

IV. Extending Taiwan's Vocational Education System to Central America

Taiwan's Technical and Vocational Education Development Experience

Hailed as an “economic miracle,” Taiwan’s economic growth over the past half century has owed much to the establishment and development of vocational education. When the country’s development started in 1948, there was an urgent need for labor, and technical colleges were instructed to use applied science in order to train technical manpower. In 1976, in the midst of rapid economic growth, the country’s educational goal was reformulated to “teaching applied science and technology to train professional personnel with practical skills.” The emphasis on “practical” and “professional” shows how the ROC’s technical colleges shifted their course to keep up with the country’s economic growth.

Vocational Education and Economic Development

The ROC’s economic development can be divided into three periods: the agricultural period, the industrial period, and the information technology period. Apart from the government’s economic development policies and guidance, and the flexibility and resilience of SMEs, a key factor that fostered rapid growth was Taiwan’s abundant manpower resources.

In the early years after World War II, the goal of vocational education was to train various types of basic technical workers. In the early 1960s, 56 percent of the labor force was employed in the agricultural sector, and only 17 percent in industry. In order to train the manpower needed for the development of agriculture and basic industries, the government actively increased the number of primary and secondary vocational schools.

As industry’s demand for specialized technical personnel rose, vocational schools meeting the needs of primary industry began evolving into institutes of agriculture and technology, and industrial vocational schools started appearing.

The rapid expansion of Taiwan’s industrial sector by 1965 created a tremendous demand for technical manpower. From the mid-1960s through the 1970s the government began actively developing higher technical and vocational education.

The mass production of industrial goods not only increased the demand for basic and higher level technicians, but also led to a demand for commercial technicians skilled in the selling and marketing of industrial products. The establishment of commercial vocational schools and the transformation of industrial vocational schools into schools of business and technology during this period provided the manpower needed by business and the service industry.

After 1991, the emergence of information technology caused a rapid transformation in the industrial structure. As vocational students become more motivated to pursue higher education, the government responded by allowing technical colleges to transform themselves into institutes of technology and allowing universities to establish two-year technology programs. In addition, the government also began actively encouraging the planning and establishment of community colleges. It also implemented an extendible higher vocational education policy during this period.

There are three main factors in economic development: labor, capital and technology. Among these, the improvement of technology is considered to be the “engine” in economic growth. Along with the acceleration of capital, the improvement of technology raises labor productivity. However, before the improvement of technology can be implemented, the enhancement of human resources is required.

In the process of economic development in the ROC, different manpower needs existed during different developmental stages. Thanks to the dynamic evolution of national planning, the vocational education system’s legal and institutional framework was modified at appropriate times to achieve quality and quantity goals. This allowed the vocational education system to continue to provide the personnel possessing the various types of skills and levels of expertise needed for economic development.

The goals of vocational education are to provide the manpower needed for social development and to train students in job skills. All levels of vocational schools in Taiwan therefore take the training of various grades of professional technical personnel as their chief goal. Because technical schools at all levels emphasize practical skills and professionalism, the overriding consideration in the planning of vocational education is economic development.

Transfer of Taiwan's Vocational Education Experience to Central America

Background

In view of the fact that Taiwan's vocational education system has been a major factor behind the country's economic success, many friendly countries have requested the Council of Labor Affairs' Employment & Vocational Training Administration to establish training centers in their countries or to train vocational instructors for them.

In order to help Costa Rica develop its economy and to further the ROC's policy of pragmatic diplomacy, Dr. Mao Kao-wen, former education minister and current ambassador to Costa Rica, took advantage of his experience at the Ministry of Education to assist the Costa Rican government in implementing a vocational education improvement plan. This plan incorporates the reconstruction of the vocational curriculum, the writing of new technical textbooks, the acquisition of additional laboratory equipment, and the improvement of teacher qualifications. So far the plan has succeeded in improving the quality of vocational education and training in the fields of electronics, mechanical engineering and computer science at Costa Rica's seven vocational high schools, two community colleges and one technology center. The implementation of the plan is meeting the developmental goals of Costa Rican industry.

The objectives behind the ICDF's acceptance of the important mission to promote the ROC's vocational education experience throughout the Central American region are clear: to provide comprehensive assistance to friendly countries displaying the promise of economic take-off; to help the private sector to develop; and to establish a viable economic infrastructure. It is hoped that the ICDF's multidirectional approach of improving manpower resources and raising the quality of working techniques will help the Central American countries to enjoy industrial growth and economic development.

The ICDF has discussed implementing a "modernized vocational education" program with the government of El Salvador, and also intends to draw up vocational education programs for Guatemala, Nicaragua and Panama. Transferring Taiwan's vocational education experiences to those countries will enable them to achieve a closer fit between their vocational education systems and national development policies, and will help them to improve their manpower resources and technology standards.

Program Goals

1. To help friendly countries to better integrate their educational systems and maximize the use of their resources, while taking into consideration the balanced development of both ordinary and vocational education. The planning and integration of a country's vocational education system and school curriculum will seek to foster balanced educational development.
2. To assist friendly countries to improve their educational facilities and learning environment, to strengthen the functioning of vocational schools, and to raise the level of professional expertise and workplace experience required of instructors. The objective is to improve the quality and effectiveness of the country's technical education and vocational training.
3. To assist friendly countries in developing the manpower resources needed by industry and society. Curricula, instruction and teaching materials will be improved so as to produce the technical manpower needed for industrial development.
4. To help friendly countries to establish closer ties between education and industry. Contact with local industry will be strengthened so that the practical needs of firms can be met effectively. Local businesses and factories will be encouraged to participate in work-study programs.

Modernization of Technical Education in El Salvador

With the assistance of the Inter-American Development Bank, El Salvador successfully transformed the Central American Institute of Technology (ITCA) into a vocational education center with branches throughout the country. However, many of the instructional centers lack the facilities and equipment to meet the country's current developmental needs. Taking on the task of integrating the country's vocational schools, the ICDF is seeking to put the Salvadoran vocational education system on a firm footing.

In accordance with the country's economic development policies, the vocational education program drawn up jointly by the ICDF and El Salvador seeks to upgrade school equipment; to make more reference books available; and to improve instructor qualifications in the fields of electronics, electricity, electrical engineering, mechanical engineering, computer hardware and software, auto repair, civil engineering, and food and nutrition at the seven domestic higher technical schools.

The implementation of this program will help El Salvador carry out its plans to automate the textile industry and develop communication electronics and computer software industries. The objective is to foster the development of El Salvador's most promising industries by training personnel with good basic skills and practical experience. A key goal is the promotion of closer teamwork between government and industry. The El Salvador Ministry of Education expects that more than 24,000 students will choose to attend higher vocational school within the next five years.

Costa Rican Technical Education Improvement Project

Project Background

Over the last few years Costa Rica's economic development policy has focused on promoting the growth of technology intensive industries, particularly the electronics industry. As a result, a number of large transnational corporations have chosen to set up manufacturing plants in Costa Rica. One of the basic preconditions for industrial development is an abundant supply of skilled human resources, and the country's existing technical education and training system already plays a major role in providing technical manpower. To meet the goal of upgrading its high-tech industries, Costa Rica must greatly improve the quality and quantity of its manpower supply. With its decades of experience, the ROC is well qualified to assist Costa Rica in doing so.

Project Goals and Implementation

Response to current needs

Since several large foreign electronics firms plan to build plants in Costa Rica over the next five years, the country urgently needs production workers and technicians. There will also be a need for production line installation and testing personnel. The goal of the emergency response plan is to ease the pressing shortage of these types of workers.

In order to quickly train the production workers needed by the Costa Rican electronics industry over the next three years, the ROC sent vocational education and training specialists from Taiwan to Costa Rica. After appraisal of the training facilities and curricula of the Costa Rican Bureau of Vocational Training, the ROC specialists revised training content in order to accommodate industry needs more effectively, improve training equipment, and increase training capacity.

Following a survey of the numbers and aspirations of electronics, electrical machinery, mechanical engineering and computer science students at Costa Rican vocational schools, the ROC devised a work-study cooperative program which would allow students to work during the day and attend classes at night. Current data indicate that this plan will be able to satisfy the demand for production line workers over the next three years. The emergency response plan is coordinated with training programs at junior colleges and the Institute of Technology of Costa Rica (ITCR).

Long-term goals

To strengthen Costa Rica's technical and vocational education system, improve the qualifications of technical personnel, and provide the manpower resources needed for the country's industrial development.

Vocational Education System Improvement Plan

To ensure that the vocational education improvement plan proceeded smoothly and addressed the demands of economic development, the plan targeted the areas of electronics, electrical machinery, mechanical engineering and computer science over a two-year period. The plan includes revision and improvement of educational goals, the curriculum framework, course content, teaching materials, lab classes, lab equipment, and instructor qualifications. It consists of the following components:

Overall planning

- Instructional goals in relevant fields at all levels of vocational school.
- The integrity and connectedness of the curriculum framework.
- The content and teaching materials of basic and specialized courses.
- Lab classes and teaching materials; lab equipment standards.

Selection, compilation and promotion of teaching materials

Instructor training

Establishment of regional technical education demonstration centers

The centers will contain well-equipped basic and specialized laboratory classrooms. They will concentrate on training resources, meeting the needs of laboratory classes at vocational schools and junior colleges, and improving the quality of instruction.

Consultation by specialists

While Costa Rica will bear responsibility for the extension of plan results, the ROC may send consultants to provide guidance and assess the implementation of extension work.

Project Results

1. The curriculum framework planning for electronics, mechanical engineering, and computer science at vocational high schools, junior colleges, ITCR, and the Bureau of Vocational Training has been completed. The main focus of this planning was on vertical linkage between curricula in different levels of school and horizontal linkage between vocational training units and schools.
2. Eight first- and second-year vocational school textbooks on the basic theory and practice of electronics and mechanical engineering were compiled (in Chinese) and translated into English by personnel at vocational high schools, junior colleges and universities of science and technology in Taiwan. The textbooks are meeting the needs of vocational education and training in Costa Rica.
3. Following the completion of planning, including specifications, quantities, spatial needs, and lab management guidelines, the ICDF purchased electronics and machinery lab equipment and set up laboratories. Three vocational high school regional electronics instructional centers, one junior college electronics instructional center, and one institute of technology electronics instructional center have been established. In mechanical engineering, one vocational high school precision machinery instructional center, one vocational high school ordinary machinery instructional center, and the ITCR electromechanical integration and automation center have been established. In computer science, instructional centers have been set up at three vocational high schools, one junior college, and ITCR.
4. The ROC has provided support to the training centers run by ITCR for teachers at vocational schools, junior colleges, and the Bureau of Vocational Training. More than 140 teachers have received training.