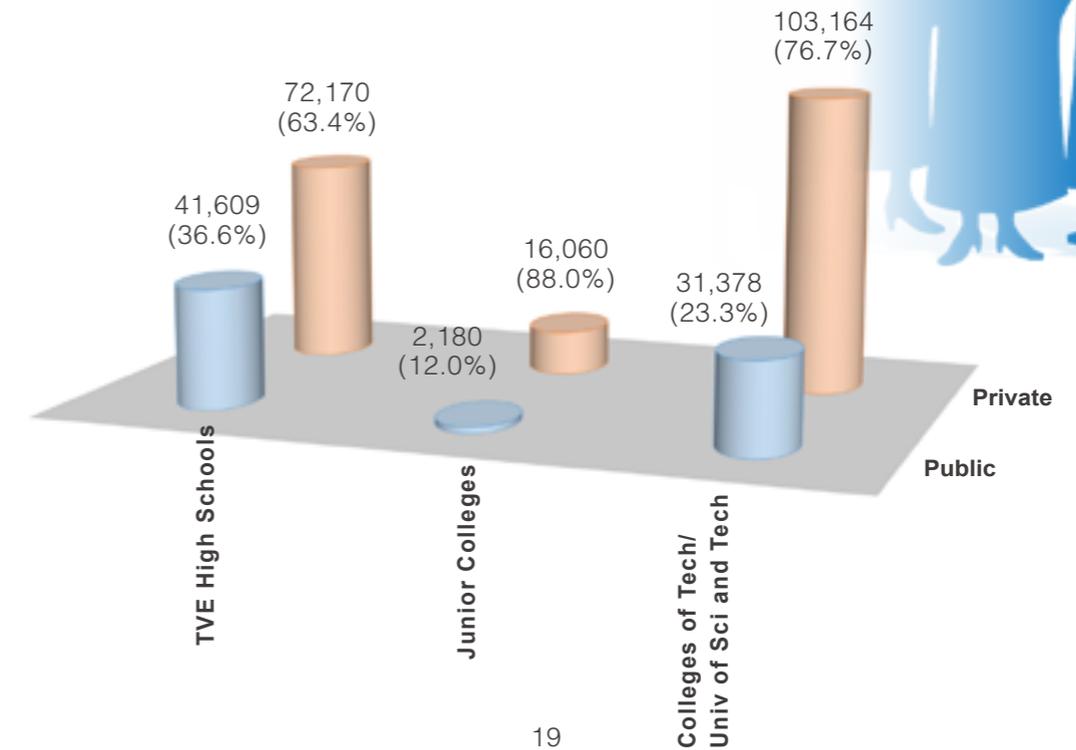
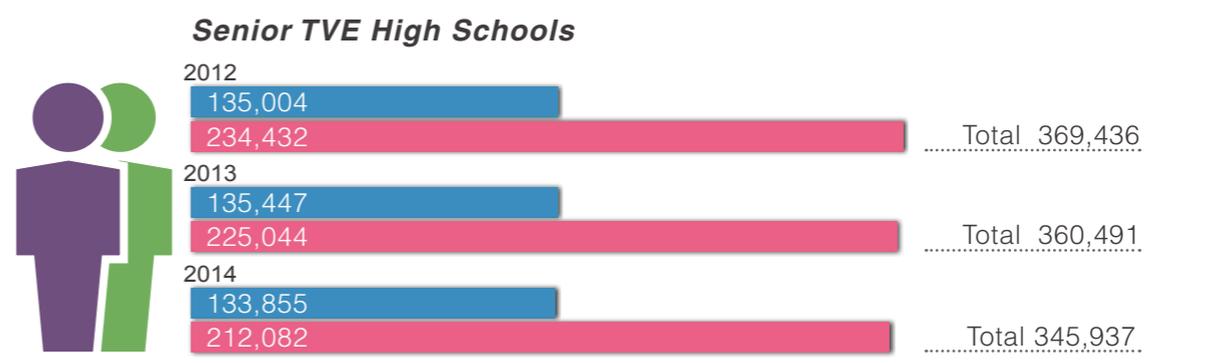
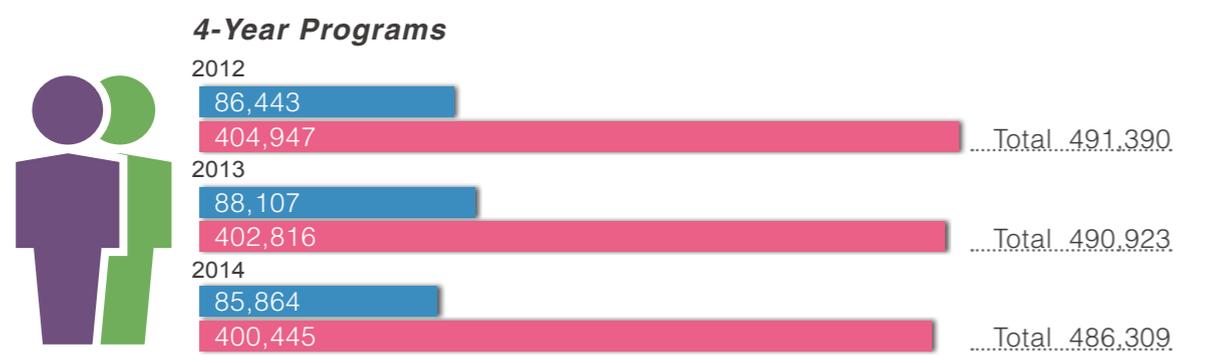
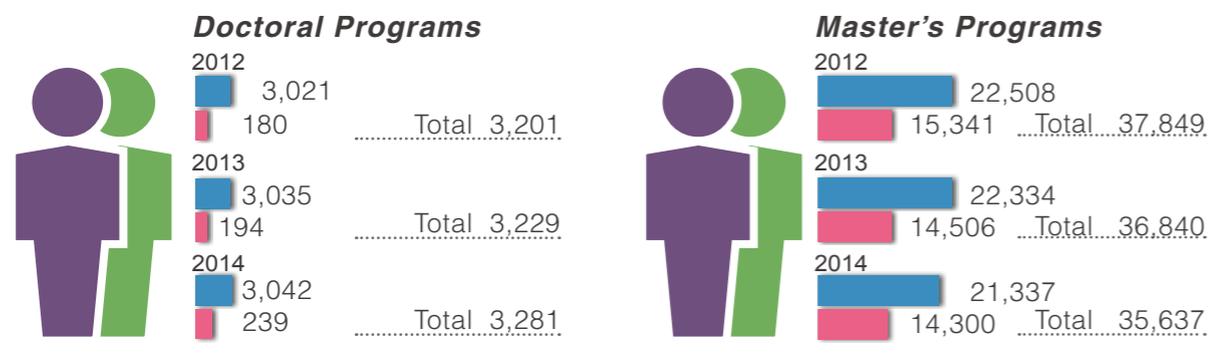
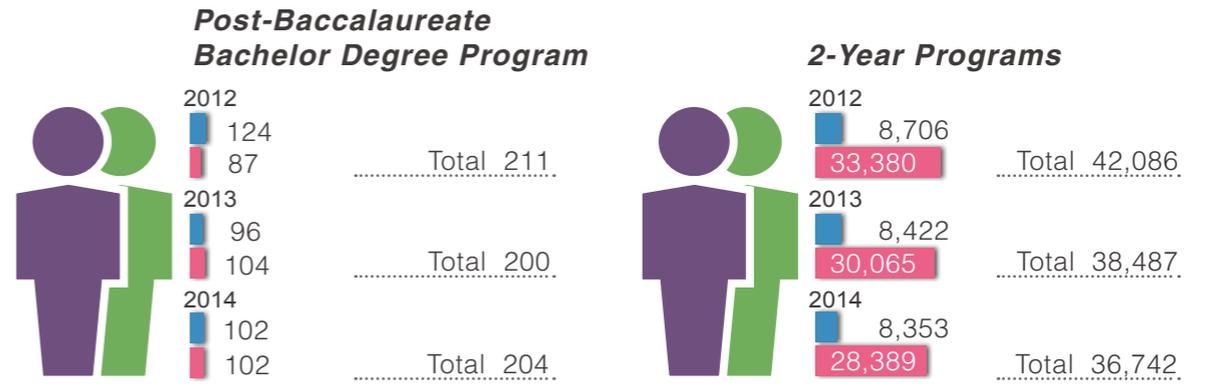




Figure 7: Comparison of Students Graduated from TVE Institutions (2012-2014)





3 Features of Technological and Vocational Education

Compared with other nations' education systems around the world, Taiwan's technological and vocational education has the following features:

Programs and systems: Comprehensive and Well-Rounded

TVE in Taiwan is now a comprehensive system that includes institutions ranging from junior high schools, senior high schools, junior colleges, universities/colleges of science and technology, to graduate schools with master's and Ph.D. programs. The different tracks within the system have been designed vertical continuity and horizontal flexibility of switching tracks, and the pipelines for recurrent education are also in place, so students and the general public alike may find suitable education opportunities at any stage of their lives.

Table 2: Numerical Comparison of Students Attending TVE Institutions (2014 Academic Year)

	TVE High Schools	Junior Colleges	Colleges of Tech & Univ of Sci & Tech
Public	133,855 (38.7%)	10,965 (11.1%)	118,698 (21.1%)
Private	212,082 (61.3%)	88,056 (88.9%)	443,475 (78.9%)
Total	345,937	99,021	562,173

Private Institutions: Proactive and Excellent

Private institutions are an important force in Taiwan's TVE development, and their presence exceeds that of public institutions. In terms of student enrollment, in 2014 academic year 61.3% of senior vocational school students were private institutions; and for Junior colleges was a staggering 80.4%. Private institutions have close connections with industries and enterprises, and their connections allow close match between TVE and market needs.





Performance Excellence in Industrial-Academic Cooperation

Another area of Taiwan's TVE emphasizes industrial-academic cooperation, which is responsible in matching education programs with the needs of industries. The current projects such as Dual System of Vocational Training Project, and Industrial-Academic Cooperation Plan, and Market-based Education Program are aimed to provide students with immediate employment upon graduation and the matching credential to excel at work. The government is also active in pushing industrial-academic cooperation projects in Taiwan's Industrial Parks, encouraging teachers and firms working together to find and work on R&D opportunities, such so that a win-win situation can be achieved in practical teaching and increasing firms' competitive advantages. Currently six Centers for Regional Industry Academia Cooperation are comprehensively pushing forward industrial-academic cooperation and intellectual property management, and their R&D results will be used in teaching our current and future students.

Programs Diversified and Adaptive

TVE responds to the various industry needs and student aptitudes with a diversified academic structure that seeks to provide students with programs that suit their inclinations and abilities, but simultaneously meets the demand of the job markets. In addition to senior high school professional groups, comprehensive high school vocational programs, junior colleges, and colleges/universities of technology (including the graduate programs), the system also includes the crafts and skills programs in junior high schools as well as the practical skills programs and cooperative work experience education in senior high schools. There are also continuing education programs in the higher education institutions, In-Service programs, and continuing education schools to meet the needs of non-traditional students. The entire academic structure is flexible and diverse. Besides the traditional agriculture, factory works, and business categories, this academic structure also offer curricula to match the needs of Six Emerging Industries, Ten Major Services Industries, and Four Major Smart Industries which provide students with wide employment opportunities.



Practical and Applicable Outcome and Achievements

The fundamental rationale of TVE emphasized teaching practical skills and applicable knowledge. To encourage those who are already excellent in their own crafts to continue their education; students can enter TVE higher education through multiple channels such as by excellent performance in skills or by referrals. Upon admission, the curricula are designed to emphasize projects and learning by doing; and students are strongly encouraged to obtain essential professional certifications. The same strong emphasis is evident in instructor recruitment and retentions. The instructors are required to have practical experiences and professional certificates before recruitment, and then are assigned to Professional Experts according to their specialties. Teachers may also be promoted by means of their technical reports instead of academic papers. All these examples strongly highlight TVE's focus on practical and applicable contents.



Outstanding Performances in International Competitions

“Learning by Doing” is the core feature of TVE schools because hands-on projects can increase learning effectiveness and help accumulate real-life experiences. Students in all TVE schools have been encouraged to enter international technical skills competitions since 2005. Recent performance in these competitions by TVE students has been very outstanding, and the design talent of Taiwan's youngsters has received international acclaim. Furthermore, beginning in 2005, the most exceptional teachers and students in all areas each year are selected and to be presented with Pride of TVE Award – the highest honor awarded in TVE. The finalists are selected based on the awards they have received and listed on each school's TVE Showcase website (<http://me.moe.edu.tw/award>), an award committee then decide the final winners.





4 Goals of Technological and Vocational Education

Taiwan's TVE has advanced remarkably over the years. Some of the main goals are listed below.

Committed Caring for the Economically Disadvantaged Students

Tuition Waiver for Senior High School Professional Groups and the First Three Years of the Five-Year Junior Colleges

As a support to the 12-year basic education and to reduce the family's financial burden, "Tuition Waiver Program for Senior TVE High Schools (including the first three years in the five-year junior colleges)" and "Same Tuition for Public and Private Senior High Schools Program" came into effect in 2011. Starting in 2014, all tuition for students from families with annual income of less than NT\$1,140,000 who enter senior high school professional groups (including the first three years in five-year junior colleges) are waived.

Table 3: Financial Assistance Programs for Disadvantaged College Students

Program	Description
Financial Aid	For students whose family annual income is below NT\$700,000. The aid will be granted by the private or public institutions according to the income level to reduce the tuition burden.
Living Expenses Financial Assistance	The institutions provide stipends to financially disadvantaged students through service learning opportunities. The amount of stipend should be reasonably fitting for individual student's monthly living expenses.
Emergency Relief Assistance	For low and very low-income families, or families with financial crisis or problems, schools should provide financial assistance according to the actual situation.
Other Benefits	Provide students of low-income families with free dormitory; the middle- and low-income family students will be given priority for dorm assignment.

Financial Assistance for Economically Disadvantaged College Students

To help financially disadvantaged students attending colleges, the government implemented Common Financial Assistance Programs for Colleges in 2005; this plan was expanded and amended to become Financial Assistance Programs for Economically Disadvantaged College Students in 2007. The provisions include academic financial assistance, living expenses financial assistance, emergency relief assistance, and preferential dormitory program. Table 3 gives the details of the programs.



Other Assistance Programs

To help financially disadvantaged students attend schools, there are also provisions in reduction/exemption programs on tuitions and/or fees (e.g., for children from low-income families and/or special situation families, for people with disabilities and their children, indigenous students), work study stipend, student loans, etc. Help Achieving Dreams is the portal where students may find information and help in finding suitable assistance program and completing the application process. The programs have been very effective in providing a stable learning environment for economically disadvantaged students in pursuing their dreams. (<http://helpdreams.moe.edu.tw/>)



Adopting a Multichannel School Admission System

Enrollment Control Quotas

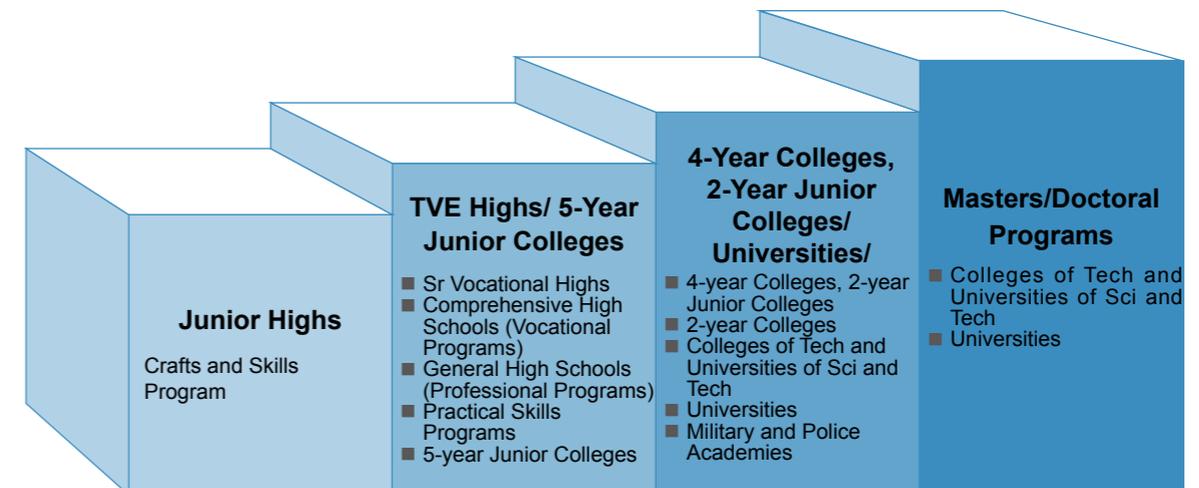
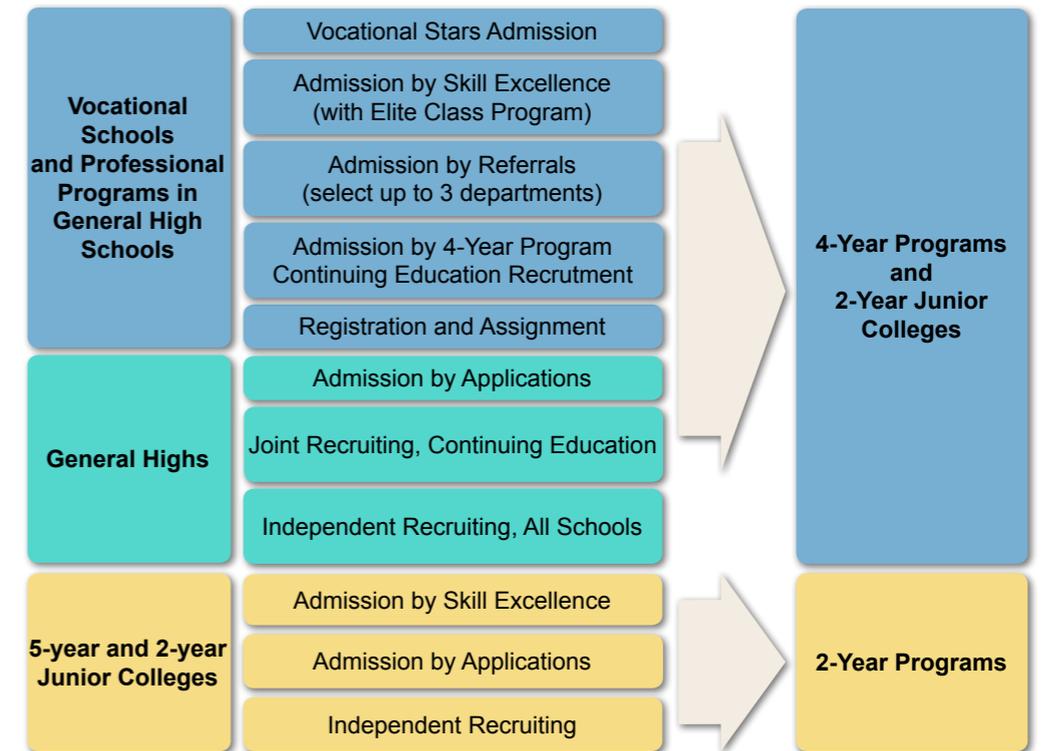
Taking into consideration the development of the entire nation, local economic development of own features, as well as the TVE institutions' development, an enrollment control quota is devised and given to each school, but allowing some flexibility in allocating this enrollment quota to school's colleges, institutions, departments, and curriculum programs – according to its own circumstances.

Examination and Recruitment Separation Program

The academic structure and the disciplines taught in TVE institutions are extremely diversified. The recruitment process is separate from that of entrance examination in order to integrate recruitment channels. This approach also simplifies the recruitment process and increase the quality of testing process, since now the two processes are handled by specialized units. The generation of entrance examinations is handled by the Testing Center for

Technological and Vocational Education, and all students are required to take test only once. The results are used by all multi-channel admission concerns, thus reduce students from the burden of taking different examinations for different subjects/schools. The major process in multi-channel admission system for TVE institutions is outlined in Figure 8.

Figure 8: Multi-Channel Admission System for TVE Students



Admission through Multiple Channels

a. Senior High Schools with TVE-related Programs

These schools include professional groups and practical skills programs in senior high schools, and vocational programs in comprehensive high schools. These schools basically take graduates from junior highs. For 2015, students may be admitted through two channels: by direct advancement or by special examinations. For direct advancement, no test score is required and students may apply in accordance to their aptitude, interests and inclinations to enter schools in their own school district. For this channel, neither entrance examination scores nor junior high grades are used for admission assessment, but students need to first receive aptitude assessment and consular advise during their junior high years prior to selecting high school programs -- TVE-related or not -- that most suit their aptitude, interests, and capabilities. For admission by special examinations, the technically inclined students may take the route of admission by referral; and academically inclined students may take related examinations and take the route of admission by assignment.

b. Five-Year Junior Colleges

Five-year junior colleges primarily admit junior high graduates through direct advancement. A multi-facet assessment of student learning performance, excellence in crafts and skills, academic balance, aptitude consultation, economic disadvantage status, and junior high grand exam scores is used – in conjunction with school-set criteria – as the basis of onsite registration and assignment.

c. Four-Year Programs and Two-Year Junior Colleges

These institutions have two major channels: one considers entrance examination scores and the other does not. The channel that does not take entrance examination scores as the basis also has several possibilities: (1) Admission by Skill Excellence, which recognizes student performances in competitions and student capabilities through obtaining certifications; and (2) the Vocational Stars Admission, for balancing the resources-divide between urban and remote area to provide equal entrance opportunities for remote-area disadvantaged students. The channel that does take entrance examination scores into account also has several possibilities: (1) admission by referral, to highlight TVE's valuing practical, applicable knowledge; uses both TVE Joint College Entrance Examination as well as certificates received and competition performance as admission criteria; (2) admission by registration and assignment, based on TVE Joint College Entrance Examination scores and student self-selected school choice priorities; and (3) admission by individual school recruitment. Furthermore, in order to give high school student who did not participate in TVE-related programs may have an opportunity to switch career course, they may apply to the Day Division in four-year programs. These students may also apply to Continuing Education Division in four-year programs by participating in continuing education joint recruitment in different areas or in independent recruiting conducted by individual schools.

d. Two-Year Programs

Two-year programs primarily admit graduates from two-year and five-year junior colleges. The regular (day-time) and continuing education programs of each school recruit students independently, and the TVE Joint College Entrance Examination scores are used as one of the evaluation criteria for admission.

Proactively Improving Teaching Quality

Implementing “Program for Adaptive Learning for Senior High School Students and Fair Distribution of Community Education Resources”

Fair Distribution Program for senior high schools was implemented in 2009 as a means to promote fair distribution of senior high school resources and to bridge the education divide; the program encourages senior high schools to adjust their curricula and features to maximize the cooperation with junior high schools. The program helps the senior high schools maintain the already-established horizontal integration with each other; vertically, it also extends to partner with junior high schools so that education resources -- such as instructors, curricula, and equipment -- can be shared. The purpose is to enhance the images and win the recognition from the parents and students in their respective communities.

Implementing “Quality Improvement Program for Senior High Vocational Schools”

As a means to build the foundation for the upcoming 12-year basic education, the government has studied and planned for the preparation of groundwork. The First Priority Regions of Education were studied and those senior vocational schools with development potentials were selected for special guidance and assistance so that the disadvantaged regions may have more quality schools in the future. Since 2007 academic year, Quality Improvement Program for senior vocational schools was initiated and would be implemented in three stages. All the public and private schools in Taiwan may submit their competitive proposal. Applicants are screened through two stages before the finalists are determined. As of 2014 academic year, 149 schools were selected for guidance and assistance; additionally, these school have received funding from this program as well.

Elevating Teaching Quality in Junior Colleges

Many junior colleges were first senior vocational schools; with the schools' structure and mission now changed, their teaching personnel must also make appropriate adjustment. In 2004 the MOE Subsidy for Technical and Vocational Institutions to Develop Overall Teaching Quality Enhancement was put in place, and this program was amended later in 2012 to become MOE Subsidy for Junior Colleges to Develop Overall Teaching Quality Enhancement, limiting the scope to only junior colleges. According to their individual strengths, resources, vision and direction of school development, the applicant schools submitted plans to elevate teaching quality, strengthen student learning effectiveness, and improve curriculum and course planning – all with the final goal of elevating the quality of overall education.

Implementing “Teaching Excellence Projects for Universities/ Colleges of Technology”

Teaching Excellence Projects for Universities and Colleges of Technology began in 2006 for improving teaching quality in higher education institutions, and for developing best practices in teaching excellence in Taiwan. The primary objects are: (1) to improve instructors' professional quality in teaching, (2) to develop sound curriculum planning, (3) to strengthening student motivation and effectiveness in learning, (4) to establish evaluation systems, and (5) to establish and improve institutional teaching quality related structures and systems.



Strengthening Faculty's Practical Teaching Capabilities in TVE Institutions

Three tasks were laid in place in 2010 to strengthen the practical teaching capabilities for TVE faculty members: (1) to encourage institutions to appoint new faculty members with practical industrial experiences in the field they will teach, (2) to support TVE faculty members to conduct research and services in public and private sectors, (3) to support TVE colleges to bring in professionals from industries to joint-teach classes. and (4) to establish faculty promotion process that includes sound technical report or practical R&D outcome as evaluation metrics.

Infusion of Industry Resources for Collaborative TVE Teaching

For cultivating quality professional talents with practical capabilities and employability, starting in 2010 TVE institutions, and TVE highs are encouraged to adopt the dual-instructor system. Thus, with the infusion of professionals and experts from the industry, the connection between TVE education and industries can be strengthened.

Encouraging Students to Participate in All Competitions

To motivate students to become proficient in professional skills, to obtain excellent practical capabilities, and to possess global perspectives, the program for encouraging students in TVE institutions to participate in international technical skills was expanded in 2005, either through cultivating contestants for international competitions or sponsoring international competitions themselves. Starting in 2010, students or teams with high performance have received support in airfare as well as food and lodging. Such participation in international or domestic competitions increases students' practical capabilities, professional competitiveness, and international recognition.

Substantiating the Professional Certification System

For strengthening skill levels for students in TVE institutions and to internalize their professional capabilities, the professional certification system must be substantiated. Faculty and students alike are encouraged to actively obtain technical certifications. Conducting Project Technician Skill Tests, modifying rules and regulations for the entrance examination procedures, as well as implementing special projects were all used as motivations. This has to be done to respond to the structural changes in industries, the increases in the number of high-level technical personnel needed by the industry. Students and faculty must be motivated to obtain professional certification both in quantity and quality. Only by doing so can the professional competencies of the faculty can be strengthened, and the teaching quality as well as student competitiveness in job market can be elevated.

Promoting Evaluations for TVE Institutions

Senior Vocational High Schools

The second-stage evaluation was implemented for the 2011-2015 time period as a means to ensure the quality of education. A school and/or the discipline shall be placed under probation and guidance if it receives less than satisfactory grades in terms of school operations or professional curriculum.

TVE Higher Education Institutions

To meet the demand of international higher education development and industrial development, the evaluation will change from assigning grades to accreditation in the new cycle of TVE Institutional Evaluation (2014-2018 academic years for universities of technology, and 2015-2019 for colleges of technology), as to help institutions develop their own specialties.

Cultivating Industrial-Academic Cooperation Talents

Student Off-Campus Internship Program

The fundamental rules and guidelines for supporting student internship outside of institutions were legislated in 2010 to encourage TVE institutions to set up required and elective internship courses, in order to substantively promote the internship curriculum.

Post-Baccalaureate Second-Major Program

This program offers students who have already obtained at least a bachelor's degree and have satisfied the military obligations to learn to obtain professional practical experiences and cross-disciplinary learning. The curriculum is meant to strengthen the employability of students and to induce student job placement upon graduation, and the curriculum is designed to meet the needs of industry by combining courses from different departments or even colleges. The time restriction for completing the curriculum is one to two years, and students are assisted in obtaining professional certifications, practical experiences, or foreign language skills. This restriction could be relaxed depending on the characteristics of each curriculum and shall be set by each individual institution.

Industry-Enterprise Human Resources (HR) Supporting Program

Through special project subsidies, MOE encourages TVE higher institutions to establish Industry-Enterprise HR Supporting Program to address the current human resource demands in the market. This program, with student employability as the focus, shall match these urgent needs with corresponding specific curricula (some shall be taught by industry experts) to cultivate professionals with immediate marketability.

Special Industrial-Academic Cooperation Classes

Five Special Classes/Short Curricula (see Table 4) are in action through tight interactions between the industry and academia to cultivate the talents needed by the industry.

Table 4: Types of Classes for Cultivating Industrial-Academic Cooperation Talents

Types of Classes	Description
Practical Skills Short Curriculum	Three years, tuition free; as an extension of Technical Skills program in junior highs; courses concentrate on practical experiences to prepare students for employment.
TVE High School Cooperative Work Experience Education	Three years, tuition free; may be one of the three models: rotation, staged, and internship; the most common one is rotation.
Industry Special Needs Classes	Three years, tuition free; institutions apply admission by direct advancement to accept students; the instructional equipments and practical training materials are subsidized through special projects to strengthen practical training/teaching.
Industry and Academia Cooperation	This initiative allows flexible connection of curricula from various levels of institution and participating firms. Take the Three-in-One option as an example, it is a cooperation of TVE high schools, TVE junior colleges, and participating firms; and the Four-in-One option adds Local Offices of Workforce Development Agency, Ministry of Labor, to the mix. Several other options that include 2-year baccalaureate program in the curricula combination are also available.
Industrial-Academic Cooperation Master's Special Classes	Invite partner firms to jointly plan curriculum, cultivate talent cultivation, and offer employment consultation; as a basis for industrial and academic cooperation.

Emphasizing Industrial-Academic Cooperation Innovation and R&D

Consummate Industrial-Academic Cooperation Rules and Regulations

As the number of industrial-academic cooperation in junior colleges and above increased and the patterns grew to be more complex, the MOE amended the December 2014 *Statute for Institutions of Higher Education Implementing Industrial-Academic Cooperation*. The primary purpose of this amendment is to guide the institutions to strengthen their operative mechanisms for the industrial-academic cooperation, specifying that the institutions should conduct comprehensive planning according to their own unique characteristics in teaching and research, and the institutions should set policies to promote internal personnel development, technological R&D, and the utilization of intellectual properties that are related to the industrial-academic cooperation. Among these subject matters, the utilization of intellectual property and related policies should abide by the principles and intentions of *Fundamental Science*

and *Technology Act* (amended and became effective in December 2011) and create rules and systems for a comprehensive intellectual property management mechanism, including the distribution of cooperative R&D profit and benefit, the resolution of conflict of interest, and protecting the participating teachers and students from breaking the laws unintentionally.

Establishing Regional Industrial-Academic Cooperation Centers

Six Regional Industrial-Academic Cooperation Centers have been established to integrate the windows for sharing industry-government-academia resources. These centers assist regional partner institutions in industrial-academic cooperation efforts and to increase cooperation forces. These centers provide industries with a platform for sharing professional information on futuristic and practical R&D results; they also help construct mechanisms for managing and utilizing resources, processes, and R&D results for industry-academia cooperation.

Promoting Industrial-Academic Cooperation Plans in Industrial Parks

Institutions are encouraged to meet industries' needs according to their own specialties and submit project R&D or innovation plans in the form of Production Projects to help enterprises in the industrial parks resolve their problems. These projects should include students so they can "learn by doing" and pick up practical experiences. Thus, the gap in labor needs between what academia can supply and what the industries really need can be narrowed.

The Plan for Developing Technological University Paradigms

The purpose of The Plan for Developing Technological University Paradigms is to clearly orient TVE higher education institutions with cultivating professionals and industry-academic cooperation and innovation R&D squarely at the center. The TVE higher education institutions shall focus on the industry-academic cooperative R&D, firmly embedding fundamental technologies and adding values through technology transfers; the teaching goals should promote teaching practical skills to increase student implementation capabilities and competitiveness. These are extremely important in driving the reforms of TVE structure and systems as well as to return the original intent and features of technological and vocational education to TVE higher education institutions.

The project was initiated in 2012 with the selection (with financial grants provided) of six institutions to be developed into science and technology university paradigms; two universities will also establish Industrial Academic R&D centers. This four-year project shall commence formally in 2013 to subsidize 12 universities of technology to develop into best-practice paragons for similar institutions. The grant-receiving universities shall focus on the application technology and human resources need of domestic industries, to integrate resources in teaching, intellectual property, other industry-related resources in the region, and each university establishes its innovation development centers in accordance to its own distinctive characteristics to become the driving force behind the development of feature industries of Taiwan.

Developing International Cooperation and Exchange

Admission of International Students

For expanding the number of international students admission, TVE institutions are encouraged to promote international cooperation projects such as cross-national academic cooperation and/or student/teacher exchange programs in order to attract international students to study in Taiwan, enrolling in degree programs, short-term programs, or Chinese language programs or other related curricula. As a result, the global perspective and competitiveness for TVE institutions can be enhanced. The activities are shown in Table 5.

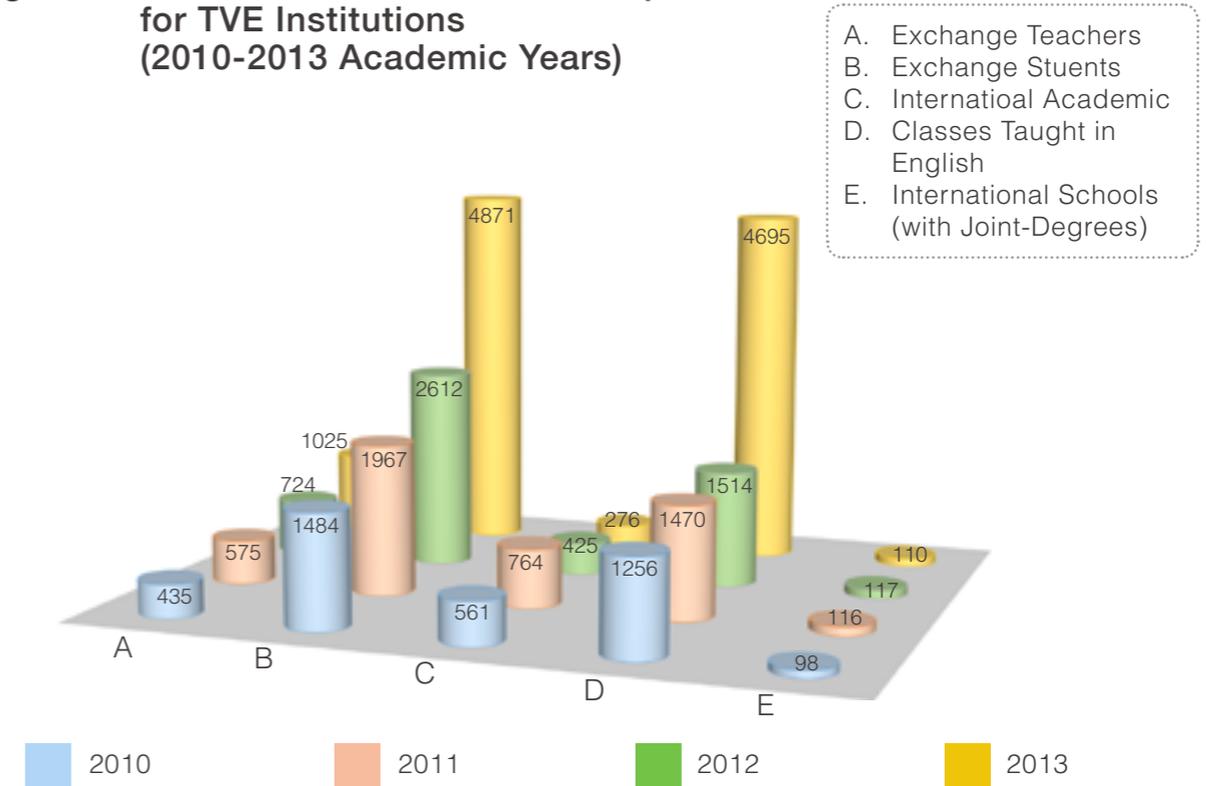
Table 5: International Students Admitted to TVE Institutions (2010-2013 Academic Years)

Academic Year	2010	2011	2012	2013
in Degree Programs	2,245	2,667	3,103	3,490
in Short-term Study Programs	672	903	1,358	1,358
in Chinese Language Programs	737	826	935	815

International Cooperations and Elevating Student Language Capabilities

To expand the global perspectives for faculty and students at TVE institutions and to increase student employability and competitiveness in job market, and to create a sound international environment (including campuses, curricula, and administrations), several measures have been implemented. Other than providing grants for TVE institutions to participate in international cooperations and to elevate students' foreign language capabilities, instructional materials and competence metrics in Business English for TVE institutions have also been designed and published as a means to gradually establish a self-learning platform for professional English. These efforts focus on practicality and aim to improve the language capabilities students will need in their professional fields, so their employability and competitiveness can be increased. The activities for TVE institutions' international cooperation in 2011-2014 academic years are listed in Figure 9.

Figure 9: Activities in International Cooperation for TVE Institutions (2010-2013 Academic Years)



Linking Industry's Technological and Vocational Reformations

In order to substantiate the Economic Power-Up Plan and balance the domestic labor force needs, basing on the foundation set forth by the first stage of Technological and Vocational Education Reform Project and consulting the similar projects of advanced nations, the legislative body has proposed the second stage of Technological and Vocational Education Reform Project (2013 to 2017). The new stage primarily tackles the goals from three aspects with nine strategies: (1) Structure Adjustment (policy restructuring, department and subjects adjusting, and pragmatic recruiting), (2) Curricula Vitalization (curricula flexibility, facilities and equipment renewal, and pragmatic strengthening), and (3) Occupational Placement Enhancement (career planning and connecting, innovation and entrepreneurship, and certificate-ability consolidating). All strategies focus on the substantiation and deepening internalization through step-by-step and phase-to-phase actions, expanding and inclusion from individual points to the overall system. The goal of the project is to ensure that "all graduates from all TVE institutions have the ability to take up employment immediately," "sufficiently providing the quality technological labor force needed by the development of industries," and "reshaping the society's images on TVE" – thus, reaching the goal of elevating the overall competitiveness of TVE.



5

Outlook of Technological and Vocational Education

Implementing Twelve-Year Basic education

To increase the quality of her citizenries and to rationalize junior highs, allowing junior high schools to become adaptive, active, innovative, high quality, and excellent, thus elevating the quality of education in senior vocational high schools, Taiwan began completely implementing twelve-year basic education in 2014 academic year. This twelve-year basic education is citizen's rights and not obligation, therefore its characteristics are "non-forced," "admissions mostly through direct advancement," and "tuition exemption." From 2014 most students are admitted without having to take entrance examinations; the tuition for senior vocational high school students (including the first three years of those in five-year programs) will be exempted, first with only the first-year students but expands annually until covering all students.

Popularized and In-depth Holistic Education

To cultivate students with humanistic literacy, social concerns, and international perspectives, TVE institutions are encouraged to integrate general education curricula with professional curricula and to create cross-departmental and cross-disciplinary courses and programs. This increase of dialogs and exchanges between the departments of general education and professional ones would allow general education to have a more in-depth application of the concept and design of the curricula and teaching strategy. Through providing diversified general knowledge courses with teaching designs that are more life-like, student interest in learning may be increased. Institutions are also encouraged to create labor learning and service learning curricula that contains cultural concerns, so the students may "learn by doing" and "practice what they were taught" to actually implement and experience the holistic education.

Elevating Teaching Quality in Higher-Level TVE Institutions

In order to elevate the overall quality of TVE, the MOE Implementation Directions Regarding Grant Subsidies for Technology Colleges/Universities Promoting Teaching Excellence and MOE Subsidy for Junior Colleges to Develop Overall Teaching Quality Enhancement are continued, and through grants to guide TVE institutions to develop sound management structures/systems and action plans to assure and improve teaching quality. Instructors are encouraged to strengthen practical teaching and to adjust/reform curricula in school in order to cultivate professional talents with balanced theory and practice background can be cultivated.

Facilitating TVE Institutional Development through Evaluation

For guiding TVE institutions to develop their special features, to increase teaching quality, and to cultivate quality talents – all following the international higher education trends and the needs of the development of industries – TVE Evaluation will be changed from Grade System to that of Accreditation, and from criterion-referenced to self-referenced; thus allowing each institution to develop its own features and return to using evaluations as the basis of self-improvement.

Cultivating Practical, Application-Oriented Professionals

The purpose is to plan curriculum reform in TVE institutions' practical curricula and cultivate instructors' practical professional capabilities, thereby returning to the original intent of TVE being practical and application-oriented, as well as expanding the model of cultivating talents through tightly-woven industrial-academic relationships. This is done to increase student competitiveness in the job market in the future. The related plans are: (1) implement the Plan for Technical and Vocational Institute Student Off-Campus Fieldwork Courses; (2) implement the Plan for Technical and Vocational Institute Instructors to go to Public and Private Sector Institutions for Research and Study Service; (3) implement the Plan for Technical and



Vocational Institutes to Hire Neighboring Industrial Sector Experts to Co-Teaching in Class; (4) implement post-bachelor second major degree programs; (5) continue to conduct all types of industrial-academic cooperation special classes; and (6) implement the Plan for Developing Technological University Paradigms; (7) Establishing a platform for the higher TVE institutions and the industries, tightly linking industry needs and to jointly cultivate talents; (8) Encouraging higher TVE institutions to create Market-based Education Program in order to establish mechanisms for customizing professional curriculum for to meet the market demand.

Becoming a Key Platform in Higher Education in East Asia

In order to actively introduce and export the higher education, TVE institutions are given resources to seek international cooperation to elevate the foreign language capability of their students, actively setting up all-English curricula, degrees, and classes, and to provide financial support to priority schools to open diversified and multi-channel curricula. Furthermore, TVE institutions are encouraged to apply for opening special classes for international students as stipulated in MOE *Regulations Regarding International Students Undertaking Studies in Taiwan*, and conduct transitional education through opening special classes abroad as stipulated in MOE *Directions Regarding Transitional Education Application and Review Process*, as to actively export our quality higher education.

Actively Promoting Academic Exchanges Across the Taiwan Strait

After the amendment of *Act Governing Relations Between the Peoples of the Taiwan Area and the Mainland China Area*, *University Act*, and *Junior College Law*, active efforts have been made in studying ways to vitalize Cross-Strait academic exchanges with China. Because of restrictions from national security, past history, and social, economic, and cultural factors, the process of expanding cross-strait academic exchange has been gradual in nature. Besides continuing the process of degree recognition for Chinese universities and admission of Chinese students, based on the foundation of academic exchange programs, efforts are being made to elevate the quality of conferences, visitation, and faculty/student exchange programs. Admitting junior college graduates from China to TVE two-year program has also been pilot-studied. It is the goal of the program to induce friendly interactions through these increased cultural/ academic exchanges.

Exploring Diverse Recurrent Education

TVE institutions are encouraged to create recurrent education special classes to the general public in order to provide channels to continuing education while employed. Currently such opportunities are offered by TVE-affiliated continuing education schools and continuing education programs in junior colleges; but institutions are encouraged to open other industry-academia cooperative recurrent education special classes as well as off-campus recurrent education special classes specific to people in Hualian-Taitung remote regions. There will be continuing effort in improving and simplifying existing recurrent education structure as well as in assisting TVE institutions in more flexibly consolidating and utilizing teaching resources to create practical special classes that match the expectation of the public and the needs of the industries.

Strengthening Social Services and Responsibilities

TVE has close ties with industry practices. To actually “strengthen services to the society and contribute to the economy for the society,” TVE continuously explores new ways to cultivate talents and develop technological consultation mechanisms for the industries. It also encourages institutions to appoint, base on their specific R&D characteristics and resources, intellectual property management personnel to devote in R&D planning and the application of results. Thus, institutions may elevate the commercialization of its intellectual properties from increasing quantity to that of improving quality, resulting in establishing an environment that induces technology transfer and research and development. In addition, institutions need to follow the directives outlined by the rules and regulations in industrial-academic cooperation to fortify the exchanges and utilizations of human resources between academia and industry; and finally, based on the industry needs, to construct innovation R&D platform for cross-institutional intellectual property cooperative operations and industry-academia partnership alliances, so the institutions may become the sources for driving the industry’s innovations.



Technological and Vocational Education in Taiwan, Republic of China

Publisher: Se-Hwa Wu (MOE)
Editorial Board: Technological and Vocational Education, MOE
Address: No.5, Zhongshan S. Rd., Zhongzheng Dist.,
Taipei City 10051, Taiwan (R.O.C.)
Phone: +886-2-7736-6731
FAX: +886-2-2397-6800
Issue Date: September, 2015 (1st edition, 1st print)
Price: NT\$70
Editors: Sophia Hsiang-Ping Ma, Ming-Yuan Wang, Ye-Yeh Chu,
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Translator: Pete Chong
Art Designer: Chin-Hsiang Lin, Rong-Wei Chen, Yu-Wen Tseng
GPN: 2010002059
ISSN: 2223-5191
Photographs: MOE, National Formosa University, National Kaohsiung
Marine University, National Kaohsiung University of Hospitality
and Tourism, National Pingtung University of Science and
Technology, National Taipei University of Nursing and Health
Science, National Taiwan University of Science and Technology,
National Yunlin University of Science and Technology, Wenzao
Ursuline University of Languages, Far East University,
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University of Technology, Taipei Municipal Da-An Vocational
High School

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Publishing) / +886-2-3322-5558 #173
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ISSN 2223-5191



9 772222 972007

GPN: 2010002059

PRICE: NT\$ 70