A COMPARISON OF THE HIGHER EDUCATION SYSTEMS OF TAIWAN, SINGAPORE, AND HONG KONG AS A MODEL FOR DEVELOPING NATIONS, 1945-1980

DISSERTATION

Presented to the Graduate Council of the
University of North Texas in Partial
Fulfillment of the Requirements

For the Degree of

DOCTOR OF PHILOSOPHY

By

Em-Amorn Kumnuch
Denton, Texas
Summer, 1996

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The purposes of this study were to (a) examine higher education activities from 1945 to 1980 before Taiwan, Singapore, and Hong Kong became newly industrialized countries; (b) study the higher education reforms that each country made in its progress in order to meet the challenge; (c) compare and contrast the higher education systems that were adopted; and (d) identify a single Asian higher education system model (descriptive model) for any country that desires to become an industrialized country.

Historical research was utilized in this study. This study was approached as follows: First, the economic growth of the countries under study was examined. Then, the countries' higher education systems were compared and contrasted. The result is at least one possible higher education system model that can be used by any country to improve the future performance of its higher education system.

The study concluded that the models of higher education used by Taiwan, Singapore, and Hong Kong from 1945 to 1980 were not identical. However, they came to similar conclusions in terms of economic development. In this case, an emerging industrial country like the social and economic condition of Taiwan, Singapore, and Hong Kong would find that adoption of those higher education models might be appropriate. For instance, an emerging country with a social and economic system like

Taiwan would find Taiwan's higher education model appropriate for adoption in that country. On the other hand, if an emerging industrial nation has social and economic criteria dissimilar to those of Taiwan, Singapore, and Hong Kong, a proposed single model of higher education would be appropriate, with an adjustment to suit the national resources, cultural background, and structure of trades and the labor force of that country.

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CHAPTER 1

INTRODUCTION

Background

During the past two decades, the world has witnessed the explosive economic growth of Taiwan, Singapore, and Hong Kong, three of East Asia's so-called "gang of four," the "four little tigers," or the "little dragons" (Schlossstein,1991) In appendices A through G, the information on the study of these three countries is provided. This information provides a basis for the rational for this qualitative research investigation. The leaders of these countries are higher education graduates. Thus, colleges and universities are critical to producing leaders involved in this growth phenomenon. According to Schlossstein (1991), the little dragons have generated the highest rates of economic growth in the world, with an annual average of 9% compared with nearly 5% in Southeast Asia, less than 4% in Latin America, under 3% in Africa, and just over 2% for the United States.

Thirty years ago there were just two categories of economic development: the industrialized (or developed) countries and the developing (or lesser developed) countries. Countries such as South Korea and Taiwan chafed at being categorized as "lesser developed." Because the non-economic areas of their cultures, such as their social organization and rich historical traditions, were in fact highly developed, they collectively became

known as "newly industrializing countries," or NICs, instead (Oshima, 1987; Schlossstein, 1991).

The economic growth rates of the little dragons have been strong because of their aggressive export strategies. However, it would be an oversimplification to give that factor alone as the reason why growth has been phenomenal. The work ethic of the Chinese using capitalistic practices provides key reasons why (Eddy, 1994). Lim (1991) and Chan (1990) suggested that they have achieved rapid and sustained economic ascendance because of their governments' support, nurture, and promotion of domestic industries and because they have sought out profitable niches in international markets. Thus, certain economic criteria were used to choose three countries of Asia for this study. These criteria are provided here.

The qualification for joining the newly industrializing country club for any nation is considered to be a per-capita income between $1,100 and $3,500 and a manufacturing share in the GDP of 20% (Balassa, 1984; O'Neill, 1984; Schlossstein, 1991). As indicated in Table 1, all three of the countries under study qualify easily.

Of the many newly industrializing countries, Taiwan, Singapore, and Hong Kong were selected for this study. Although these three societies represent less than 1% of the world's land, these countries have dominated the world's textile and electronics industries since the 1960s (Vogel, 1991). Hong Kong has joined New York, London, and Tokyo as one of the great financial centers of the world. The similarities shared by Taiwan, Singapore, and Hong Kong, including geographic characteristics, population density,

ethnicity, religion and value system, and political structure are discussed in the following section.

Table 1

Economic Performance of NICs as of 1989

	Per-capita income	Manufacturing as % of GDP
Taiwan	6,889	35.6
Singapore	10,810	30.1
Hong Kong	10,918	26.7

Note. From Asia's New Little Dragons (p. 5) by S. Schlossstein, 1991, Chicago: Contemporary Books.

Geographic Characteristics

Taiwan became independent of Japan in 1945, and of mainland China in 1949. However, mainland China still claims it as a province. This is a troublesome problem, as seen in 1996 with the Communist China having military exercises in the Taiwan Straits at the time of the Taiwan national elections. The United States sent its naval ships there because of this concern. Singapore ceased to be one of the 14 states of the Federation of Malaysia and became independent as a republic in 1965. All three countries are small islands close to mainland Asia. The common denominator of the three has been their extremely limited natural resources. Taiwan, which has a limited internal supply of natural resources, does, however, have moderate

deposits of coal, natural gas, and possible off-shore oil (Gold, 1985). Taiwan's most important natural resource is its agricultural land, which accounts for one fourth of the total land. Singapore's natural resources are also limited. Singapore has to import food and water from Malaysia, and all of its energy supplies from Brunei and Indonesia. Hong Kong also has no natural resources. All it can offer is a safe harbor. Gustav and Fei (1988) noted, however, that if location is considered as a natural resource, Singapore and Hong Kong probably have some advantages over their neighbors because of their entrepots. Geiger (1973) explained an entrepot as follows:

> [It is] an economic center that carriers on certain essential distribution, financial, transportation, and communications functions. The entrepot continuously collects its hinterland's products directly from the producers and through middlemen in the wide variations to meet the specific quantitative and qualitative requirements of buyers in other countries. Conversely, the entrepot maintains a continuing inventory of the foreign raw materials and manufactured goods required by its hinterland, and re-exports them to the latter's merchants. (p. 7)

Population Density

Although Taiwan, Singapore, and Hong Kong are small islands, the density of their population is among the highest in the world. As many as 573 people per square kilometer live in Taiwan (Hofheinz & Calder, 1982). Approximately 4,400 people per square kilometer live in Singapore, and 5,351 people per square kilometer live in Hong Kong, whereas 70 people per

square kilometer live in the United States, 2 people per square kilometer live in Australia, and 106 people per square kilometer live in France (Encarta, 1995).

Ethnicity

Taiwan's ethnic groups have come, for the most part, from the Chinese mainland provinces of Fukien and Kwangtung (Ballantine, 1952). According to Ballantine (1952), the Hoklos from Fukien furnished three fourths of the Chinese population of the island. The Hakka people from Kwangtung Province went to Taiwan for refuge. A third Chinese group is the Cantonese. Taiwan has close historical and cultural ties with mainland China. The only difference between the Taiwanese and the population of mainland China is in the time of their arrival (Johnson, 1992). By the time Taiwan was ceded to Japan, the people of Taiwan had retained the heritage, tradition, and customs that they brought from mainland China (Myint, 1982).

Although the Hong Kong population, which ethnically is 98% Chinese, can be described as Westernized, a substantial percentage of the population still adheres to traditional Chinese mores in various aspects of social living (Wong, 1986). Singapore has no native population. All of Singapore's citizens were immigrants--Chinese, Malays, and Indian (Cheng, 1983). Until 1836 the Malays were the dominant race in Singapore. Since then, however, the racial composition in Singapore has changed. The population has become predominantly Chinese. Schlossstein (1991) described the population in Singapore as 75% Chinese.

The civil war in China between the Nationalists and the Communists, which had been carried on sporadically since the 1920s, was renewed in

earnest after 1945, causing a large movement of refugees. From 1946 to 1950, millions of refugees relocated from mainland China to Taiwan, Singapore, and Hong Kong. During this period, more than 1 million mainlander refugees arrived in Taiwan, and nearly 2 million arrived in Hong Kong (Geiger, 1973; Lim, 1991). However, the refugees from the mainland to Hong Kong, especially from Shanghai, were talented people who helped to build a new economic base in Hong Kong (Vogel, 1991). Over the years, the movement of Chinese from the mainland to Taiwan and Singapore has caused some problems with the native populations who have lost land and political power.

Religion

Religion is a social set of beliefs, ideas, and actions that relate to a reality that cannot be verified empirically, yet is believed to affect the course of natural and human events (Terpstra & Kenneth, 1991). Religion and culture are important in explaining the behavior of people in modern East Asia because the beliefs and values of the people originated with Chinese civilization and its major religious philosophy, Confucianism.

Confucianism was founded in the 6th century BC and was first intended as an ethical and educational system that would renew and reform the old Chinese noble patterns of life. Confucianism starts with the assumption that human nature is good and that virtuous leadership can produce moral and diligent behavior in others (Rozman, 1991). The influence of Confucianism is deeply rooted in Taiwan and Hong Kong, where the people are ethnically Chinese, and in Singapore, where the Chinese are the ethnic majority. The depth of Confucianism forms the fundamentals of human relationships, from

top to bottom. Other religious, such as Buddhism and Christianity, have also influenced the value systems of people of these three nations, but to a lesser extent in terms of numbers of people.

Value System

Hofheinz and Calder (1982), Oh (1991), Huat (1989), and Hicks and Redding (1991b) noted several common value characteristics among the three countries under study. These include five relationships--between friend and friend, brother and brother, man and wife, parent and child, and ruler and subject. The importance of family in the Confucian value system is clearly the major force of human thought. The family relationship is a strong tie which teaches that piety towards one's elders is the most important of all virtues. These values motivated the early Chinese settlers to work hard and save enough to start their own small businesses and to provide for their family. Ebrey (1991) stated:

> The importance of the future generations can be seen by the anxiety of the parents to see their sons married, and to accumulate property for their children. With this in mind they work hard and live thriftily so that they can save some capital for the prospective children. They feel guilty when unusually good food is eaten or extra money is spent, not because they cannot afford these things, but because they want to have something to leave to their descendants. (p. 46)

Schlossstein (1991) described the three countries as quintessentially chopsticks cultures: Like chopsticks, individually the people would break, but together they are strong and durable. Confucianism focuses on the

importance of the group over the individual. An individual may have to make a personal sacrifice for the good of the group. Confucianism also provides teachings on human interrelationships and emphasizes the importance of hierarchy, social order, and proper behavior (Schlossstein, 1991). These values have reinforced the principles of thrift, discipline, and hard work among the people of Taiwan, Singapore, and Hong Kong.

Political Structure

Taiwan, Singapore, and Hong Kong share several political features. Both Taiwan and Singapore have been ruled by one strong party for more than 5 decades (Huang, 1989). As shown in Figure 1, the Kuomintang has been in power since Taiwan was retroceded to China after World War II. The Taiwan government has been under the one-party dictatorship in which the party's authority rested in the hands of its two supreme leaders--Chiang Kai-shek (ruled 1949-75) and his son Chiang Ching-kuo (ruled 1975-87). In Singapore, the People's Action Party under Lee Kuan Yew has governed since its first victory in 1959. Lee Kuan Yew stepped down as prime minister at the end of 1990, but retains a cabinet post. Hong Kong is not a democracy. Since 1842 all power has been in the hands of civil servants who are primarily responsible, through the governor, to the United Kingdom. However, Hong Kong has been under English laws and will be until 1997, when the colony is returned to mainland China. These English laws have influenced the prosperity of the colony, as has the protection of Great Britain over this period. The British have exerted favorable economic environmental characteristics in Singapore in the period studied here, as had the Japanese until their loss of Taiwan in 1945.

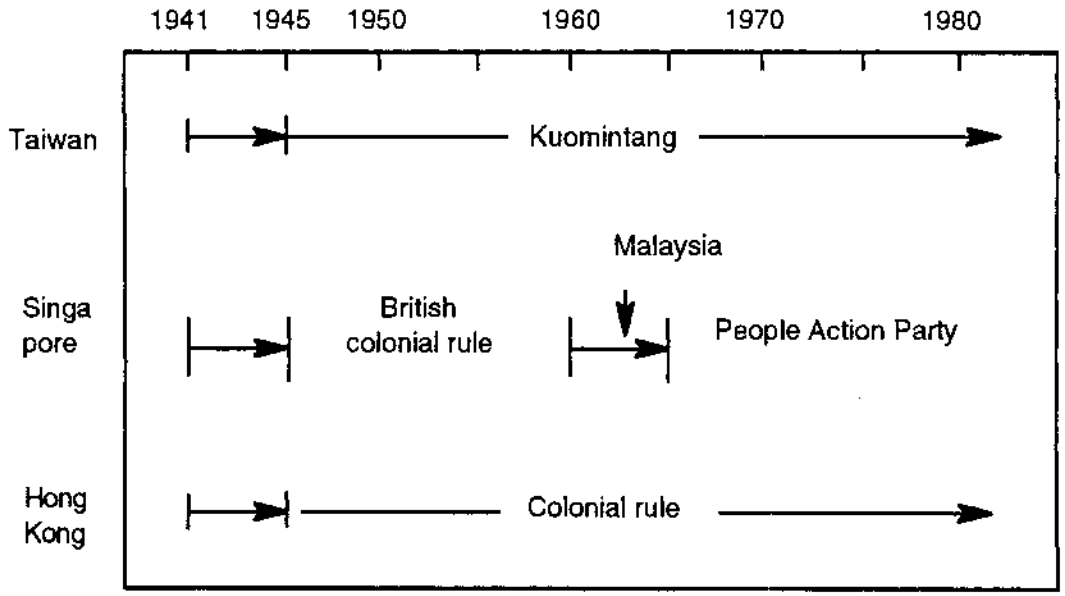


Figure 1. Political profile.

From The Eastasia Edge (p. 153) by R. Hofheinz and K. E. Calder, 1982, New York: Basic Books.

Economic Growth

The rapid economic growth of the three countries has continued in spite of their lack of natural resources and relatively small domestic markets (Chan, 1987). However, the prospects of future oil discoveries off their coasts in the years ahead may very well change these economic conditions. Another factor will be how well they all respond to keeping up with technological advancement favorable to their trade balance. The only major asset for their development appears to be human capital. Because of the hard-working people and their sheer numbers in these nations, this human capital should not be underestimated. The total exports of the three countries from 1973 to 1989 are illustrated in Table 2.

Table 2

Total Exports of the Three Countries

	Exports						$US Million
	1973	1975	1980	1983	1985	1987	1989
Singapore	3666	5376	19376	21833	22813	28686	44678
Hong Kong	5071	6019	19743	22095	30183	48478	73140
Taiwan	4483	5309	19811	25123	30726	53679	66304

Note. The data in rows 1 and 2 are from International Financial Statistic Year Book (p. S8) 1990, Washington DC: International Monetary Fund. The data in row 3 are from The State and Economic Transformation: The Taiwan case (pp. 25-26) by C. K. Pang, 1992, New York: Garland.

However, many characteristics have played a seminal role in the impressive development of the three newly industrializing countries. These factors, including an outward economic orientation, commitment to education, incentives and increases in private saving, a strong emphasis on applied research and development, and infrastructure, are discussed in the following section.

An Outward Economic Orientation

During the early postwar (World War II) period, Taiwan, Singapore, and Hong Kong had a vigorous protectionist program that allowed most domestic industries to develop behind high tariff walls until they became competitive. This program, import substitution, occurs when domestic

production replaces foreign sources of supply goods and service (Ahmad, 1978). Import substitution regimes are an assorted mix of tariff, quotas, and exchange controls, which generally are designed to discourage imports of consumer goods.

In order for a nation to develop its own economy, the priority of its government's actions should be to increase productivity rather than to hand out welfare. If a nation that is poor in natural resources associates with small domestic markets, resources must be imported and, therefore, products must be exported in order to make any progress (Hicks & Redding, 1991a). That is how the newly industrializing countries functioned in the early 1960s. The three countries under study were laying the groundwork for their own export-led growth, stressing import substitution and replacing it with a more outward-looking focus on exports (Schlossstein, 1991).

Taiwan's economy was developed in two stages (Chan, 1990). In the first stage, the government of Taiwan engaged in import substitution and sought to replace imports of non-durable goods with indigenous production. The second stage, an export-oriented economy, required large capital outlays and advanced technologies. To meet these needs, the government exported primary goods (for example, food and minerals) to the Soviet Union in exchange for loans, technologies, and advice.

In Singapore the government placed primary emphasis on the development of import substituting in order to create additional jobs and to keep pace with the growth of the labor force (Geiger, 1973). After its separation and independence from Malaysia in 1965, the island country

shifted to an export-oriented industrialization strategy directed toward the global market (Lim, 1991; Okumura, 1991).

It was not until the mid 1960s that Hong Kong made a major effort to develop a manufacturing industry for exports to compete with the world markets. Under the earlier import-substitution strategy, most industrial ventures had been undertaken by both existing and new local Chinese and British firms. When the city-state shifted to an export-oriented policy, the government carried on an active and sophisticated program of publicizing Hong Kong's productive capabilities in foreign markets. Then facilitating manufacturing was invested in Hong Kong by foreign companies and in educating the city-state's own entrepreneurs to the need and opportunities for expanding their exports (Geiger, 1973).

Commitment to Education

Education is an important characteristic that must be taken into consideration when contemplating economic development. As Psacharopoulos and Woodhall (1985) noted, education represents both consumption and investment. On the one hand, it is valued for its immediate benefits, and on the other, it helps to create future income by providing educated workers with skills and knowledge that enable them to increase their productive capacities and thus to receive higher earnings. When capital is created by human resources acting on natural resources, the two basic economic inputs are natural and human resources (Oshima, 1993). However, without human resources, natural resources cannot be developed. Because human resources must be educated, an appropriate educational system is essential for economic development.

Taiwan, Singapore, and Hong Kong's most important natural resources are human power. Because they are almost completely without natural resources, the three countries must rely entirely on their people and their skills, education and training, and motivation for economic growth and development. Investment in these factors improves the quality of life and enhances the standard of living in the countries. Because of this, the governments of Taiwan, Singapore, and Hong Kong have, in the past, made the education and training of their citizens central to their strategies of economic development.

The educational system, at the most basic level, is a source of the human productivity and creativity necessary for modernization to continue. The educational system also assists in the preparation of individuals for highly specific occupational tasks (Adams, 1970). Highly educated people have become essential to social and economic development in the world. Thus, uneducated people are rapidly becoming economically unproductive and a liability (Drucker, 1961). Knowledge and technology are changing the world. Because the structural changes in work requirements and occupational groupings become clear with educational development, education must change with it. In the 1960s many countries were committed to educational reform in order to promote economic growth (Adams, 1970). As a result, educational systems sought to produce proportionately more people with highly developed skills and abilities that would enable them to adapt rapidly to changing circumstances.

Chandrakant (1980) noted that many countries realize that a central focus of economic development effort is the intensive application of science

and technology to increase agricultural and industrial productivity. However, the availability of science and technology does not guarantee that economic development will occur automatically. It is more important that individuals be trained to apply their knowledge and skills to increase productivity. Thus, the most crucial investment that countries can make is in their human resources--in education.

Like other countries, the three countries included in this study were not immediately successful in their attempts at economic growth. At first, they faced a growing shortage of technical workers who were needed in business. Hundreds, perhaps thousands, of production-related jobs that were required to carry a viable industrial infrastructure went unfilled while many educated persons faced unemployment (Lucas, 1981). Therefore, Taiwan, Singapore, and Hong Kong undertook the enormous job of restructuring, reorienting, and expanding their educational systems to meet their countries' needs and devoted more and more attention to the role of technical and vocational education (Oshima, 1993; UNESCO, 1979).

The experience of Taiwan, Singapore, and Hong Kong with human-resource development is vital in increasing the wealth of other nations. These three countries accomplished their remarkable social and economic performance through the development of skills, the knowledge and talent of the labor force, and the fullest use of their energies and capacities (James, Naya, & Meier, 1989). The following is a brief descriptive narrative of the development of Taiwan, Singapore, and Hong Kong's educational systems.

Taiwan. Education in Taiwan is the product of two historical streams. The first is from the events on the island of Formosa prior to 1949. The

second stream encompasses the events since the Republic of China became the central government. In 1895 the educational system of Taiwan was at a turning point because the Japanese had overtaken the island. The Japanese introduced several dramatic changes in the educational system because they wanted to make Taiwan an integral part of their empire by requiring instruction in the Japanese language and culture (Tsurumi, 1977). After several years, a new system was established, with one type of schooling for the Chinese and another for the Japanese. Four of the island's first modern institutions of higher learning--three normal colleges to train teachers and Taihoku Imperial University, which became National Taiwan University after World War II--were established during this time (Smith, 1991).

After World War II, the island reverted to China. Then the conflict between the Communists and Nationalists on mainland China forced the latter out to Taiwan, Singapore, Hong Kong, and other nations. It was not until 1949, when the Nationalists established their government, that widespread reforms took place and the education system was revamped. The growth of higher education in Taiwan was explosive. In the first 35 years, the number of higher education institutions increased from 7 (1 university, 3 colleges, and 3 junior colleges), with a total of 6,665 students, to 105 institutions (16 universities, 12 colleges, and 77 junior colleges), with an enrollment of 428,576 students. During this period the overall educational level of the population grew substantially. As an example, for the population aged 15 years and over, the average number of years of schooling was 2.8 from 1946 to 1950. That figure increased to 6.9 years in 1976 (Smith, 1991).

Singapore. The educational policies adopted by Singapore's government can be divided into four different stages. The first stage is the educational policy to the end of the colonial period in 1941. The second stage is the implementation of Japan's educational policy from 1942 to 1945. The third stage is the educational policy from 1945 to 1959. The final stage is the educational policy under the People's Action Party government (Selvaratnam, 1994).

The system of education in Singapore at the first stage displayed a fundamental inequality of treatment and opportunity that resulted from the absence of a guiding policy (Wilson, 1978). The government was faced with the difficulty of devising an educational system to meet the needs of a heterogeneous population (Doraisamy, 1969). Thus, the education of "others" had been left to non-governmental agencies. For example, the Chinese schools were run by the Chinese themselves, and the Christian schools were conducted according to their own principles.

From 1942 to 1945, Singapore found itself under the administration of another imperial power, which had direct impact on the educational policy. The Japanese recognized that education was a powerful instrument for achieving the major objective of "incorporating the Southern Region into the domain of Imperial Japan," by uniting the "cultures of the individual nationalities" with that of Japan (Doraisamy, 1969, p. 75). Universities and colleges were closed except insofar as they were required for technical training to satisfy immediate military demands. Consequently, those technical schools produced the skilled labor force that played an important role in the post-war period.

In 1946 Singapore was established by the United Kingdom as a separate Crown Colony. During the period from 1946 to 1959, Singapore experienced major educational problems, which created questions about who was to receive education, for how long, and at whose expense. Wilson (1978) stated that, in order to deal with these problems, the government prepared an Education Programme. The principles underlying the program were that (a) education should aim at extending the capacity for self-government; (b) equal educational opportunity should be afforded to all children; and (c) a basis of primary, secondary, vocational, and higher education should be developed.

Since 1965 education in Singapore has reflected the philosophy and attitudes of the leaders of the dominant political force, the People's Action Party. It was not until 1965, when Singapore established its independence, that the island's educational policy was aimed to develop a specific Singapore identity. This identity included the ability of citizens to speak English, either as the mother tongue or as a second language. Subsequent action was to shift emphasis away from the liberal arts tradition of the "colonial" educators in favor of mathematics, science, and technical subjects (Wilson, 1978).

Hong Kong. Hong Kong's educational development can be divided into three stages (To, 1992). The first stage was during the British colonial period (1842-1941); the second stage was during the 4 years of Japanese occupation of Hong Kong (1941-1945); and the final stage was after returning to British colonial rule following World War II.

The first university in Hong Kong, the University of Hong Kong, was founded in 1910 by Hong Kong's governor, Frederick Lugard. Governor Lugard believed that a university in Hong Kong would indeed promote understanding between the races and would contribute to a Chinese empire the opportunity of acquiring Western knowledge. The administrative structure of the college was similar to that found in most British universities. The majority of the instructors were British and, therefore, English was the language of instruction (To, 1965). The establishment of the university had repercussions at the middle school level because parents came to recognize the economic value of an education in English. As a result, the number of pupils in English-language schools increased by 60% between 1901 and 1913 (To, 1992).

During the Japanese occupation of Hong Kong, education was disrupted, and the University of Hong Kong was closed. After these 4 years, the education department was faced with the fundamental problem of getting back into schools and of finding buildings, materials, textbooks, and teachers (Fu, 1975).

The political changes taking place on the mainland in 1949 affected Hong Kong's educational system as well. Hong Kong students no longer had the kinds of educational options in the field of higher education that they had had before. Students from Chinese middle schools could not pass the Hong Kong University Matriculation examination in English because of the difficulty of studying in a second language, English. As a result, the university took various steps to provide more classes taught in Chinese. In 1957, three post-secondary colleges formed the Chinese Colleges Joint

Council in order to promote Chinese higher education in Hong Kong (Fu, 1975). The promise of a higher education taught in the Chinese language was attractive to many middle school students, especially those who had attended Chinese schools. According to To (1965), higher education in Hong Kong has developed rapidly since 1959.

Incentives and Increases in Private Saving

To meet the needs of economic development, a tax reform measure was instigated by the Taiwan, Singapore, and Hong Kong governments. The purpose of the tax reform, on the one hand, was to seek higher revenues to meet fiscal needs, and on the other hand, it was to encourage saving, promote capital formation, and stimulate economic development.

To attract more saving in the private sector in Taiwan, in 1960 the government enacted the Statute for Encouragement of Investment (Ho, 1978). The statute gave a 5-year income tax holiday to qualified newly established enterprises and to enterprises that expanded capacity by 30%. Singapore, Schlossstein (1991) explained, created its Central Provident Fund (CPF) scheme, which was similar to an Individual Retirement Account (IRA). Employees, as well as employers, were required to make regular monthly contributions to the account, which would be invested, tax-free, in any government-approved plan but could not be withdrawn until age 55. Each account was established and administered in an individual's own name and was designated for his or her future. In Hong Kong, business profits were taxed at only 15%, and the maximum tax on personal income was set at 15% (Geiger, 1973). As Geiger also pointed out, there were no import and

export duties; excise duties were collected only on alcoholic beverages, tobacco products, and vehicle and aviation fuels.

A Strong Emphasis on Applied Research and Development

Taiwan, Singapore, and Hong Kong have simulated the Japanese style of applied research and development, which is a step-by-step process that applies existing discoveries rather than copying the Western style of research and development that emphasizes an approach to discovery, that puts a great premium on basic research and rewards the invention of new processes (Schlossstein, 1991). However, it is known that many inventions and patents have been copies of projects printed by some in these nations to improve their advantage. The three countries emphasize applied rather than basic research and focus on technical and commercial development (Schlossstein, 1991).

Research and development to invent and develop cost-reducing processes as well as new and improved products is one input into the innovation process that leads to technological change and enhances productivity growth (Kendrick, 1984; Link, 1987). These countries also sent many of their students to America and other countries to learn the most advanced technological approaches to bring back to their industries and businesses. As Link pointed out, productivity growth is important to the improvement of economic development because it enhances the standard of living and the quality of life. This comes basically from changing how things are done. Studies of research and development on productivity show a vital relationship. Research can discover entirely new principles that

permit functions to be performed in a new way at a much lower cost (Burnham, 1973).

In an effort to catch up with advanced industrialized nations, Taiwan has substantially increased both its direct investment and its indirect support for building up a domestic science and technology infrastructure. In 1978 total expenditures on national research and development composed .48% of Taiwan's gross national product, equaling about U.S. $111 million. By 1984 total expenditures reached 1.0% of the gross national product or U.S. $540 million (Simon, 1992). Research and development have enabled Taiwan to identify its technological options and alternatives without dependency on foreign technology to improve its negotiating position against the world market. In 1961 Singapore began construction of its first large industrial park in Jurong, which was soon filled with companies such as General Electric, Hewlett Packard, NEC, and Fujitsu. In addition, a Ministry of Science and Technology was established to help the universities and technical colleges improve their laboratories and other research and development facilities (Geiger, 1973). In the 1960s, research institutes and engineering schools were established in Hong Kong. Although Hong Kong's government officials were less involved in guiding industrial development, they did have a de facto industrial policy (Vogel, 1991). Public funds were used to develop many areas as industrial estates. The colony's leadership also helped with export promotion and represented the position of local textile firms in international textile negotiations (Vogel, 1991).

Infrastructure

The three countries invested their capital to form policies with broader approaches to development that involve intense concern for the evolution of the industrial structure. Taiwan, during the Japan's colonial rule, 1895-1945, its infrastructure improved due to the large investment in the building of roads, harbors, railways, and an irrigation system by the Japanese government (Chen, 1982). These countries are continually working to upgrade their infrastructures. Such a strategy takes them out of competition with poorer, less sophisticated economies and gives them the ability to compete with the industrial world (Hofheinz & Calder, 1982).

Thus, the three East Asian countries included in this study share many common characteristics. The Chinese cultural tradition they inherited, the outward economic policies they adopted, and the free-enterprise environment they chose show close similarities among their economies and make it possible for them to be treated together as the subject of this study of their higher education systems.

Statement of the Problem

The problem of this study is to identify the models of public higher education used by Taiwan, Singapore, and Hong Kong from 1945 to 1980 to achieve their status as newly industrializing countries.

Purposes of the Study

The major purpose of this study is to investigate the education systems that were in place by the time Taiwan, Singapore, and Hong Kong became newly industrializing countries. The aims of the study are (a) to examine

education activities before they became newly industrialized countries; (b) to study the higher education reforms that each country made in its progress in order to meet the challenge; (c) to compare and contrast the higher education systems that were adopted: and (d) to identify a single Asian higher education system model (descriptive model) for any country that wants to be an industrialized country.

Research Questions

Based upon the purpose of this descriptive historical study, the following qualitative type questions were developed:

1. What was the higher education system in each country before it became a newly industrialized country?

2. What kind of higher education model did each country install during the transition to a newly industrialized country?

3. Why was a specific higher education system chosen when alternatives were available?

4. What are the similarities and differences of the three higher education reform systems?

Assumptions of the Study

In the process of determining the higher education systems of the countries under study prior to their emergence as industrialized nations, the following assumptions were made:

1. The countries used vocational education systems to improve their human resources prior to economic growth.

2. Because the countries have few economic resources, but share a similar culture and the same political background, their education systems are a driving force in their economic development.

3. Education is the basis of economic development in all the countries.

Significance of the Study

A considerable number of researchers have analyzed the educational systems and the economic development of developed and developing countries. For example, attempts have been made to analyze the role of the investment in education as a major source of economic growth between a developing country (South Korea and North Korea) and a developed country (the United States) (Jung, 1990). Researchers have also dealt with developing nations, such as those in Africa, Asia, South America, and the Middle East, in greater depth on certain specific issues related to educational and economic development (Corso, 1988; Githiora, 1989; Hamouri, 1992; Lee, 1983). The major finding of these studies is that the contribution of education is seemingly significant to economic growth. Investment in education reduces the overall inequality of personal income distribution and improves the relative status of the low-income group.

Much of the development literature and research has been focused on the contributions of vocational education in providing youth with appropriate knowledge and skills to become sources of manpower for their own countries (Hsia, 1981; Law, 1979; Lucas, 1981; Wang, 1982). Thus, an important condition in developing nations is the creation of a close relationship between manpower needs and a labor supply that is dedicated and committed to national development in educational policies. These

policies should develop necessary human capital in order to accelerate the national economic growth.

Theoretical Basis for Study

The theoretical basis for the study is based on Duressa's (1985) study. Duressa (1985) undertook a comparison of the East Asian NICs--Hong Kong, Japan, Korea, Singapore, and Taiwan. The study was based on the interaction and interdependencies of five components--capital, education, politics, entrepreneurship, and technology--as most influential in the countries' national development. Duressa, however, did not include much detail on the kinds of educational reforms or educational systems that the countries undertook in order to emerge as industrialized nations.

This study, however, is designed to build upon previous studies with the belief that an educational system is a major factor in economic development. This research is approached in the following manner: First the economic growth of the countries being studied is examined. Next, the countries' educational systems are compared and contrasted. The result will be at least one educational system model that can be used by any country to improve the future performance of its higher education systems.

Methodology and Procedures

This historical research study includes an application of the descriptive-analytical approach. The following is the process of historical research, according to Best and Kahn (1986):

> [Historical research] describes what was. The process involves investigating, recording, analyzing, and interpreting the events of

> the past for the purpose of discovering generalizations that are helpful in understanding the past and the present, and, to a limited extent, in anticipating the future. (p. 24)

The historical method is a process of critically examining and analyzing records and survivals of the past (Gottschalk, 1961). The word history, by its most common definition, means the past of mankind. The imaginative reconstruction of the past from data derived using that process is called historiography. By means of both the historical method and historiography, this study provides a reconstruction of as much of the development of the educational reform of the countries studied as possible.

The procedure of Gottschalk (1961) was used. The first step was the interrogative, "Where?" What area of the world was to be investigated? The answer for this study was Far East Asia, with particular emphasis on the three nations of Taiwan, Singapore, and Hong Kong. The second step, which was biographical, centered on the interrogative, "Who?" The answer was ethnically the Chinese. The third step, which was chronological, centered on the interrogative, "When?" What period of the past was to be included in the study? The answer was the period of time from 1945 to 1980. The year 1980 was chosen because of uniform favorable economic conditions and higher education development for all three of the countries under study. The final step, which was functional or occupational, centered on the interrogative, "What?" The answer was the educational systems.

The study will look at (a) types of systems, (b) subject matter, (c) origin of the educational plans, and (d) funding strategies.

Why should anyone care what happened in the past? Tilly (1990) noted that all reliable knowledge of human affairs rests on events that are already history. Historical knowledge is increasingly valuable because it provides a key to the present and a guide to the future. History is crucial because from it we can learn something from the past and make life better in the future. In addition, knowledge of the past prevents us from making the same mistakes.

Common Elements in these Countries

The three geographical territories have the following in common: (a) a population that is largely Chinese in ethnic background; (b) a capitalistic economic system; (c) a political system that has tended to evolve toward a democratic one on paper but was autocratic in its past practices; and (d) a work ethic that favors the production of products for overseas sales over services for its people.

Collection of Materials

The researcher used the library and media resources of the University of Texas in Austin, the U.S. Library of Congress, UNESCO documents, and international Internet, with communications with the national libraries of Taiwan, Singapore, and Hong Kong. In reviewing the literature, salient information taken from primary and secondary source materials was summarized and analyzed.

Organization of the Study

The remainder of this study is organized as follows: Chapters 2, 3, and 4 provide a review of related literature with emphasis on the development of the higher education systems in Taiwan, Singapore, and Hong Kong prior to

their emergence as newly industrialized countries. Chapter 5 provides (a) a comparison of the higher education activities that each country has carried out and (b) recommendations.

CHAPTER 2

HIGHER EDUCATION IN TAIWAN

Since 1945 the development of higher education in Taiwan has been subject to Chinese influence. Before the end of World War II, the Japanese occupation of Taiwan, then called Formosa, was a great handicap to the residents of this large island off the coast of China. China has long claimed Taiwan as its 21st province. The political and military crisis over Taiwan continues into the late 1990s. The possible reunification of Taiwan within China becomes a more difficult goal each year as Taiwan becomes more democratic and China remains autocratic under an "old line Communism" of the past. All the tertiary institutions in Taiwan were reformed according to the model of modern Chinese colleges and universities, which was largely based on the American style (Wu, Chen, & Wu, 1989). The goals of Taiwan or the Republic of China's system of education are expressed in its constitution, which became effective on December 25, 1947. As noted by the Ministry of Education (1962), article 158 of the constitution states: "The nation's educational and cultural services shall have as their aim the development among the citizens of national characteristics, democratic spirit, traditional morality, good physique, scientific knowledge, and the ability to earn a living" (p. 17). However, at the Fourth National Education Conference held in February 1962, expanded goals were set for education in Taiwan. These goals were to establish a strong relationship between economic and educational planning, enforce science education, improve the

quality of higher education, reinforce research capabilities, and modernize social education.

In Taiwan, higher education includes universities, colleges, technical colleges, junior colleges, normal colleges, and normal universities or teacher training colleges. The purpose of institutions of higher education is to provide students with opportunities for advanced studies and training as specialists in their chosen field (Lee, 1982). Epsetin and Kuo (1991) noted that institutions of higher education in Taiwan are governed primarily by one of four levels of authority: national, provincial, private, or military and police. At the national level, the Ministry of Education is in charge of policymaking and educational development. National institutions are financed by the central government treasury. Provincial institutions are approved by the central Ministry of Education, but are financed and supervised by the separate Taiwan Provincial Government, located in the city of Taichung. Private institutions must conform to general policies established by the Ministry of Education, but are administratively independent. Military and police academies are approved by the Ministry of Education.

The Ministry of Education, which is a branch of the central government, has a great deal of power over higher education in Taiwan. It approves the establishment of tertiary institutions and is in charge of all administrative matters dealing with academic work, culture, and education. It appoints the presidents of public institutions and approves the appointment of the presidents of private institutions by their boards of trustees. It determines the enrollment, tuition rate, general education courses, required departmental

courses, and minimum credits for graduation. The ministry also functions as the final authority in all faculty and student appeal cases. Even trivia such as the school calendar and dormitory charges at each institution are determined by the ministry.

All colleges and universities offer 4-year undergraduate programs leading to a bachelor's degree. Most institutions also offer master's programs, and some offer doctoral programs. The second category, technical colleges, requires a full 4 years of study after graduation from a senior vocational school, 2 years of study after graduation from a 2- or 5-year junior college, or 2 years of study after graduation from a 3-year junior college. Junior colleges are comprised of three kinds of institutions: 2-year junior colleges, which admit vocational high school graduates; 3-year junior colleges, which admit both academic and vocational high school graduates; and 5-year junior colleges, which admit junior high school graduates. So vocational education in Taiwan established its own uniqueness in the school system and is parallel to academic education (Yung & Welch, 1991). The last category of higher institution in Taiwan--normal colleges and normal universities--trains teachers for secondary elementary schools. In general, higher education in Taiwan can be divided into two stages. The first stage covers the period of the events on the island of Formosa from 1895 to 1945. The second stage encompasses the events since the Republic of China became the central government of Taiwan.

Educational System From 1895 to 1945

Before the Japanese takeover, Taiwan education generally had been neglected by the central government of the Chinese mainland, and no

provision was made for higher learning on the island (Epsetin & Kuo, 1991). In 1895 Japan took a significant step toward the establishment of a European-style empire on the edge of Asia when it acquired its first colony. The colony was the island of Taiwan, which China ceded to Japan after the Sino-Japanese War of 1894-1895. Although the Japanese government had no experience in colonial administration, it was ambivalent about the direction of education for Taiwan. The Japanese wanted to assimilate Taiwan as an integral part of the empire in which education was seen as an instrument of fundamental social, political, economic, and cultural change (Tsurumi, 1977).

In 1919 an education rescript was published in order to fulfill the policy of assimilation, answer the call of the Taiwanese for educational reform, and meet the demands of the island's economy for raising the level of general and technical education (Wu et al., 1989). The educational system designed by the 1919 rescript, however, did not satisfy Taiwanese demands for education. Three years later, in 1922, a new rescript was promulgated. Institutions of higher learning established during the period of Japanese occupation are shown in Figure 2. The institutions of higher education included three colleges with a study period of 3 to 4 years; one university, Taihoku Imperial University, which became National Taiwan University after the war; and three junior colleges. All of the institutions stressed research and provided high-level manpower to support Japan's policies of colonization and expansion (Chen, 1991). Nevertheless, the establishment of the institutions laid the foundation for the development of Taiwan's

current system of higher education. Thus, the Japanese were the founders of Taiwanese higher education.

Normal Colleges

Tsurumi (1977) stated that education proposals for Taiwan's normal colleges were originally intended to train the Taiwanese as Japanese language teachers for common schools. In 1899 three normal colleges, which were opened in Taihoku, Taichu, and Tainan, offered 3-year courses in ethics, Japanese language, composition, reading, arithmetic, bookkeeping, geography, history, science, calligraphy, music, gymnastics, and pedagogy. Taiwanese students aged 18 to 25 who had graduated from a Japanese language institute were eligible to apply to the normal colleges.
Because an island-wide survey had shown that after graduation from normal college, only one third to one half of the teachers used their English. Thus, English was reduced to elective status in 1925, and arithmetic instruction was brought up to the standard of that offered in Japan's normal colleges (Tsurumi, 1977). The curriculum was changed again in 1933. Following the example of Japan's normal colleges, the 5-year main course was reorganized as a compulsory core of subjects for all students. Students were allowed to develop areas of concentration in accord with their interests and aptitudes during their following final 2 years.

Medical College

In the early days of Japanese rule, epidemic diseases were widespread in Taiwan. Wu et al. (1989) pointed out that the traditional Chinese herb doctors, lacking knowledge of Western medicine, were not able to provide

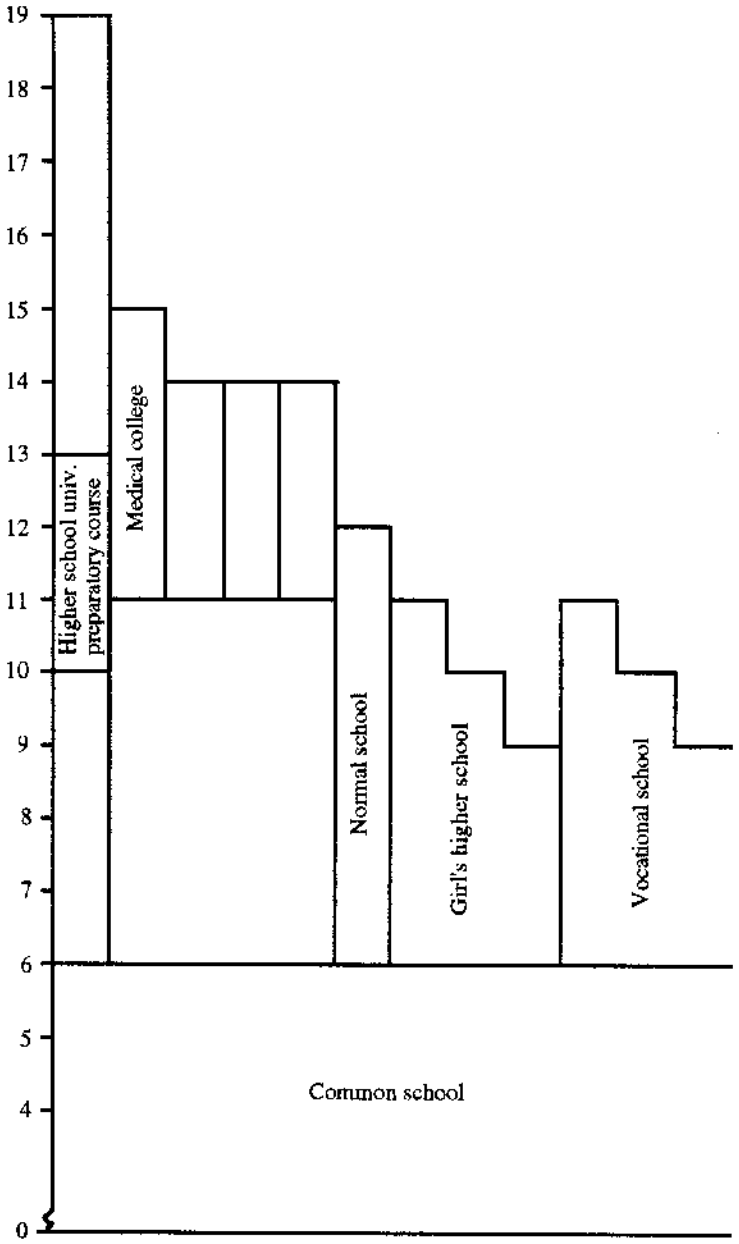


Figure 2. Taiwan's school system as outlined by the 1912 rescript. From "The Development of Higher Education in Taiwan" (p. 121) by W. Wu, S. Chen, and C. Wu, 1989, Higher Education, 18, 117-136.

the necessary treatment. At the same time, Japanese doctors trained in Western medicine were insufficient in number. Consequently, in 1899, a medical college was established to train Taiwanese doctors in Western medicine to replace Chinese herb doctors (Tsurumi, 1977). From its beginning, the medical college concentrated on problems of medicine relevant to the island. For example, in 1918 a special 1-year graduate course in tropical medicine was instituted (Wu et al., 1989).

Taihoku Imperial University

Taihoku Imperial University was established in 1928 as an important part of the proposal of 1919 and the 1922 rescript (Tsurumi, 1977). When the university opened its doors, only two faculties were offered. One was literature and political science, and the other was agriculture. The university was converted from a two-faculty institution into a comprehensive one in 1943 (Wu et al., 1989). Because Taihoku Imperial University was founded by the Japanese for the Japanese, the Japanese placed strict quotas on the number of Taiwanese who were permitted to attend the institution (Smith, 1984). This showed the social or ethnic prejudice of the Japanese rule. This situation remained unchanged until the end of Japanese rule.

Educational System After 1949

Taiwan was under Japanese control for 50 years, until the end of World War II. Since then, education in Taiwan has expanded rapidly. Liu and Armer (1993) claimed that this development contributed significantly to the rapid economic growth. After the Nationalists established their government on Taiwan in 1949, the government wanted to cut off the spiritual ties

between the Taiwanese people and the Japanese. To do this, the Chinese authorities proceeded immediately to reform the schools left by the Japanese in accordance with the Chinese school system. Thus, the new educational system was largely the product of Chinese Nationalist thought brought over from the Chinese mainland (Epsetin & Kuo, 1991; Koo, 1968). The university was reorganized based on the model of mainland Chinese universities. Its chair system was replaced by the department. Students took required courses and electives offered by their department, and credits were counted for each course. A study period of 4 years, following the American system, was required for graduation instead of 3 to 6 years, as in the Japanese system (Wu et al., 1989).

Taiwan's educational system in 1970 is shown in Figure 3. Junior colleges were divided into two categories according to the qualifications of the students. One was called a 5-year system junior college, and the other was a 2-year system junior college or a 3-year system junior college. There were two levels of normal education. The junior normal college was to train elementary school teachers having a period of study of 5 years. The normal college and normal university were to train secondary school teachers. The university and college were to work for a bachelor's degree. The period of study was 4 years, except for departments of medicine and law, in which the period of study was from 5 to 7 years. Only students who had bachelor's degrees were eligible to be admitted to graduate schools to work for the master's degree.

During the 1990s many changes were made in the educational system, as shown in Figure 4. Junior colleges were divided into two programs. One

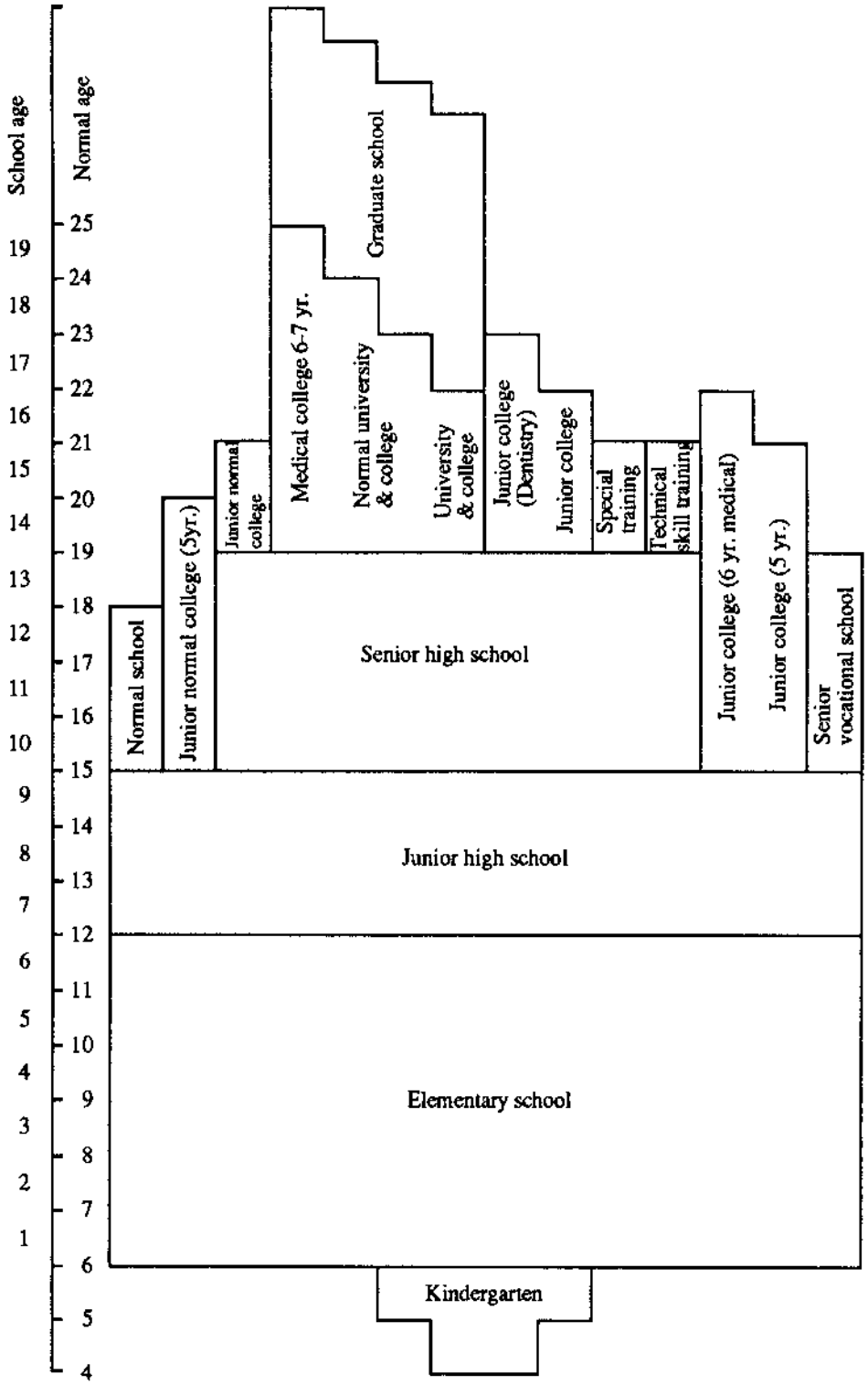


Figure 3. Taiwan's school system in 1970.
From Education in the Republic of China (p. 7) by Ministry of Education, 1970, Taiwan.

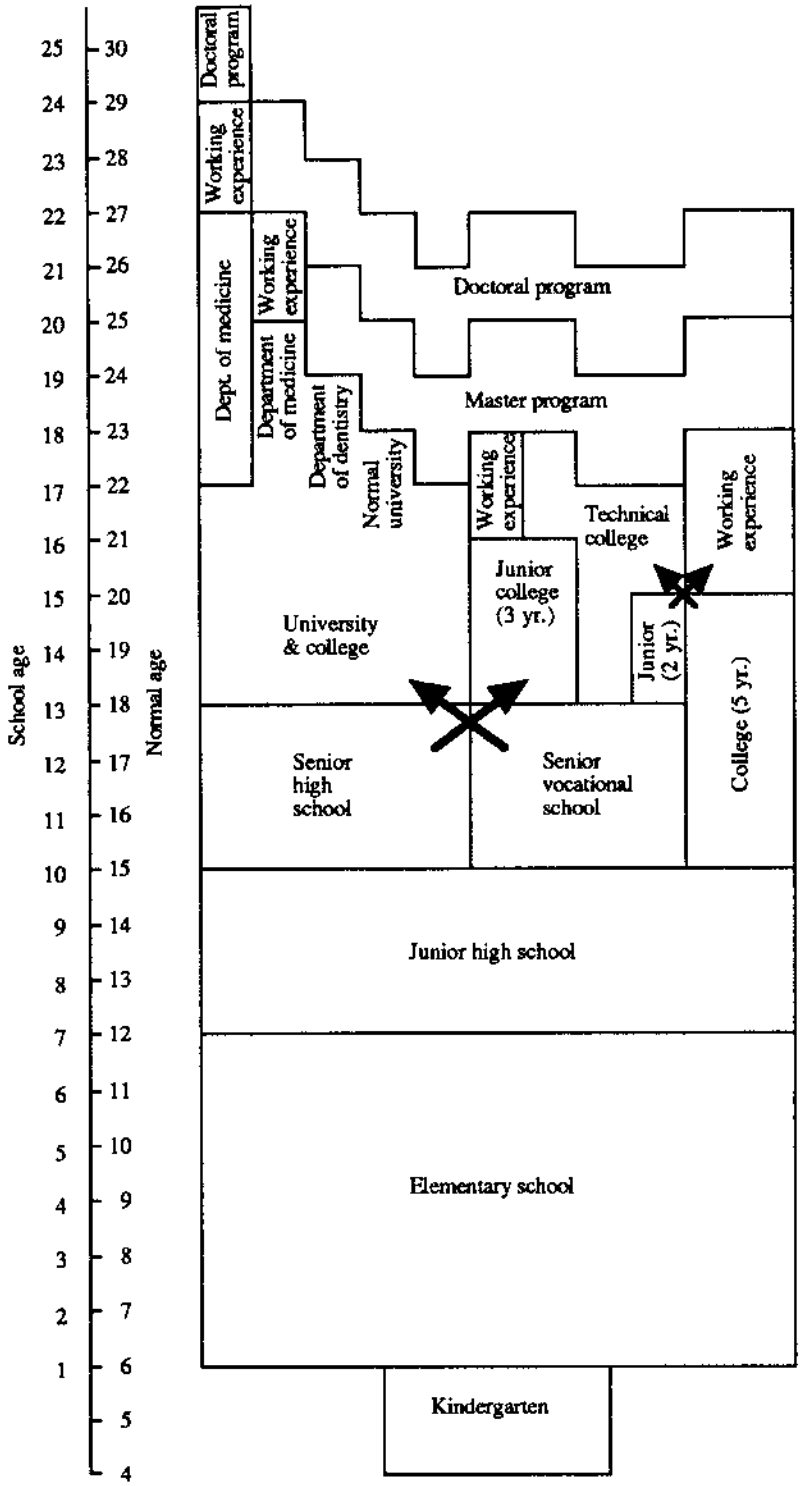


Figure 4. Taiwan's school system in 1990.
From Education Statistics of the Republic of China (p. 5) by Ministry of Education, 1990, Taiwan.

admitted junior high school graduates for a 5-year study program. The other admitted senior secondary school students for a 2- or 3-year study program. The period of study for most undergraduate students was 4 years. Students in law and medical colleges spent from 5 to 7 years in undergraduate studies. Students who held bachelor's degrees or had graduated from junior colleges were admitted to graduate schools for master's degree studies. Students who had master's degrees were admitted to work for doctoral degrees.

Table 3

Number of Higher Education Institutions in Taiwan

Academic year	Type of institution		
	Colleges and universities	Junior colleges	Total
1950-51	4	3	7
1960-61	15	12	27
1970-71	22	70	92
1980-81	26	77	103
1987-88	39	68	107

Note. From Taiwan (p. 550) by S. Chen, 1991, New York: Garland.

The development of higher education in Taiwan has been tremendous since the 1960s, especially in the field of vocational training due to rapid industrialization. Myers (1990) and Singh (1991) stated that the government had maintained a ratio of three to seven in favor of vocational schools to

keep the level of output at the technician level high in order to meet the demand for manpower planning. The expansion of higher education in Taiwan between the academic years 1950-1951 and 1987-1988 is shown in Tables 3 and 4. There were only three vocational training institutions at the college level in 1950. However, the number of junior colleges reached 77 in 1980. The number of higher education institutions in Taiwan increased from 7 in 1950-1951 to 107 in 1987-1988, whereas student enrollment increased from 6,665 in 1950-1951 to 362,001 in 1987-1988.

Table 4

Enrollment at Higher Education Institutions in Taiwan

Academic year	Type of institution			
	Colleges and universities	Junior colleges	% enrolled in junior colleges	Total
1950-51	5,379	1,286	19.3	6,665
1960-61	27,172	7,888	22.5	35,060
1970-71	95,145	55,301	36.8	150,446
1980-81	159,394	105,246	39.8	264,640
1987-88	208,054	153,947	42.5	362,001

Note. From Taiwan (p. 551) by S. Chen, 1991, New York: Garland.

Entrance Examination

Although the current higher education institutions in Taiwan are similar to those in the United States, the admission policy of Taiwan's colleges and

universities is different. Beginning in 1954, colleges and universities in Taiwan instituted the Joint College Entrance Examination (Epsetin & Kuo, 1991; Lee, 1982; Smith, 1984). With this system, all high school graduates who wish to be admitted to any of the universities or 4-year colleges must sit for the Joint College Entrance Examination, likened to European approaches. Students' admission to the higher education institutions is based solely upon their scores on the entrance examinations. The examination covers subjects found in the high school curriculum, such as mathematics, history, science, language, and Confucian ideals. Test preparation is kept confidential, with even the names of those working on the examination kept secret (Epsetin & Kuo, 1991). Printing and packaging of the tests are done in a special area where workers are required to remain for more than a week, until the examination is over.

Through the application procedure for admission to the colleges and universities, candidates apply for admission to one or more departments of the schools of their choice in rank order. Examination scores, then, determine the candidates' chances of pursuing the paths chosen. As a result, those with the highest scores are given access to the most prestigious institutions. Once an individual is admitted to a college or a university, a change of field or institution is usually not allowed (Smith, 1984). In 1984 the Ministry of Education adopted new regulations for the university entrance examination (Republic of China, 1988). After taking the examination and receiving their scores, candidates fill in a list of their preferred departments and their preferred universities and colleges, based on their scores and the minimum requirement for each department set by the

Ministry of Education. The new regulations enable candidates to anticipate how far they can reach and to select a major based upon their interest rather than on their predicted chances of gaining admission. This severe testing approach has increased student suicides and caused students to study overseas, especially in America.

Technical and Junior Colleges

The technical and junior college is to offer the courses of applied science with the aim of turning students into technicians after graduation (Ministry of Education, 1990). Taiwan's industrial vocational education has been greatly advanced in the 40 years since the central government was moved to the island of Taiwan in 1949. In February 1953 the Sino-American Conference on Industrial Vocational Education, sponsored by the Ministry of Education, was held (Chang, 1986). The purpose of the conference was to investigate industrial colleges; the government believed that the only way to strengthen defense and power in Taiwan was to raise the quality of the technical manpower and to build up human resources. After a comprehensive survey and inspection, the Ministry of Education decided to adopt the unit-trade training approach, which stresses learning practical knowledge, strengthening skill-training as well as the ability to operate machines, and increasing the number of practicum hours for the purpose of educating students to be technical personnel. The unit-trade curriculum included only three categories of subjects: general subject, related subjects, and shop practice (Koo, 1968). The related subjects included, uniformly, three subjects associated with mathematics, science, and drawing. The

purpose of the unit-trade training was to prepare students for entry-level jobs in single, specific trades (Lyau & Thomas, 1994).

In 1970 the Ministry of Education decided that the technical and vocational education system should be more flexible and that the system should include junior colleges and senior institutions of technology--a parallel of universities (Chang, 1986). Junior college education is divided into two categories, based on the qualifications of the students. One category, which admits junior high school graduates for a study period of 5 years, is called the 5-year system junior college. The other, which admits graduates from senior high schools for a study period of 2 or 3 years, is called the 2-year system junior college or 3-year junior college. Admittance is limited to qualified candidates who have passed junior college entrance examinations. Junior colleges are divided into 13 areas of study, including agriculture, engineering, business, art, agricultural engineering, industrial and business management, home economics, marine science, medicine, nursing, physical education, journalism, and foreign languages. In 1980 there were 24 programs offered in the 2-year junior colleges, 12 programs in the 3-year junior colleges, and 9 programs in 5-year junior colleges (Wang, 1982). A credit system is used. Credits are granted on the basis of one credit for 1 hour of study weekly in each semester.

According to the spirit of Article 158 of the Constitution of the Republic of China, the role of junior colleges is to teach applied sciences and techniques and to train personnel with practical and professional technical talents (Hsia, 1981). In 1974 the National Taiwan Institute of Technology was established. The department of engineering administration and

technology and the department of electronic engineering and technology offered 2-year programs to junior college graduates. In 1976 the 4-year program began to enroll vocational high school graduates, and a master's degree program started in the 1979 academic year (Lee, 1982; Yung & Welch, 1991).

The contents and teaching methods of unit-trade training, which has prevailed since 1953, have indeed produced many skilled specialists. As a result of the rapid development of technology and the emergence of the age of information, however, some scholars and educational administrators became concerned that students who receive only unit-trade training may not be able to adapt to the new challenges and rapid change inherent in technological society. Hence, in March 1984, the Cluster Ladder Program was created (Chang, 1990). In the Cluster Ladder Program, the 32 departments were grouped into five clusters--mechanical engineering, electrical engineering and electronics, civil engineering and architecture, chemical engineering, and industrial arts.

Due to the success of the Sino-American Industrial Vocational Education Cooperative Project in the 1950s, a solid foundation for the development of industrial vocational education in Taiwan was instituted. After 40 years, the Ministry of Education established a dual system: the general education system and the technical vocational education system. Chang (1991) noted that, in 1991, technical institutes and junior colleges exceeded universities and colleges in both the number of schools and the number of students. The total number of technical institutes and junior colleges in 1991 was 76, whereas the total number of universities and

colleges was 45. The number of students in technical institutes and junior colleges was 320,068 in 1991, whereas the number of students in universities and colleges was 234,183.

Teachers' Training Colleges

There are two kinds of teachers' training institutions in the Republic of China (Ministry of Education, 1988). Teachers' colleges, which originally were normal junior colleges, train teachers for primary schools. The normal college and normal universities are responsible for the training of secondary school teachers. Both teachers' colleges and normal colleges require 4 years of academic study on campus and 1 year of teaching practicum at either primary or secondary schools (Yang, 1995). During their 4 years, students are required to take 148 credits. The course of study covers general education, professional training, and academic specializations. Academic specialization, according to Yang (1995), has a different meaning for primary and secondary school teachers. Because primary school teachers have to teach all subjects, they are required a broad knowledge of subjects areas; students for secondary school, however, are required to specialize in one subject area. The teacher training colleges admit high school graduates. In both types, students are exempted from tuition charges and enjoy living allowances. In return, students are obligated to serve on assigned teaching jobs upon their graduation (Liang, 1991). Free tuition and guaranteed job assignments are major attractions for many students who cannot afford other public or private universities. With this system, the government ensures the availability of an adequate number of teachers in every part of the country. According to the Ministry of Education (1988), the qualifications of teachers

are screened and approved by central and provincial educational authorities. Teachers of secondary or lower schools are screened and registered according to their education and experience. University and college teachers are screened according to their education, experience, and publications in their fields of study.

Students who commit themselves to the teaching field in Taiwan are not only free from all educational expenses, they can also take advantage of the training offered by the government upon graduation. In 1956 the Elementary School Teachers In-Service Training Center, which is a permanent organization for the inservice training of elementary and kindergarten teachers, was established. The Secondary School Teachers Research Center was set up in 1958 to train secondary school teachers (Ministry of Education, 1970). The purpose of the establishment of the two inservice training and advanced study systems was to provide teachers an opportunity to gain new knowledge and teaching methods in order to improve their efficiency in teaching.

Due to rapid social changes, the old teacher education system was no longer able to meet the country's needs. Consequently, the Ministry of Education eliminated the older system in 1979 and declared a Teacher Education Statute, which incorporates the training of elementary and secondary school teachers (Liang, 1983).

Colleges and Universities

A university in Taiwan must have at least three undergraduate colleges. Institutions of higher learning with only one college are called colleges. It is notable that colleges and universities in Taiwan have a variety of roots. The

National Taiwan University, which originally was the Taihoku Imperial University, was founded in Taiwan under Japanese rule. Several universities were originally established on the Chinese mainland and later reactivated in Taiwan. These include National Tsinghua University, National Chiaotung University, National Chengchi University, National Central University, Soochow University, and Fu-jen Catholic University. Many universities were founded after the retrocession of the island to China by Japan in 1945. The newer institutions include National Taiwan Normal University, National Sun Yat-sen University, Tunghai University, Tamkang University, Chinese Culture University, Feng-chia University, and Chung-yuan Christian University. All students who wish to be admitted to any university or 4-year college must sit for the Joint College Entrance Examination. In 1991 an "open university" was established that introduced a nontraditional approach and provided access for adults to higher learning (Epsetin & Kuo, 1991).

As mentioned earlier, after World War II, the education system in Taiwan was reorganized according to the Chinese model. There are three types of courses in colleges and universities: (a) general courses for all departments, (b) required courses for individual departments, and (c) electives (Wu et al., 1989). The general courses, including Chinese, English, the general history of China, and the history of contemporary China, as well as the required courses, are arranged by the Ministry of Education. Only the elective courses are offered freely by each institution. Major curricular changes were instituted in 1952, 1964, 1972, and 1975 (Epsetin & Kuo, 1991). In 1952 new elective courses, including Chinese language, modern Chinese history, English, international organization, and international

affairs, were introduced. Subsequent reforms have reduced the large requirement for course work in the major field, increased flexibility in the selection of elective courses, and reduced the minimum credits required for a bachelor's degree from 142 to 128 hours (Epsetin & Kuo, 1991). In addition to general courses, which are required by all students regardless of their major, the required courses for each department are reconsidered every 4 to 6 years by the Ministry of Education in order to keep up with the world's academic standards and to meet the needs of a changing society (Wu et al., 1989).

Because the Ministry of Education approves the establishment of each institution, changes in the percentage of college students enrolled in different fields reflect the direction of government policy. As shown in Table 5, the percentage of humanities students increased considerably between 1950 and 1960, but decreased very quickly after 1960. The percentage of engineering students declined, but later increased substantially to 34% in 1986.

Table 5

Ratio of College Students in Different Fields in Taiwan (unit: %)

Year	Field								
	Hum.	Educ.	Art	Law	S.Sci.	N.Sci.	Engr.	Med.	Argi.
1950	7	3	1	3	24	7	30	17	7
1960	18	5	3	3	25	9	20	8	9
1970	12	6	3	2	35	7	20	9	6
1980	11	6	3	2	33	6	30	5	4
1986	9	5	2	2	31	6	34	8	3

Note. From "The Development of Higher Education in Taiwan," by W. Wu, S. Chen, and C. Wu, 1989, Higher Education, 18, p. 130.

Educational Expenditures

Appropriations for education are specified in the constitution of 1947. Article 164 of the constitution stipulates that the expenditures for education, science, and culture shall not be less than 15% of the budget of the central government, 25% of the budgets of the provincial government, and 35% of the budgets of hsien and municipalities (China Handbook, 1953). All government higher education institutions are supported by these funds, and students pay for only a fraction of the cost of their education (Wickremasinghe, 1992). On the other hand, private institutions are largely supported by student tuition and contributions from various government and private sectors. As shown in Table 6, the ratio of educational expenditures to GNP in 1951 was 1.73% and increased to 4.54% in 1980. Approximately

20% of the national education expenditure was used for higher education. The fastest growth occurred between 1960 and 1970.

Table 6

The Ratio of Educational Expenditures to GNP

Year	Total educational expenditures NT$ 1,000	% to GNP	% to Higher education
1950			15.1
1951	213,082	1.73	
1955	673,263	2.09	
1960	1,671,962	2.52	13.7
1965	3,959,628	3.38	
1970	11,236,766	4.57	27.3
1975	25,377,015	3.95	
1980	74,112,578	4.54	21.5

Note. From Educational Statistics of the Republic of China (p. 72) by Ministry of Education, 1990, Taiwan: The Bureau of Statistics.

CHAPTER 3

HIGHER EDUCATION IN SINGAPORE

The development of higher education in Singapore since 1905 has been subject to two major influences, British and Chinese. Singapore stands alone among these three territories in being least influenced by the future of Communist China and what will happen to institutions of higher education due to Chinese political activity in the years ahead. When the King Edward VII Medical School and Raffles College, currently known as the National University of Singapore, were established, they offered a version of British schooling, with English as the language of instruction. In addition, when the Singapore Polytechnic was established in 1958, it had been drawn up along the lines of polytechnics in the United Kingdom (Lee, 1973). And when Nanyang University was founded in 1956, it followed the Chinese university system, with Chinese as the language of instruction.

Admission into higher education institutions in Singapore is highly competitive. Selvaratnam (1994) warned that, if admission standards are compromised, (a) low ability students have a hard time competing with other, better prepared students, (b) resources are wasted because of high drop-out rates, and (c) inadequately prepared graduates lack the knowledge and skills necessary to perform their duties. Thus the system was based on the principle that access to higher education is determined by students' performance.

Today there are seven institutions of higher education in Singapore: the National University of Singapore; Singapore Polytechnic; Ngee Ann Technical College; Singapore Technical Institute; the Institute of Education, namely, the Teachers' Training College; the Nanyang Technological University; and the Open University. All of the universities were established after World War II, except for the National University of Singapore, which was founded in 1905. The Singapore Polytechnic was established in 1958, the Institute of Education in 1950, Ngee Ann Technical College in 1963, Singapore Technical Institute in 1969, the Nanyang Technological University 1981, and the Open University in 1994 (Chen & Vasenwala, 1974; Selvaratnam, 1994). In general, there have been three stages in the development of higher education in Singapore. The first stage includes the development of higher education from 1905 to 1941. The second stage covers the years from 1945 to 1959. And the final stage includes the evolution of higher education from 1959 until 1980.

Higher Education Prior to 1941

The educational policy of Singapore prior to 1941 was the result of interaction between the people of Singapore and the British colonial administration. Doraisamy (1969) found that this educational policy was influenced by four factors: the local private situation, the local religious situation, the official religious policy of the colonial administration, and the religious and educational conditions in England. These diverse factors created much difficulty for the Colonial Office in their attempt to devise an system of education to meet the needs of a heterogeneous population. The

target population consisted of immigrants from China, Malaysia, and India, who differed in language, traditions, customs, and beliefs.

Higher education in Singapore is traced from 1905 when the Singapore Medical School was founded. At the time it was established, the school had only one full-time faculty member, assisted by part-time lecturers who were either private practitioners or government medical officers. In 1912 the school was renamed the King Edward VII Medical School. In 1916 the school was recognized by the General Medical Council of the United Kingdom to award graduate degrees in medicine and surgery (Hayden, 1967). By 1935 full courses in dentistry, pharmacy, and medicine were being provided.

Liberal arts education began in 1929 with the establishment of Raffles College, which was the second institution of higher learning in Singapore. The purposes of Raffles College were to meet the urgent need for more qualified teachers and to offer technical training for a growing population of young men and women. Raffles College, which was opened with a faculty imported from the United Kingdom, was supported by public subscription and government grants. From the beginning, the college was bedeviled with insufficient funds and a general suspicion that it was merely a teacher training institute (Hayden, 1967).

English was the language of instruction in both King Edward VII College of Medicine and Raffles College (Hean, 1966). Raffles College provided education in arts and sciences by offering 3-year courses in mechanics and steam fitting, electricity, and domestic and radio-engineering. The entrance requirement was to pass the Cambridge School Certificate

Examination and to have completed credits in English and three other subjects. The college diploma was awarded to students who successfully completed the 3-year courses.

Postwar Higher Education: 1945 to 1959

Singapore was liberated from Japanese occupation on September 5, 1945. From that day until 1946, the British Military Administration took charge of all affairs, including education. The period of the British Military Administration was characterized by the restoration of law and order. In addition, education became a focus of attention. Schools were reopened in whatever buildings were available. The College of Medicine and Raffles College were reopened with about 200 students each. However, this new era brought with it some problems concerning the ultimate purpose of education. Questions were raised about who should receive education, for how long, and at whose expense (Wilson, 1978).

In 1946 Singapore became independent from the Straits Settlements and appointed its own governor and director of education. In order to deal with the above problems, the government, at the suggestion of the Colonial Office in London, prepared an Education Programme, which was referred to as the Ten Year Plan. Doraisamy (1969) stated that the general principles of the Ten Year Plan were as follows:

> That education should aim at fostering and extending the capacity for self-government, and the ideal of civic loyalty and responsibility. The equal educational opportunity should be afforded to the children--both boys and girls--of all races. That upon a basis of free primary education there should be developed

> such secondary, vocational and higher education as will best meet the needs of the country. (p. 47)

In 1955 the Department of Education was converted into the Ministry of Education. The Ministry of Education began by setting up a Joint Advisory Council for Apprenticeship Training, establishing two technical secondary schools, and opening Chinese language schools and the Singapore Polytechnic.

The National University of Singapore

Early in 1947 a commission was appointed to make recommendations for the development of the National University of Singapore. The commission recommended that the two existing colleges, the King Edward VII College of Medicine and Raffles College, be merged in 1949 to form the University of Malaya. Gopinathan (1989) observed that the original intention of the university was to serve both Malaya and Singapore. Ten years later, it was reconstructed as a single university with two divisions, one in Kuala Lumpur and the other in Singapore, which was known as the University of Malaya in Singapore (Puccetti, 1972). In 1962 the Singapore branch was established as an independent university and named the University of Singapore.

The university started with three faculties: arts, science, and medicine, including dentistry and pharmacy. Soon after, education (1950), engineering (1955), law (1957), and agriculture (1961) were added. It offered a bachelor's degree in arts, science, law, and medicine. Course lengths varied from 3 years for a first degree in arts and science to 6 years in medicine. Four-year honors courses were available in arts and science.

Nanyang University

Interest in higher education by Chinese citizens in Singapore began long before the 1950s. During the pre-war period, the Chinese people sent their children to China for additional education. When educational facilities in the People's Republic of China were closed to residents outside of China, the Chinese community determined the need to establish its own institution of higher education (Hayden, 1967; Higbee, 1980; Tapingkae, 1976). The idea of a Chinese language university was being discussed by Chinese business and professional leaders in Singapore with a view to accommodating young Chinese whose English was not adequate for admission to the National University of Singapore. As a result, Nanyang University was created in 1953 and began admitting students in 1956 (Justus, 1964). Doraisamy (1969) noted:

> The aims of the university--Nanyang University--as outlined in a document dated 7th March, 1953 were: (a) to provide further education for secondary school graduates; (b) to train teachers for secondary schools; (c) to train specialists for the country; and (d) to meet the growing needs for the higher education. (p. 94)

The university was located in Jurong, where approximately 500 acres of land had been donated by the Singapore Hokkien Community Guild (Doraisamy, 1969). Chinese was the language of instruction, and the university followed the Chinese (Taiwan) university system. The Chinese system, in turn, is based upon the American pattern in which students must secure a requisite number of credits in prescribed courses in order to graduate (Hayden, 1967; Tapingkae, 1976). The Nanyang University began

with two colleges, the College of Arts and the College of Science. The College of Commerce was formed in the following year (Lee, 1973). In 1957, a total of 388 students was enrolled in arts, 327 students were enrolled in science, and 185 were enrolled in commerce (Tapingkae, 1976). It offered 4-year programs leading to the bachelor's degree in arts, science, and commerce. For a bachelor of science degree in physics, a student had to take both general courses and elective courses.

Singapore Polytechnic

The idea of a Singapore Polytechnic was first discussed in the 1950s, when a committee was formed to investigate the shortage of trained draughtsmen and technicians in the engineering industry (Hayden, 1967; Tapingkae, 1976). However, it was not until 1958 that the Polytechnic began instruction in a wide range of subjects: commerce, engineering, science, and architecture. Singapore Polytechnic was specifically geared to give technical and management training that was not of a university level. In the first year, 2,700 students were enrolled. More than 400 were full-time students, 500 were on a part-time day-release system and attended evening classes, and the remainder attended evening classes (Hayden, 1967).

The number of students enrolled was impressive. However, the Polytechnic did not accept the school-leaving qualifications from the Chinese language stream of education. With this rule, half of Singapore's population was not eligible to benefit from the courses at the Polytechnic. When the People's Action Party won the election in May 1959, a change was brought about by making the Polytechnic accessible to all Singapore students (Lee, 1973).

Teacher Training College

The Teacher Training College (TTC) was founded in 1950. It offered a 2-year program for secondary teachers and a 3-year inservice program for primary teachers (Doraisamy, 1969; Higbee, 1980).

Higher Education After 1959

When Singapore attained self-government status in 1959, it became clear that, in order to develop the country, Singapore could no longer depend upon entrepot trade alone. In the reorientation of the economic policy of the state, industrialization was vital (Doraisamy, 1969). Industrialization was the key to survival. To increase industrial productivity, skilled workers had to be trained. Hence, a policy of diversification to accelerate economic growth through industrialization was adopted. Technical and vocational education played a crucial role in the development of a skilled work force to meet the needs of Singapore's economic development. According to Law (1984), director of Vocational and Industrial Training Board, Singapore, the educational system was shifted from the liberal arts to technical education and training to fulfill the manpower needs of industrialization and prepare for emerging modern technological society.

Educational policy in Singapore since 1959 has reflected the philosophy and attitudes of the leader of the political force, Lee Kwan Yew (Wilson, 1978). He had expressed the need to promote science and technology education. On the 1966 National Day, Lee said:

> From now onwards, we must concentrate our expenditure on the areas which will help directly to increase productivity and accelerate economic growth. For instance, take education,

> expenditure on this is a necessity. In a highly urbanized society, our future lies in a well-educated population, trained in the many disciplines and techniques of a modern industrial society. (Lee, 1991, p. 98)

Lee also addressed the students of the Singapore Polytechnic in 1972 about the importance of promoting science and technology education in Singapore:

> And for us the most important single thing is, of course, the development of our human resources, exploiting our strategic location which makes possible certain industries. Well, for the time being, the government has decided that probably it would be more sensible for Singapore to produce more technicians than engineers. (Lee, 1991, p. 98)

The new government was committed to a program of rapid industrialization and technical education in order to provide the much-needed skills and professional knowledge required for the process of industrialization. The government defined its broad national aims of education in Singapore as follows:

> The main aim of education in Singapore is to develop the potentialities of every child physically, mentally and morally to the fullest extent possible in accord with the needs and interests of society by ensuring the optimum acquisition of experience, knowledge and skill, each according to his intelligence, ability, aptitude and interest. In the context of Singapore today, this entails the inculcation of sound habits, values and attitudes which

> would lead to the development of creativity and loyalty to the Republic; the instilling of the love of freedom, truth and justice with respect for fundamental human rights, appreciation of racial and religious tolerance and acceptance of the democratic way of life; and the propagation of the necessary knowledge and skills needed to carry out the successive stages of economic development; the preparation for changes in society. (Doraisamy, 1969, p. 59)

The industrialization program in the 1960s created a demand for middle-level technical personnel. The government emphasized the study of mathematics, science, and technical subjects. In early 1961 a commission of inquiry into vocational and technical education was appointed to inquire into the facilities of instruction in all vocational, trade, and technical institutions in Singapore. The commission was to recommend a comprehensive scheme to be adopted by the Ministry of Education so that vocational and technical education could be coordinated and systematized with the proposed industrialization plans of the government of Singapore (Wong, 1974; Wong & Yee, 1971). Furthermore, the Singapore Polytechnic underwent major changes in the early 1960s to relate more closely to national needs. Consequently, courses were reorganized at the technician and professional levels (Tapingkae, 1974). In addition, the Polytechnic was looked on with favor by the Singapore government. It received more money and resources from the government to develop as "the M.I.T. of South East Asia." The student enrollment in vocational education in Singapore increased from 843, which accounted for 6.6% in 1963, to 20,743 students, which accounted for

41.2% in 1979, as shown in Table 7. The Ngee Ann Technical College, which formerly trained only Chinese stream students in arts and commercial courses, was also converted into a polytechnic institution (Clark, 1969; Wong, 1974).

Table 7

Enrollment at Higher Education in Singapore

Year	Type of institution			
	Colleges and universities	Technical and vocational institutions	% enrolled in tech. institutions	Total
1962	10,113	-	-	10,113
1963	11,849	843	6.6	12,692
1965	13,807	1,193	7.9	15,000
1967	13,005	1,752	11.9	14,757
1969	12,713	4,129	24.5	16,842
1971	14,269	6,063	29.8	20,332
1973	16,925	7,124	29.6	24,049
1975	18,501	9,830	34.7	28,331
1977	20,734	10,860	34.4	31,594
1979	20,743	14,516	41.2	35,259

Note. From Singapore Development Policies and Trends (p. 245), by P. Chen, 1983, New York: Oxford University Press.

Figure 5 shows the structure of Singapore's educational system in 1961. The institutions of higher education included two universities, the University of Singapore and Nanyang University, and Singapore Polytechnic and the Teacher Training College. The University of Singapore offered degrees in both undergraduate and graduate levels, whereas Nanyang University offered only undergraduate degrees. The Polytechnic offered diploma, pass degrees, and honor degrees.

In 1968 the education system underwent reassessment and reorganization in the wake of announcements by the British government that the British military would pull out in 1971 rather than in 1975 (Doraisamy, 1969; Wong & Yee, 1971). Wong and Yee (1971) commented that "industries had to be rapidly developed, the British military installations had to be commercialized or utilized profitably, and Singapore's every production resource had to be explored and exploited maximally" (p. 59). Accordingly, on May 14, 1968, the Minister of Education outlined in Parliament Singapore's new education policy, which included the formation of a ministerial committee consisting of the Ministers of Education, Finance, and Labor to ensure that educational policies were coordinated to Singapore's greatest advantage (Wong & Yee, 1971). The education system in 1972 is shown in Figure 6. The possibilities of achievement in higher education had been raised, particularly in the area of teacher training. The University of Singapore, Nanyang University, and the Teacher Training College were all to offer degrees in the undergraduate as well as graduate level.

In 1973 the Ministry of Education was divided into the General Education Department and the Technical Education Department. The main objective for this division was to expand vocational training in order to increase the supply of skilled manpower required by new industries and created by the shift in economic activities from entrepot trade to skill-intensive manufacturing. The Technical Education Department, headed by the Director of Technical Education, assisted by two deputy directors, was responsible for institutional and industrial training (Law, 1992; Wong & Yee, 1971). The Technical Education Department took over all technical and vocational schools and vocational institutes and coordinated technical courses at Ngee Ann College and the Singapore Polytechnic. It reorganized the curricula in technical and vocational schools to place more emphasis on practice training and to ensure that the courses and curricula developed were relevant and met the requirements of the industries (Doraisamy, 1969; Law, 1992; Wong & Yee, 1971).

The National University of Singapore

In the academic year 1964-1965, the university was composed of four faculties: arts, law, science and medicine, and a school of education (Hayden, 1967). After the independence of Singapore became a reality in 1965, the economy grew rapidly. The labor market was increasingly tight, with a severe shortage of skilled and semi-skilled labor. The shortage of skilled labor had an important impact on the direction of the university. In 1969 curriculum development had been aligned to the manpower needs of the economy. The emphasis of the university was on science and technology. As a result, three new faculties were added: the Faculty of

Engineering, the Faculty of Architecture and Building, and the School of Accountancy and Business Administration (Tapingkae, 1976). To avoid duplication and to facilitate administration, the School of Education was transferred to the Teacher Training College.

In the Faculty of Arts and Social Sciences, student enrollment underwent a substantial reduction, in line with the policy of the university. Tapingkae (1974) pointed out that the university wanted to reduce the number of students studying political science, philosophy, and sociology and to encourage more students to study applied science in order to meet the demand of the changing socioeconomic structure of Singapore.

Nanyang University

As a private institution, Nanyang University had problems from the beginning. There were the educational problems, such as academic standards and the courses to be offered on the one hand, and political problems, such as the recognition of degrees, on the other (Doraisamy, 1969). As a consequence, the government appointed a commission in January 1959 to look into the academic standards of Nanyang University, the adequacy of the teaching staff and equipment, and the means to be adopted by Nanyang University for ensuring satisfactory standards of academic work. The chairman was S. Prescott, vice-chancellor of the University of Western Australia, who had considerable experience of university education in China.

The commission reported that the university had grown too fast. It was without an appropriate of the organization and administration system, the standards for library and laboratory conditions were inadequate, and the

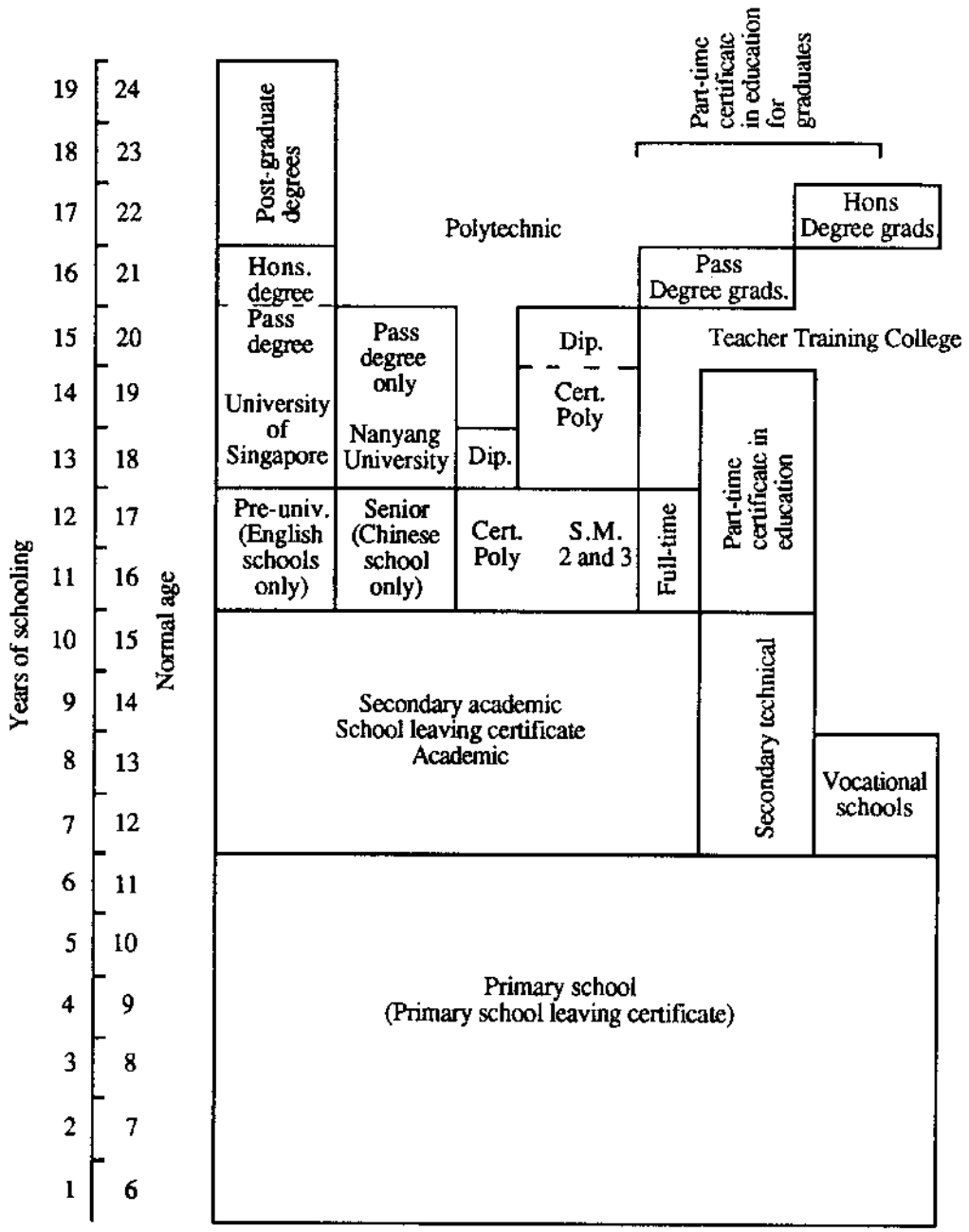


Figure 5. Singapore's education system, 1961.
From Education Innovation in Singapore (p. 24) by H. K. Wong, 1974, Paris: UNESCO.

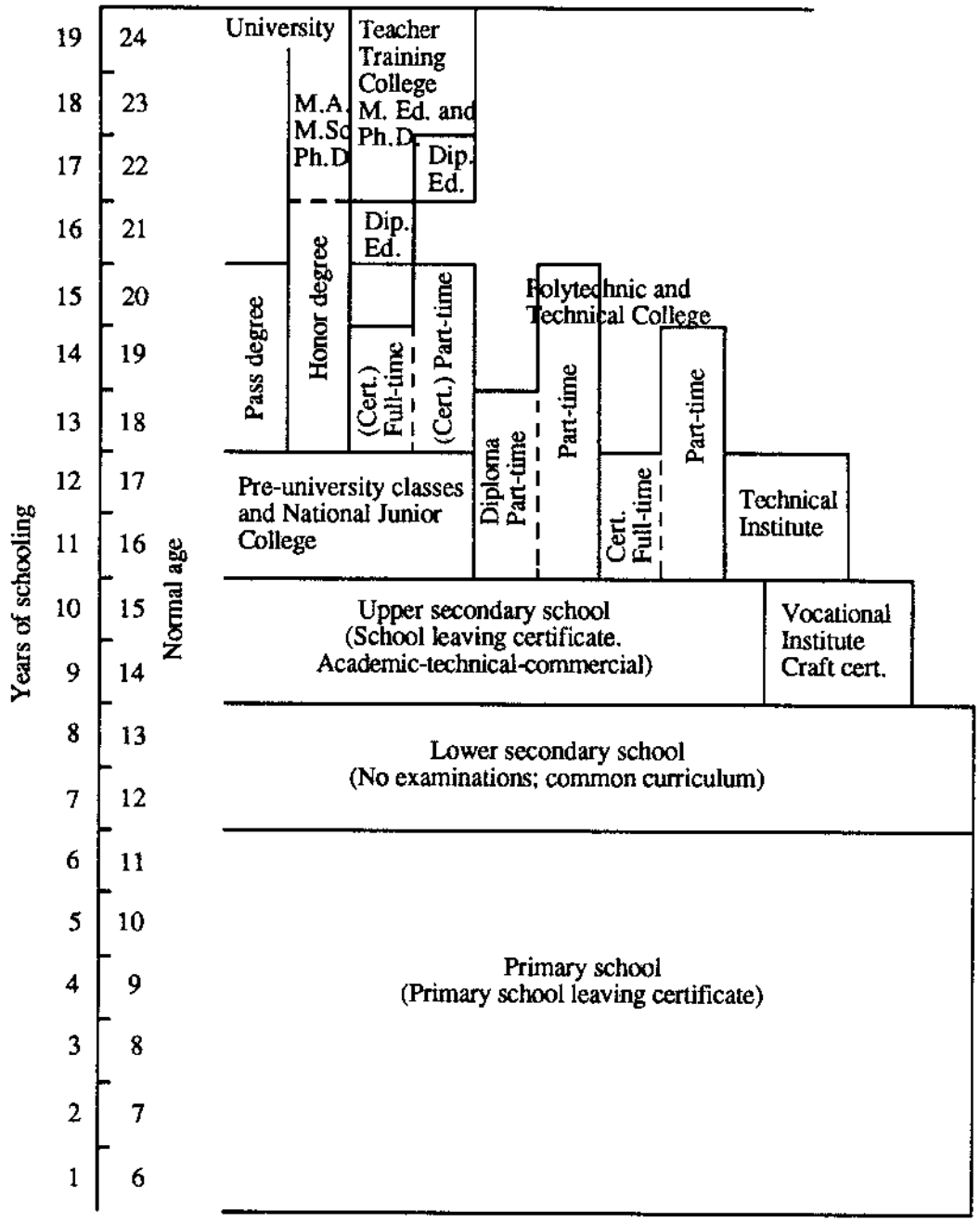


Figure 6. Singapore's education system, 1972.
From Education Innovation in Singapore (p. 25) by H. K. Wong, 1974, Paris: UNESCO.

faculty was not sufficiently qualified (Hayden, 1967). The commission, therefore, did not give a recommendation to the government to consider Nanyang degrees as comparable to the other recognized universities. In July 1960, immediately following the publication of the commission's report, a review committee was set up by the Ministry of Education to determine the extent and sequence of the reorganization of Nanyang University. The committee recognized that the university was established to meet the demand for higher education for students from Chinese secondary schools. It was the committee's task to decide how to improve the university so that it performed a constructive role in the promotion of higher education in the country. During this time, Nanyang University's future was being shaped by two factors. The first factor was that the university needed state financial support. The second was that the government wanted to integrate the university into the state system of education, which was British in structure (Lee, 1973).

Although negotiations between the government and representatives of the university on the question of reorganization took place soon afterward, it was not until June 1964 that an agreement was finally reached (Doraisamy, 1969). In 1964 the Singapore government agreed to finance the university in the same manner as it had financed the National University of Singapore, thus changing the university from a private to a public university (Higbee, 1980). One part of the reorganization was the appointment of a curriculum review committee. The purpose of the committee was to review the current organization of courses of study and the contents of individual courses and

to recommend courses of study that were adequate for the needs of the society (Gopinathan, 1989; Hayden, 1967).

The committee's recommendations were as follows:

1. Instead of Nanyang's original simple 4-year undergraduate program, a 3-year pass-degree course, to be followed by a 1-year honors-degree course for pass-degree graduates of outstanding scholastic merit, was to be used. This was the first time that the British approach was introduced into Nanyang's degree structure (Lee, 1973).

2. The university was to serve society as a whole. To achieve this, the university must ensure that students from all streams of education in the country would benefit from the university's existence.

3. Equal emphasis was to be given to English and Chinese rather than a primary emphasis on Chinese. A language center was set up as a service for students from all departments who were not proficient in the language. In addition, the language of instruction, which was originally Chinese, was changed to English in 1975 (Higbee, 1980).

With the implementation of the Curriculum Review Committee's recommendations, the salary structure for the university faculty was revised to match that of the National University of Singapore (Lee, 1973). This step removed the greatest barrier to the recruitment of quality faculty. In August 1980 the government persuaded the Nanyang University Council to unanimously accept the prime minister's proposal to merge Nanyang University with the University of Singapore to form a single strong national university known as the National University of Singapore (Selvaratnam, 1994; Seng, 1984). The merger of these two institutions was expected to

help develop stronger departments of higher quality and to reduce central administrative costs.

Singapore Polytechnic

After the new government, the People's Action Party, came into power, changes were also made at Singapore Polytechnic. The new government was committed to a program of rapid industrialization and technical education that provided the skills and professional knowledge required for the country's development. In 1959 the Polytechnic's role, which was redefined, was to produce more highly trained workers to support the government's industrialization program (Tapingkae, 1976). To complete that task, Toh Chin Chye, chairman of the Board of Governors, arrogated and set about implementing the government's goals. As a result, the Polytechnic dropped courses of study for which adequate or comparable facilities already existed elsewhere in Singapore, as well as courses that catered to small numbers of students in highly specialized subjects. The Department of Science and Technology was abolished, and the Department of Commerce was replaced by a new Department of Accountancy. The Departments of Engineering, Architecture and Building, Accountancy, and Nautical Studies were established in 1959, and diplomas were awarded at the professional, technician, and crafts levels (Hayden, 1967).

In order to make the Polytechnic accessible to all Singapore students, the board also decided that the institute should have its own internal examination system for admission. At the same time, the intention was to keep the internal examination standards high so that Polytechnic diplomas could eventually be recognized by foreign countries (Lee, 1973). In 1963

Singapore Polytechnic was restructured and upgraded to the status of an advanced college of technology (Selvaratnam, 1994). Its crafts courses were transferred to the vocational and technical institute. In 1965 arrangements were made between Singapore Polytechnic and the National University of Singapore so that trained professional graduates of the Polytechnic were awarded degrees by the university (Tapingkae, 1976). The professional degree courses at Polytechnic were transferred to the National University of Singapore, where corresponding Departments of Accountancy, Architecture and Building, and Engineering were set up in 1969. In addition to the formal full-time and part-time courses, the Polytechnic also offered a wide range of short courses to meet the more specific needs of industries (Seng, 1984). Since then, Polytechnic has been reorganized into two main schools--the Schools of Industrial Technology and Nautical Studies.

Institute of Education or Teacher Training College

During the 1960s efforts were made to meet the needs of the growing school population. As a result, teacher training became a part-time program. An effort was made to offer training for teachers in English, Chinese, Malay, and Tamil languages. In 1973 the Teacher Training College was replaced by the Institute of Education, which was responsible for the training of all teachers from preprimary to preuniversity (Higbee, 1980). However, teachers in Singapore can be categorized in two ways, according to their academic qualification and according to their specialization (Chew, 1995). Primary teachers are trained as generalist teachers and are expected to teach more subjects than secondary teachers, who are trained as subject specialists. The course study covers content courses--comprehensive coverage of the

core knowledge in areas of study with major social, cultural, and economic, curriculum studies--courses designed with teaching skills for the classroom, and practicum.

Ngee Ann Technical College

In 1963 another influential group of Chinese, the Ngee Ann Kongsi of Singapore, entered the educational field and established an independent college of technology and commerce called Ngee Ann College (Hayden, 1967). A significant difference between this college and Nanyang University was the attempt by Ngee Ann to introduce English as one of the languages of instruction (Meow & Partiatmodjo, 1979). The entrance requirement was a school certificate or its equivalent. The course of study took 4 years, or 6 years for evening class students. The college included three faculties--Arts (with Departments of Chinese and Malay languages), Commerce (with Departments of Business Administration and Accountancy), and Technology (with Departments of Applied Chemistry, Telecommunications, and Domestic Science).

Ngee Ann suffered from many problems, including poor curriculum planning, shortage of high caliber staff, and insufficient financial support (Meow & Partiatmodjo, 1979). In June 1964 the Kongsi engaged Lucian W. Pye of the Massachusetts Institute of Technology and Arthur L. Singer of the Carnegie Corporation to survey the college and make recommendations (Doraisamy, 1969). The main recommendation was that the college become a public institution of higher education. The team also recommended that the college should be developed into a community college and offer technical diplomas to meet the growing needs of industry and commerce in

Singapore (Lee, 1973). The main recommendation was accepted, and in early 1967 the college stopped enrolling new students in its degree courses and began enrolling its first students for the technical diploma in 1968. The Ngee Ann Act, passed by Parliament in 1967, changed the institution's name to Ngee Ann Technical College. In 1982 it was upgraded to a polytechnic (Selvaratnam, 1994).

Singapore Technical Institute

In addition to the expansion of Singapore Polytechnic and Ngee Ann Technical College, in 1969 a new institution, Singapore Technical Institute, was established to meet the growing demand for technicians (Tapingkae, 1974). The institute offered craft technician courses in an attempt to fill the gap between the trade courses offered in industrial training institutions and the 3-year full-time technician courses available at Singapore Polytechnic and Ngee Ann Technical College (Wong & Yee, 1971).

The Nanyang Technological University

Instead of expanding the Faculty of Engineering at the National University of Singapore, the Nanyang Technological Institute was established in 1981 as a separate engineering institute on the former campus of Nanyang University (Selvaratnam, 1994). The institute had three faculties when it started: Mechanical and Production Engineering, Civil and Structure Engineering, and Electrical and Electronic Engineering. Later, two more faculties were added: Applied Science and Accounting and Business. The purpose of the Nanyang Technological Institute was to produce the

highly skilled manpower needed for the sophisticated, capital-intensive Singapore economy of the 1990s (Selvaratnam, 1994).

Selvaratnam (1994) and Seng (1984) pointed out that, after the institute was founded, its administration and finances were an integral part of the National University of Singapore. The graduates of the institute were awarded the National University of Singapore degree. In July 1991 the institute was made a full-fledged university and named the Nanyang Technological University. In 1992 the Nanyang Technological University began awarding its own degrees.

Educational Expenditures

Education in Singapore is financed almost entirely by the government of Singapore. Only a small proportion of its income is derived from endowments and fees. Each public-funded tertiary institution is annually allocated a lump-sum grant that comprises a budget for recurrent and development expenditure(Selvaratnam, 1994), which is based on student numbers. In Singapore, education, formerly the biggest item in the national budget, now ranks second, next to defense. The total budget for education from 1972 to 1982 is shown in Table 8. In 1964 the proportion of government expenditure on education was 2.58% of the GNP in 1972, and it increased to 4.03% in 1982.

Table 8

The Educational Expenditures to GNP

Year	Total educational expenditures $ 1,000	% to GNP	% to higher education
1972	210,298	2.58	14.8
1973	264,877	2.65	15.2
1974	334,462	2.74	15.1
1975	391,264	2.90	15.3
1976	405,872	2.80	17.3
1977	415,823	2.63	17.2
1978	458,105	2.59	17.2
1979	556,419	2.73	16.2
1980	686,379	2.95	16.0

Note. From Yearbook of Statistics: Singapore (p. 253) by K. Kim, 1982, Singapore: Department of Statistics.

CHAPTER 4

HIGHER EDUCATION IN HONG KONG

The development of education in Hong Kong since 1842 has been subject to two major influences, British and Chinese. These two forces have interacted with one another to produce the present educational system in Hong Kong (Fung, 1986). Although the Chinese traditionally have a high regard for education, there were no formal schools in Hong Kong when it was taken over by the British. The general practice was for wealthy families to hire teachers to tutor their children at home (Fung, 1986). The British government, on the other hand, began to show an interest in education when it started forming its own schools in 1858. Postiglione (1992) suggested that education was used as a powerful tool for the British to keep control over its colonies and allowed the British government to influence those who received higher education and would become community leaders, which would ensure a favorable link with the territory after British withdrawal.

Today schools in Hong Kong fall into one of three categories--Anglo-Chinese, Chinese, and English--according to the language of instruction and the type of curriculum offered (Berrien & Barendsen, 1960). Anglo-Chinese schools were developed after 1926, offering a modified version of British schooling, with English as the language of instruction. Chinese schools are similar in form and curriculum to the educational pattern on the Chinese mainland prior to 1949. English schools follow closely the British pattern of education in form, curriculum, and certificates or diplomas earned. The

University of Hong Kong is the higher education institution empowered by the colony's government to grant academic degrees in the British educational pattern (Berrien & Barendsen, 1960).

Today, higher education in Hong Kong includes three universities: the University of Hong Kong, a British model institution using English as its language of instruction; the Chinese University of Hong Kong, whose acknowledged task is the perpetuation of the Chinese cultural heritage; and the newly founded Science and Technology University of Hong Kong. All the universities in Hong Kong are self-governing, drawing their income mainly from grants made by the Hong Kong government (Luk, 1994). Students entering the universities are those who fare the best in the entrance examinations. As To (1992) explained, these universities subscribe to different educational ideals: They design their own curricula, represent different standards, appeal to different audiences, and admit students of differing aspirations and abilities. Although they compete with one another, their goal is to provide a variety of programs to meet the educational needs of their society.

Hong Kong became a British colony by a treaty with China in 1842 as a result of the Opium War. During the 19th century, higher education in Hong Kong did not show much development. The first school in the 19th century was a missionary institution that was founded before the Hong Kong government saw the need to form its own schools. Beginning in the 1950s, however, higher education in Hong Kong developed rapidly. In general, there have been two stages in the development of higher education in Hong Kong. The first stage includes the development of higher education prior to

1941, and the second stage includes the evolvement of higher education from 1945 until 1980.

Higher Education Prior to 1941

Immediately after Hong Kong became a British possession, the government and the Western missionaries were concerned only with the development of English education (To, 1992). The government's policy was to let the people survive on their own. The government did not take responsibility for the support of education, except for the English schools operated by the Education Department. For a time, individuals who could not qualify for a government-supported English education, or who did not want to follow the British pattern of education, had to find ways to meet their own educational needs. Ride (1962a) noted that those who could afford to study abroad were sought by universities in other countries or studied in China; thus, there was no immediate demand to provide education locally.

As time went on, a demand grew among the Hong Kong Chinese for training in medicine. Although hospitals for the treatment of the Chinese had been established, for years a hospital based on European standards was not available (Sweeting, 1990). As a result, the Alice Memorial Hospital was opened. Soon after the hospital opened, its beds were filled with patients, and the idea of forming a school of medicine within the hospital soon followed. Consequently, the first higher education institution in Hong Kong was established in 1887 by the London Missionary Society Foundation (To, 1965). The institution, known as the Hong Kong College of Medicine, appeared to have little difficulty enrolling students. After 4 or more years of

study, those who came met a certain standard of proficiency, based on written and oral examinations, and received a license or certificate of the college qualifying them to practice in its name (Lo, 1963).

The administrative structure and the courses of study were similar to those of medical schools in Britain and consisted of an academic body, an executive body, and a public body. Under the supervision and control of the dean, as the Chairman of the Senate, the day-to-day administration was carried out by a secretary and a director of studies. Because the majority of the instructors were British, English was the medium of instruction in all classes. The curriculum for the first year consisted of botany, chemistry, anatomy, physiology, materia medica, physics, and clinical observation. In 1890 the college secretary was authorized by the court to apply to the General Medical Council of Great Britain and the Joint Board for Preliminary Examinations of Scottish Universities for recognition of the college preliminary examinations, which was the first step toward full recognition of the college's courses and diploma (Ride, 1962a).

During the period from 1887 to 1911, the college delivered valuable services to society. However, the college faced financial difficulties because it had no endowment fund and received only a small grant from the local government. In March 1911 the Hong Kong College of Medicine was amalgamated with the University of Hong Kong and became its Faculty of Medicine (Ride, 1962a; To, 1965). The Faculty of Medicine of the University of Hong Kong is one of the finest in all of Asia.

University of Hong Kong

The University of Hong Kong was founded in 1911 and opened in 1912. Sir Frederick Lugard, Governor of Hong Kong, was the university's first chancellor. The main aspiration for the university was to meet the demand for university education of Chinese students, particularly in fields of medicine, engineering, and law, in order to advance Hong Kong's program of modernization and the adoption of Western techniques (Endacott, 1962). The university was eventually supported by the local public, the Hong Kong government, and the British government (To, 1965).

The students and the administration of the university were organized in a typically British manner. The court was established as the supreme governing unit, with the council of 17 executives of the university's affairs. The senate, which included the vice-chancellor, pro-vice-chancellor, full-time lecturers, and the colony's director of education, controlled and supervised the university's curriculum (Endacott, 1962; Higbee, 1980; To, 1965).

The university began with only two faculties--medicine and engineering--54 students, a skeleton staff, and very little money or equipment (Harrison, 1962a; To, 1965). In 1913 a faculty of arts was added. The university, which continued to grow, had enrollments of 364 students in 1933 and 600 students by 1941.

Although the outbreak of World War I in 1914 touched Hong Kong only slightly, wartime conditions eventually stunted the growth of the infant university. By the beginning of 1920, there were clear signs that the young university was facing serious financial problems (To, 1965). As Harrison

(1962a) reported, some members of the faculties had resigned, and the court had refused to adopt the income and expenditure accounts for the 1919-1920 academic year. Consequently, the government set up a commission to investigate the university's affairs. As a result of the commission's recommendations, the government provided an additional endowment to the university for buildings and equipment. In addition, the university received a large grant from the Rockefeller Foundation of New York in 1922. It still seems strange that a United States foundation would help one of the world's most prosperous colonies of England at that time.

The Faculty of Medicine. Although most of the lecturers of the Faculty of Medicine in 1912 were part-time lecturers, the university's goal was to replace the part-time lecturers with full-time faculty (Ride, 1962b). The first full-time faculty member in this faculty, appointed in August 1912, was T. H. Matthewman, who was a lecturer in physics. In February of the following year, professorships in anatomy and physiology were authorized. By 1914 the Faculty of Medicine had schools of anatomy, physiology, pathology, and tropical medicine. A school of biological science was added in 1928. The year 1915 was important in the faculty's early history because of the introduction of full-time clinical teachers in surgery.

The Faculty of Engineering. The history of the Faculty of Engineering dates back to the beginning of the university in 1911. The first session began in September 1912. The desire of the founders was that the natural resources of China should be developed for the benefit of the Chinese. The only way to accomplish this was to apply this scientific knowledge in order

to increase the wealth of the nation, which would consequently raise the standard of living of its people.

The problem facing the Faculty of Engineering was a lack of space and equipment (Mackey, 1962). Space was secured by using all vacant rooms in the main building. For equipment, the faculty solicited donations from British firms, which made possible the training of engineering students in the practical aspects of their profession. Mackey pointed out that the financial history of this faculty during its first 30 years is evident from student enrollment during the same period. The rapid increase in the student population to 100 in 1912 was followed by a rapid decline to 50 in 1916. Enrollment was approximately 135 by the outbreak of World War II.

The Faculty of Arts. The Faculty of Arts was in full operation in October 1913, with courses in pure science, physics, chemistry, mathematics, economics, history, English, and Chinese. As pointed out by Harrison (1962b), two important events occurred in 1916. The first was the faculty's decision to reorganize the syllabus to include a pass degree course, an honors degree course in economics and political science, and a diploma course in commerce. The second event was the starting of a department for teacher training.

In 1920, however, the Faculty of Arts had to restructure its syllabus based on the results of the commission's findings. This restructuring required the elimination of the honors syllabus, the provision of a narrower range of other courses, and the conversion of the 2-year course in commerce to a 4-year degree course, which was reorganized into departments of pure arts and science, teacher training, and commercial training (Harrison,

1962b). As a result of the restructuring, the faculty became more like a commercial training school.

In 1939 a committee was formed to evaluate the Faculty of Arts. The committee's report showed that, since its establishment, the faculty had grown by adding only a School of Chinese Studies (Harrison, 1962b). Based on the committee's recommendation, the following five departments were included in the Faculty of Arts: English, Chinese, history, economics, and education.

The Hong Kong Technical College

The Hong Kong Technical College, originally a government trade school, was established in 1937 (UNESCO, 1966). At the time the college began, three courses were provided: mechanical engineering, building construction, and telecommunications.

Higher Education After 1945

After World War II, the Hong Kong government realized that the city-state could less and less depend on entrepot to compete with the world. As a result, there was growing concern for a development of vocational and technical education in both the manufacturing and government sectors (Lee, 1991). On the one hand, the Technical Education and Vocational Training Investigation Committee was appointed in 1951 by the government to collect information about the facilities available and to bring about future requirements. Then, in July 1954, Sir Murray McLehose, the Hong Kong governor, appointed a standing committee on vocational and technical education with the following terms:

> To keep under constant review the current facilities for, and the requirements of, technical education and vocational training with particular reference to the needs of commerce and industry; To advise Government on the steps that should be taken to meet these requirements and on all other general matters relating to technical education and vocational training. (Sweeting, 1993, p. 21)

On the other hand, the Chinese Manufacturers' Association contributed one million Hong Kong dollars in 1955 to found a technical college (Lee, 1991). This was considered a milestone in the development of vocational and technical education in Hong Kong.

After 4 years of disrupted education during the Japanese occupation of Hong Kong, the Education Department was faced with the fundamental problem of getting children back into school and of finding buildings, materials, textbooks, and teachers (Fu, 1975). Because of the political changes taking place on the mainland of China, Hong Kong students no longer had the educational options that had previously been available. A committee, with John Keswick as the head, was set up by the Hong Kong government to study the problem. The study called for an extension of studies offered by the University of Hong Kong to provide more Chinese courses. In the late 1950s the resources of three private Chinese-language colleges unrecognized by the Hong Kong government were consolidated to form a strong institution that represented the Chinese cultural identity. Support for the institution was won from the international academic community and from the local colonial government (To, 1991). Thus, in 1963, the Chinese University was established.

Hong Kong's education systems in 1968 and 1980 are shown in Figures 7 and 8, respectively. The University of Hong Kong and the Chinese University stood at the top of the educational pyramid. Admission to both universities was based upon passing the matriculation examination. There were three teacher training colleges. All of them admitted students who had the English or Chinese School Certificates. There was only one technical college.

The Chinese University of Hong Kong

The need for a university in Hong Kong which offered classes in Chinese had existed for many years. Since 1949, social and political conditions in China had undergone many changes. Thus, the possibility of going to China for higher education was no longer an option for many young men and women of college age. Among the immigrants to Hong Kong, however, were refugee educators and missionaries, former teachers in universities or colleges on the mainland of China, who began to open colleges of their own. According to Huang (1965), three colleges were instituted for that purpose. The New Asia College was founded in 1949, followed by the establishment of the Chung Chi College and the United College of Hong Kong. These three colleges received little support from endowment funds in their beginning years.

It was not until 1959 that the government realized the importance of a Chinese university in which Chinese was the principal language of instruction. Accordingly, in June 1959, the government announced that selected colleges would be given financial assistance to enable them to

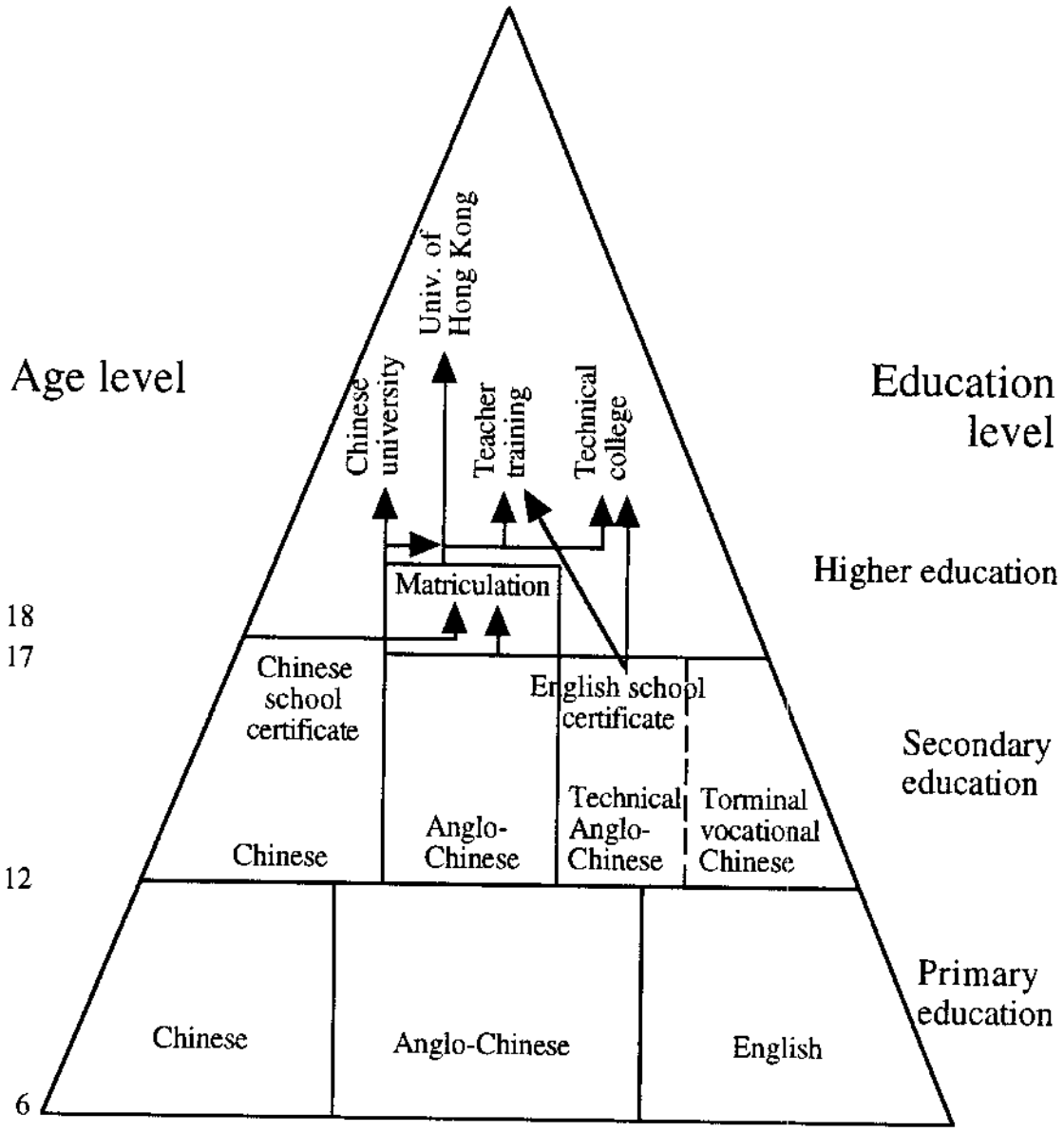


Figure 7. Hong Kong's Education system, 1968.

From Education and Hong Kong (p. 22) by C. Rosemary, 1969, Toronto, Canada: Toronto Board of Education.

<table>
<tr><th>Age</th><th>School Yesr</th><th>Anglo-Chinese (1)</th><th>Chinese (2)</th></tr>
<tr><td>25</td><td>20</td><td rowspan="4">Graduate and Professional Degree</td><td rowspan="4">Graduate and Professional Degree</td></tr>
<tr><td>24</td><td>19</td></tr>
<tr><td>23</td><td>18</td></tr>
<tr><td>22</td><td>17</td></tr>
<tr><td>21</td><td>16</td><td rowspan="3">University (First Degree)</td><td rowspan="3">University (First Degree)</td></tr>
<tr><td>20</td><td>15</td></tr>
<tr><td>19</td><td>14</td></tr>
<tr><td>18</td><td>13</td><td rowspan="2">Matriculation, Lower and Upper Form VI (2 Years)</td><td></td></tr>
<tr><td>17</td><td>12</td><td>Matriculation</td></tr>
<tr><td>16</td><td>11</td><td rowspan="5">Secondary, Forms I-V (5 Years)</td><td rowspan="5">Secondary, Middle I-V (5 Years)</td></tr>
<tr><td>15</td><td>10</td></tr>
<tr><td>14</td><td>9</td></tr>
<tr><td>13</td><td>8</td></tr>
<tr><td>12</td><td>7</td></tr>
<tr><td>11</td><td>6</td><td rowspan="6">Primary 1-6 (6 Years)</td><td rowspan="6">Primary 1-6 (6 Years)</td></tr>
<tr><td>10</td><td>5</td></tr>
<tr><td>9</td><td>4</td></tr>
<tr><td>8</td><td>3</td></tr>
<tr><td>7</td><td>2</td></tr>
<tr><td>6</td><td>1</td></tr>
<tr><td>5</td><td></td><td rowspan="2">Preprimary (Optional)</td><td rowspan="2">Preprimary (Optional)</td></tr>
<tr><td>4</td><td></td></tr>
</table>

Figure 8. Hong Kong's Education system, 1980.

From The Administration and Placement of Students From: Hong Kong, Malaysia, Philippines and Singapore (p. 15) by H. Higbee, 1980, Baguio, Philippines: The American Association of Collegiate Registrars and Admissions Officers.

improve their standards and that a commission would be appointed to make recommendations on the preparedness of the colleges for university status (Huang, 1965; To, 1965). Following the 1959 announcement, the Chinese College Joint Council acted as the unofficial agent of the colleges for raising standards and creating uniformity in matters of examinations and qualifications for teaching staff (Huang, 1965). In April 1963 the three colleges, the New Asia College, the Chung Chi College, and the United College of Hong Kong, were declared ready for university status (To, 1965). Thus, the Chinese University of Hong Kong was officially inaugurated in October of that year.

The establishment of the Chinese University offered unique challenges because it represented the first attempt in Chinese history to integrate three separate, distinct streams of development in Chinese higher education (Huang, 1965). Each stream was organized by groups of scholars from the Chinese mainland; however, each had a uniquely different background. The New Asia College got its traditions from the national university on the Chinese mainland, and the main objective was to carry on an educational ideal of promoting traditional Chinese humanistic studies in Hong Kong. The Chung Chi College got its traditions from Christian universities and colleges in China, and the United College was the result of a merger of a number of small colleges organized by scholars who were mostly from Kwangtung Province (Alice, 1994; Huang, 1965).

Since the founding of the Chinese University of Hong Kong, the university has taken a clear stand on university education. It believes in a

development of liberal education. The first vice-chancellor, Chohming Li, stated:

> There can be no doubt that more highly trained professional people are needed to run Hong Kong's sophisticated economy which has reached formidable dimensions. But the community needs leaders as well as technicians. While professional education provides technical competence, liberal education develops leadership qualities. In fact, the Chinese University believes that the liberal arts should be part of everyone's education and should therefore be included in the educational programmes of all students at all levels. (Lao, 1994, pp. 131-132)

Today, the Chinese University of Hong Kong is governed by a council which manages and controls the affairs, purposes, and functions of the university and a senate which controls and regulates instruction, education, and research (To, 1991). The university has six faculties: arts, business administration, science, social sciences, medicine, and education (Higbee, 1980). The university not only offers bachelor's, master's, and doctoral degrees, but it also offers postgraduate diploma programs in education, social work, and family medicine (To, 1991). Although the principal language of instruction is Chinese, the majority of the teaching staff is bilingual and speaks Chinese and English.

Since the Chinese University of Hong Kong was established, its academic system has been an integration of the Chinese, the British, and the United States systems (Cheung, 1994). For example, British university students must take part in degree examinations, whereas in the United States,

students are required to earn a number of credit units. Luk (1994) stated that the degree examination instituted a three-stage university-wide examination that took place at the end of a student's second, third, and fourth years. The first stage was the intermediate examination, covering Chinese, English, major subject, minor subject, and an elective subject, and a total of five papers. The second stage was the degree examination part I, with three papers. And the third stage was the degree examination part II, with four papers. Furthermore, the three foundation colleges followed the tradition in mainland China in which the period of study was 4 years. As a result, in order to be awarded a degree, a student must pass the degree examination, accumulate the required 124 credits units, and complete 4 academic years of studies (Cheung, 1994).

The Chinese University of Hong Kong admits students through the Hong Kong Higher Level Examination, for which the students should have finished sixth form study, or through the Hong Kong Advanced Level Examination (To, 1991). Until 1973-1974, the university required students to select their major and minor subjects in the first year. However, this policy was changed in order to broaden the educational opportunities available to students. Beginning from 1973-1974, when students were admitted to the university, they would not be required to select their major and minor subjects until the beginning of their second year (Luk, 1994). During the first 2 years of the course, equal attention was given to the major and minor disciplines and to general education. In the last 2 years, however, the major and minor subjects were studied almost exclusively, with only a small amount of time devoted to general education

Huang (1965) indicated that in May 1965 the Chinese University of Hong Kong announced the adoption of a new teaching method that was an integration of the best features of systems from all parts of the world. The new system called for the reexamination of all syllabuses, the reduction of lecture hours, the use of small group teaching, and reductions in examinations. In the 1968-1969 academic year, the university enrolled 605 students in arts, 575 in sciences, and 781 in commerce and social science. By the 1980-1981 academic year, 1,066 students were enrolled in arts, 889 in business administration, 1,244 in science, and 1,244 in social science (The Hong Kong, 1981).

The university's academic year officially begins on August 1 and ends on July 31, and it includes two teaching terms. The first term lasts from early September to mid-December, and the second lasts from early January to late April. Admission to the university is determined by students' performance on a matriculation examination. In 1973 the university changed its policies in order to broaden the educational opportunities available to students and to develop solutions to social needs (Higbee, 1980). Under the new policies, students are not required to select their major and minor subjects until the beginning of their second year. To satisfy the matriculation requirements, applicants for admission to the university are required to satisfy certain faculty entrance requirements. The Faculty of Arts has no special requirements. Selection for admission is normally based on students' performance in art subjects on the matriculation examination, their records of secondary school performance, and the results of any interviews considered necessary. The Faculty of Commerce and Social

Science requires passing grades in Chinese and English and a passing grade in at least one subject from among geography, economics and public affairs, and general mathematics. The Faculty of Science normally requires that students pass three of the following subjects: biology, chemistry, physics, general mathematics, and higher mathematics; they must have grades in at least two that are "satisfactory to the Social Faculty." Passing grades in both general and higher mathematics are counted as passing one subject; however, in the selection of students for admission, preference is given to applicants who have passed higher mathematics.

The Hong Kong Polytechnic

After a period of rehabilitation and reconstruction following World War II, education in Hong Kong was expanded rapidly to meet the needs of the people, especially in the field of vocational training. Hence, the Hong Kong Technical College expanded its facilities to operate an evening department that offered 12 courses. The college had an enrollment of 872 in 1947 (Law, 1979). In addition, a committee on technical education was formed. The duty of the committee was to examine individuals' needs for technical and vocational education (Law, 1979). By the end of 1953, the Hong Kong Technical College had an enrollment of 4,335 students. Female students were admitted for the first time in 1954.

In 1957 the Hong Kong Technical College, originally known as the Government Trade School, offered both day and evening programs (Berrien & Barendsen, 1960). The daytime program was given in six departments. The Department of Building offered 3-year diploma courses including construction, carpentry, bricklaying, and surveying. The Department of

Commerce offered a 1-year course in typing and stenography. The Department of Electrical engineering offered a 2-year course for radio technicians and an 18-month course certificate in wireless telegraphy and radar technicians. The Department of Mechnical Engineering offered a 3-year diploma in machine design. The Department of Navigation offered various short courses for the training of merchant marine officers. And the Department of Textiles offered 3-year diploma courses in weaving and spinning, testing, and dyeing. All courses were taught in English, with the exception of factory accounts and automobile engineering, which were conducted in Cantonese. Seven hundred forty-seven full-time and 7,321 part-time students attended the college in September 1961.

In order to meet the rapidly growing need for technical education, the government of Hong Kong established a Polytechnic in Hong Kong. In May 1969 the Polytechnic Planning Committee was formed. In their final report, which was submitted to His Excellency the Governor on July 28, 1971 (Hong Kong Polytechnic, 1976), the committee recommended the academic development of the Polytechnic, sites for new buildings, legislative requirements, costs and financing, staff requirements, continuing supervision, construction, and advisory machinery.

On March 24, 1972, the Hong Kong Polytechnic Ordinance was promulgated. The Hong Kong Polytechnic was formally established on August 1, 1972, when the board of governors and the director assumed responsibility for the new institute, which took over the campus of the former Hong Kong Technical College (Higbee, 1980; Hong Kong Polytechnic, 1976; To, 1991).

The Hong Kong Polytechnic offered a wide variety of professional and occupational programs to meet the manpower needs of commerce, industry, and the community. Three levels of diploma programs, which differed in admission requirements, were offered (Higbee, 1980). The higher-diploma program and the ordinary-diploma program were each 3 years in duration. The two programs also had the same basic admission requirements, which included the completion of Form V and the possession of a Certificate of Education. However, the difference was that the higher-diploma level was conducted at a higher theoretical level. The associateship-diploma was earned through examination by the appropriate professional institution in the United Kingdom. In 1983 some of the courses offered in the Polytechnic were upgraded to the degree level (Fung, 1986).

In 1975 the Hong Kong Polytechnic was classified into 14 teaching departments, which represented the following areas: accountancy, building and surveying, business and management studies, civil and structure engineering, mathematics and science, mechanical and marine engineering, production and industrial engineering, and textile industries. In the 1974-1975 academic year, 2,950 students were enrolled full-time, and 12,963 students were enrolled in evening courses (Hong Kong Polytechnic, 1976). However, in 1980, the polytechnic increased its offerings to 17 teaching departments grouped under three divisions: applied science, commerce and design, and engineering; and two institutions: the institution of medical and health care and the institution of textiles and clothing. There were approximately 7,200 full-time students, 3,400 part-time day-release, and

14,500 part-time evening students at the beginning of the 1980-1981 academic year (The Hong Kong, 1981).

The University of Hong Kong

Stock (1962) pointed out that "the effects of the Second World War upon the university were diverse and far-reaching (p. 85). The buildings, if not destroyed, were devastated by looters, and the student body was scattered throughout China. During the war, some members of the pre-war staff reached retirement age, some died, and others elected not to return. Only a nucleus of the teaching faculty was available after the war to carry on the work. In addition, endowment funds previously invested in China had disappeared, leaving the university in desperate financial straits.

In 1945 a committee was set up by the government to consider whether or not the University of Hong Kong should continue to exist and to investigate problems related to financing and reestablishing the university (Mellor, 1980; Stock, 1962). The committee recommended that the university should be reestablished as soon as possible. The British government granted $4 million to the university to restore university buildings. Equipment, modern texts, and journals were arriving from England and elsewhere by every ship. In 1951 the university reorganized its degrees in arts, science, and engineering and reduced them from 4 to 3 years' duration (Mellor, 1980).

For admission to undergraduate programs of the University of Hong Kong, students must first obtain satisfactory results in an approved advanced-level examination. To (1992) explained that, in Hong Kong, this means that students have to finish 7 years of secondary education. Entry to

the University of Hong Kong is difficult and intensely competitive. Higbee (1980) stated that, even if a student may pass the qualifying examination, it is by no means assured that he or she will be admitted unless he or she meets the requirements of the different faculties, which are not specified. With only a limited number of places available each year, students with the highest grades will normally be accepted (Higbee, 1980).

The university offers 3-year degree courses in the medium of English. There are nine faculties: arts, architecture, dentistry, education, engineering, law, medicine, science, and social sciences. Each faculty offers both undergraduate and postgraduate programs. To (1992) explained that, besides awarding bachelor's, master's, and doctoral degrees, the university also offers programs leading to various professional diplomas and certificates. In 1950 the university had returned to its pre-war level (To, 1965). By the 1968-1969 academic year, 887 students were enrolled in arts, 437 in science, 596 in medicine, 479 in engineering and architecture, and 248 in social science (Byers, 1969). In the 1980-1981 academic year, 1,117 students were enrolled in arts, 651 in science, 838 in medicine, 1,023 in engineering and architecture, 838 in social science, and 186 in law (The Hong Kong, 1981).

The Faculty of Medicine. After World War II, teaching in the medical faculty was restored, but with a revised curriculum, that provided a 5-year course of study in the medical sciences, leading to the degree of bachelor of medicine and bachelor of surgery (Berrien & Barendsen, 1960). According to the passing of the Medical Act of 1950, all students were required to complete a hospital internship of 1 year after qualifying before they could be

licensed to practice (Ride, 1962b). Diplomas earned since 1953 entitle medical practitioners registered in Hong Kong to full registration in the United Kingdom (Berrien & Barendsen, 1960).

The Faculty of Engineering and Architecture. After the liberation of the colony in August 1945, a survey of university premises revealed that the engineering buildings were completely demolished. Rehabilitation work started early in 1948, and by 1950 a new building had been added. A complete reorganization of the degree curriculum was undertaken with university approval in 1950 (Mackey, 1962). The main features of the new curriculum were the restriction of introductory courses to the first year of the degree and a broadening of the range of professional subjects in subsequent years. In July 1955 the university's degree in civil engineering was fully recognized by the Institution of Civil Engineering, and in February 1956 the degree received similar recognition from the Institution of Structural Engineers.

The Faculty of Arts. Courses in arts, which were resumed in 1948, were organized much like the pre-war courses, as groups of studies--letters and philosophy, economics and politics, and Chinese (Harrison, 1962b). By the beginning of the 1951-1952 academic year, two types of degree curricula were offered. The first was a 3-year pass or ordinary degree curriculum, and the other was a 4-year honors curriculum. However, in 1954, students were required to complete 4 years of study for each of the degrees. In 1962 there were nine departments within the Faculty of Arts. These included Chinese,

economics and political science, education, English, geography and geology, history, mathematics, modern languages, and philosophy (Harrison, 1962b).

The Faculty of Science. The Faculty of Science was separated from the Faculty of Arts a few months before World War II. When the Japanese surrendered in December 1945, the faculty found itself in a difficult position. Books and scientific papers were lost, and windows, frames, doors, and benches had all disappeared (Barker, 1962). In spite of these problems, however, classes were resumed in October 1946.

In the pre-war period, science degree courses had followed a pattern of 4 years divided between intermediate courses and final courses (Barker, 1962). First-year courses were taken by medical and engineering students as well as scientists. English was a compulsory fourth subject. In 1952 the first major change was to convert the first year into preliminary science courses, from which English was excluded. The science courses consisted of 3-year pass degree courses with examinations in three subjects followed by 1-year honors degree courses in one subject. The second change was in 1959, when the pass and honors degrees were renamed general and special, respectively, with classified honors awarded in both.

Teacher Training College

In 1950, N. G. Fisher, Chief Education Officer of Manchester, was invited to advise the Hong Kong government on its expenditure on education (Fung, 1986). The report recommended that the Hong Kong government should give more attention to the major expansion of teacher training facilities. Consequently, the Grantham Training College was founded in

1952, and the Sir Robert Black College was opened in 1960. The first college, the Northcote Training College, had been opened in 1939. In 1967 all three training colleges were renamed Colleges of Education (Fung, 1986). And in 1975 the Hong Kong Technical Teachers' College was established. The Colleges of Education are responsible for the preparation of teachers for the primary and secondary schools, whereas the Technical Teachers' College offers courses for future teachers of technical subjects in secondary, prevocational schools, and technical institutes (To, 1991).

Education Expenditures

Both universities and the Polytechnic are largely financed by the government. Because of the importance attached to developing university and polytechnic facilities, the University and Polytechnic Grants Committee (UPGG) was appointed by the governor to provide impartial and expert advice on the amount of finance required to develop any level of higher education activity (The Hong Kong, 1981). The committee also advises the government on the allocation of funds among the universities and the Polytechnic. Funds are made available by means of block grants provided over a planning period of 3 years. As shown in Table 9, government expenditures on education as a percentage of GDP was 2.83% in 1974 and increased to 3.04% in 1980.

Table 9

The Ratio of Educational Expenditures to GDP

Year	Total educational expenditures HK$ million	% to GDP	% to Higher education
1974	1,098.7	2.83	20.48
1975	1,231.6	3.03	25.19
1976	1,366.0	2.63	21.70
1977	1,570.4	2.63	21.15
1978	1,858.3	2.67	22.29
1979	2,325.0	2.70	23.55
1980	3,228.5	3.04	25.10

Note. From The Hong Kong Education System (p. 76) by Hong Kong Government, 1981, Hong Kong: Government Printer.

CHAPTER 5

COMPARISON OF HIGHER EDUCATION SYSTEMS OF TAIWAN, SINGAPORE, AND HONG KONG AND RECOMMENDATIONS

Taiwan, Singapore, and Hong Kong have achieved a rapid industrial transformation. They possess limited natural resources, but have recognized the importance of education as the key to transforming themselves from agricultural to industrial economies. In this study, the development of the higher education systems of Taiwan, Singapore, and Hong Kong is described in chapters 2, 3, and 4, respectively. The primary intent of this study was to identify the models of higher education used by Taiwan, Singapore, and Hong Kong from 1945 to 1980 to achieve their status as newly industrializing countries. This chapter presents the summary of the purpose, methodology, and procedures of the study, as well as a comparison of the three countries in the following areas: origin of education; higher education systems before becoming newly industrialized countries; type of higher education installed during transition; funding strategy; models of higher education systems used by Taiwan, Singapore, and Hong Kong; and a single model of a higher education system. Research conclusions and recommendations are also presented.

Summary

The purposes of this study were (a) to examine educational activities before Taiwan, Singapore, and Hong Kong became newly industrialized countries; (b) to study the higher education reforms that each country made in its progress toward to meeting the challenge; (c) to compare and contrast the higher education systems that were adopted; and (d) to suggest a single Asian higher education system model (descriptive model) for any country that wants to become an industrialized country.

The research questions of this study were the following:

1. What was the higher education system in each country before it became a newly industrialized country?

2. What kind of the higher education model did each country install during its transition to a newly industrialized country?

3. Why was a specific higher education system chosen when alternatives were available?

4. What are the similarities and differences in the three higher education reform systems?

Historical research was used in this study. The process involved examining and analyzing records and data of the past. This study provided a reconstruction of as much of the development of the higher education reform of Taiwan, Singapore, and Hong Kong as possible. The study was approached in the following manner: First, the economic growth of the countries being studied was examined. Then the countries' higher education systems were compared and contrasted. The result is at least one higher

education system model that can be used by any country to improve the future performance of its higher education systems.

Origins of Education

Origins of education of Taiwan, Singapore and Hong Kong are shown in Figure 9. The higher education system in Taiwan closely resembles the modern Chinese universities, which are based on the American university system. In Singapore and Hong Kong, the higher education institutions are reminiscent of British and Chinese higher education institutions. What are the differences between American and British higher education systems? Luk (1994) stated that the American higher education system emphasizes a broadly based general education in the undergraduate curriculum in order to broaden the intellectual horizons of the students. In the British higher education system, on the other hand, the honors undergraduate curriculum demands specialization in a principal subject, whereas the more broadly based curriculum leads to ordinary degrees. In addition, general education takes place through tutorials, private readings, and college life rather than in a formally planned program.

Taiwan was under Japanese rule from 1895 to 1945. It is interesting that the development of higher education in Taiwan is subject to the Chinese or American style instead of the Japanese influence even though the Japanese used education as a tool to assimilate Taiwan to become part of the empire. The reason for this was that, when the Nationalists established their government on Taiwan, they instantaneously reformed the schools left by the Japanese with the education system that they brought from mainland China. With this new higher education system, a 4-year period of study

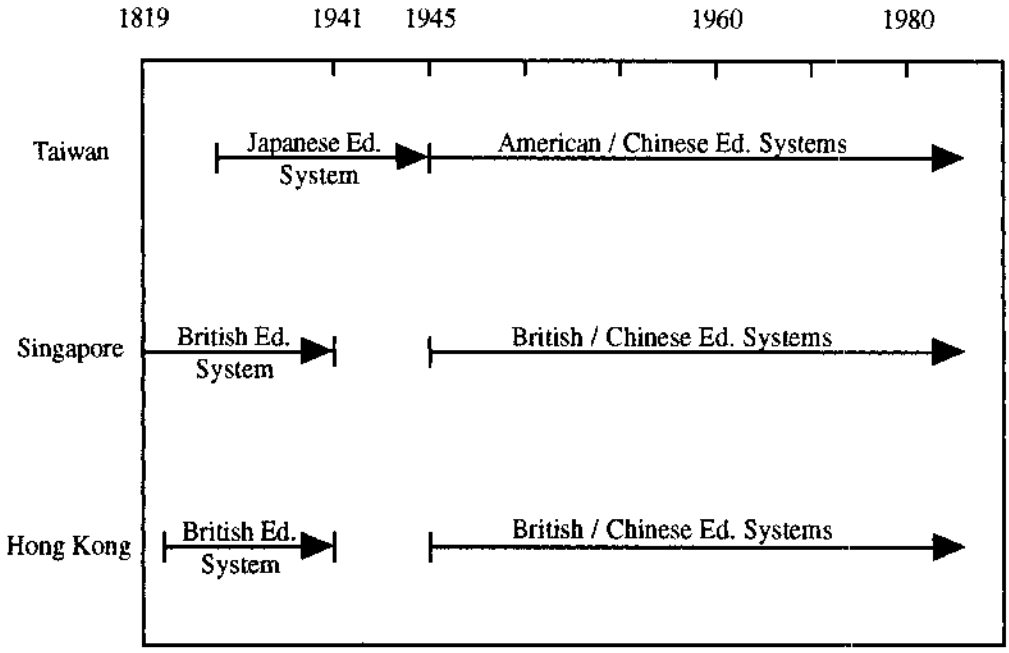


Figure 9. Origins of education.

required for graduation is used instead of a 3- to 6-year period based on the Japanese system (Wu et al., 1989). Moreover, each student must take required courses and electives offered by the department, and credits are counted for each course.

Regarding the admissions policy, there is a difference between the Taiwan educational system and the American system. Epsetin and Kuo (1991) stated that, in Taiwan, all high school graduates who want to further their studies in higher education must take the entrance examination offered by the Joint College Entrance Examination. Admission is based on the score on the entrance examination.

Singapore and Hong Kong became British colonies in 1819 and 1842, respectively. Both inherited a British model of higher education. The first

higher education institution in Singapore was the King Edward VII Medical School founded in 1905, which became the National University of Singapore in 1947 (Hayden, 1967). The Hong Kong College of Medicine, the first higher education institution in Hong Kong, was established in 1887 and became the University of Hong Kong in 1911 (Sweeting, 1990). The administration and courses of study in both the King Edward VII Medical School and the Hong Kong College of Medicine followed the British system. English was the language of instruction in both institutions.

It was not until 1949, when social and political conditions in mainland China changed, that the Chinese higher education system played a crucial role in both Singapore's and Hong Kong's higher education. Because the Chinese did not want a British education, they sent their children to mainland China for further education. After 1949, going to China was no longer an option for higher education, so the Chinese in Singapore decided to establish their own higher education institution. Consequently, Nanyang University was founded in 1953 (Higbee, 1980), and, in Hong Kong, the Chinese University was instituted in 1963 (Huang, 1965). Both Nanyang University and the Chinese University of Hong Kong followed the Chinese education system, and Chinese was the language of instruction.

Higher Education Systems Before Industrialization

After World War II, Taiwan was restored to mainland China's Taihoku Imperial University, which was established during the Japanese occupation, was renamed and reorganized. In the first 5 years following 1945, higher education in Taiwan grew very slowly. There were only seven higher education institutions. Four of them were colleges and universities, and

three were junior colleges. In colleges and universities, students needed three types of courses in order to complete their degree. The first type was general courses, which must be taken by all students regardless of their majors. The second was required courses for individual departments. And the last was elective courses.

In Singapore, liberal arts education began with the founding of Raffles College in 1929. This college became the second institution of higher learning in Singapore after the establishment of King Edward VII College of Medicine in 1905. Raffles College provided education in arts and sciences, and it became the institution that produced trained teachers for the middle and secondary classes in English schools. These two colleges were eventually amalgamated and became the National University of Singapore in 1949. The university was organized in faculties of arts, science, law, and commerce.

Nanyang University, another institution of higher education in Singapore, was founded in 1953. It accepted mainly students from the Chinese secondary schools, who previously had to go to mainland China for further study. The university offered degrees in arts, science, and commerce. It was organized according to the mainland China or American style. Chinese was the language of instruction. To obtain a bachelor of science degree in physics at Nanyang University, students were required to take two types of courses, general and elective.

As in Singapore, the first higher education institution in Hong Kong was the Hong Kong College of Medicine, operated on the British model with English as the language of instruction. In 1911 the Hong Kong College of

Medicine was amalgamated with the University of Hong Kong (To, 1965). The main aspiration for the university was to serve Chinese students in advanced education. It was supported by the local public, the Hong Kong government, and the British government. When the university began operation, it had only two faculties: medicine and engineering. In 1913 a faculty of arts was added. In 1951 the university reorganized its degrees in arts, science, and engineering and reduced them from 4 to 3 years' duration.

The reason for the establishment of the Chinese University of Hong Kong was similar to that of Nanyang University in Singapore. When the Communists took over mainland China, the possibility of going to China for higher education was no longer an option. As a result, the Chinese University of Hong Kong was established, with its academic system integrating the British and the American styles (Cheung, 1994). In order to earn a degree, a student must pass the degree examination, British style, and accumulate the required 124 credits hours, American style.

Types of Higher Education During Transition

Figure 10 shows the types of higher education in Taiwan, Singapore, and Hong Kong during transition. Taiwan became independent of Japan in 1945 and of mainland China in 1949, and Singapore achieved self-government status in 1959. The governments of Taiwan and Singapore recognized that industrialization was vital to their countries' survival in the world economy. At the time, because of the lack of natural resources and the growing unemployment rate, the governments in both countries decided that they must industrialize.

Unlike Taiwan and Singapore, initial industrialization in Hong Kong was prompted not so much by its government but by its people. Until 1950 Hong Kong's source of economy had been its entrepot trade with China. But with the onset of the Korean War , this trade with mainland China was no longer available. As a result, the economic policy was shifted to industrialization in order to survive. In addition, the government of Hong Kong took a more active role in the improvement of industrial support facilities.

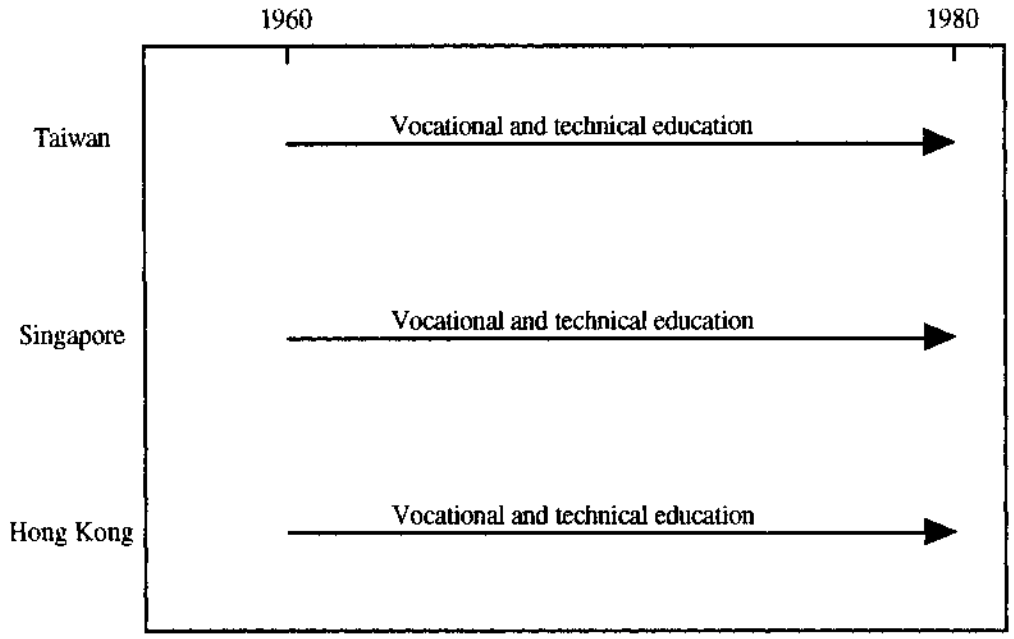


Figure 10. Types of higher education during transition.

With growing attention to industrialization, many countries gave more attention to the development of vocational and technical education. This event happened in Taiwan, Singapore, and Hong Kong as well. As Lucas (1981) stated, these three countries at first faced the growing shortage of

production-related jobs to carry a viable industrial infrastructure, whereas many educated people went unemployed. Their governments realized that, when the economic structure changed, their education systems had to change in order to produce the right kind of people to perform the job. Therefore, they took on the enormous job of restructuring their education systems to meet their countries' needs, emphasizing vocational and technical education (Oshima, 1993; UNESCO, 1979).

Taiwan

In Taiwan the development of vocational and technical education has been tremendous since the 1960s. In order to secure the output level of technicians to meet the demand for manpower planning, the government of Taiwan maintained a ratio of three to seven in favor of vocational schools (Singh, 1991). Consequently, the number of vocational and technical institutions increased from 3 in 1950-1951 to 77 in 1980-1981. The student enrollment in the vocational and technical education type of institution increased from 19% in 1950-1951 to 40% in 1980-1981.

The development of vocational and technical education in Taiwan started in 1953 when the Sino-American Conference on Industrial Vocational Education was held to investigate industrial colleges. Consequently, unit-trade training was adopted to prepare students for entry-level jobs in single, specific trades (Koo, 1968). Due to the success of Sino-American Industrial Vocational Education, the Ministry of Education established a dual system: the general education and the technical vocational education system. In 1970 the vocational and technical education

system included junior colleges and senior institutions of technology parallel to universities.

Singapore

Like Taiwan, the development of vocational and technical education in Singapore has been tremendous since the 1960s, because the government realized that technical education would provide the skills and knowledge for the country's development (Lee, 1991). During this period, Singapore's education shifted from the liberal arts tradition to vocational and technical education. The government also stressed the study of mathematics, science, and technical subjects. Law (1992) stated that in 1973 the Ministry of Education was divided into the General Department and the Technical Education Department. In Singapore there were three vocational and technical education institutions, including Singapore Polytechnic, Ngee Ann Technical College, and Singapore Technical Institute. The student enrollment in vocational and technical education was only 7% in 1963, and it increased to 42% in 1979.

Hong Kong

Similar to both Taiwan and Singapore, Hong Kong's education following World War II was expanded rapidly to meet the needs of the people, especially in the field of vocational training. A milestone in the development of vocational and technical education in Hong Kong occurred in 1955 when the Chinese Manufacturers' Association contributed one million Hong Kong dollars to found a technical college (Lee, 1991). In 1961 the student enrollment was 747 full-time students and 7,321 part-time

students. In the 1980-1981 academic year, the student enrollment rose to 7,200 full-time students, 3,400 part-time day-release, and 14,500 part-time evening students.

Funding Strategy

The public institutions of higher education were almost entirely financed from government revenue in all three societies. Wickremasinghe (1992) observed that, in Taiwan, the financial responsibility for education, by law, required the central and provincial governments, as well as the municipalities, to contribute a certain percentage of their income toward education. In Singapore and Hong Kong, all government tertiary institutions were financed by the government by means of grants. In Singapore each public institute received an annual lump-sum grant, based on student enrollment (Selvaratnam, 1994). In Hong Kong, public universities and polytechnics received the subsidy by means of block grants recommended by the University and Polytechnic Grants Committee (The Hong Kong, 1981). The block grants were provided over a 3-year period.

The expansion in education was reflected by an increase in educational expenditure. In reference to the government budget for education, Taiwan educational expenditure in the government was 1.73% of GNP in 1950, and it rose to 2.52%, 4.57%, and 4.54% in 1960, 1970, and 1980, respectively. In Singapore, the proportion was 2.58% in 1972, rose to 2.90% in 1975, and reached 2.95% in 1980. In Hong Kong, the proportion of educational expenditure as a percentage of the GDP was 2.83% in 1974, and it increased to 3.04% in 1980. The funding strategies of the three countries are shown in

Figure 11. In the area of higher education, nearly 20% of the national education expenditure was spent for higher education in all three countries.

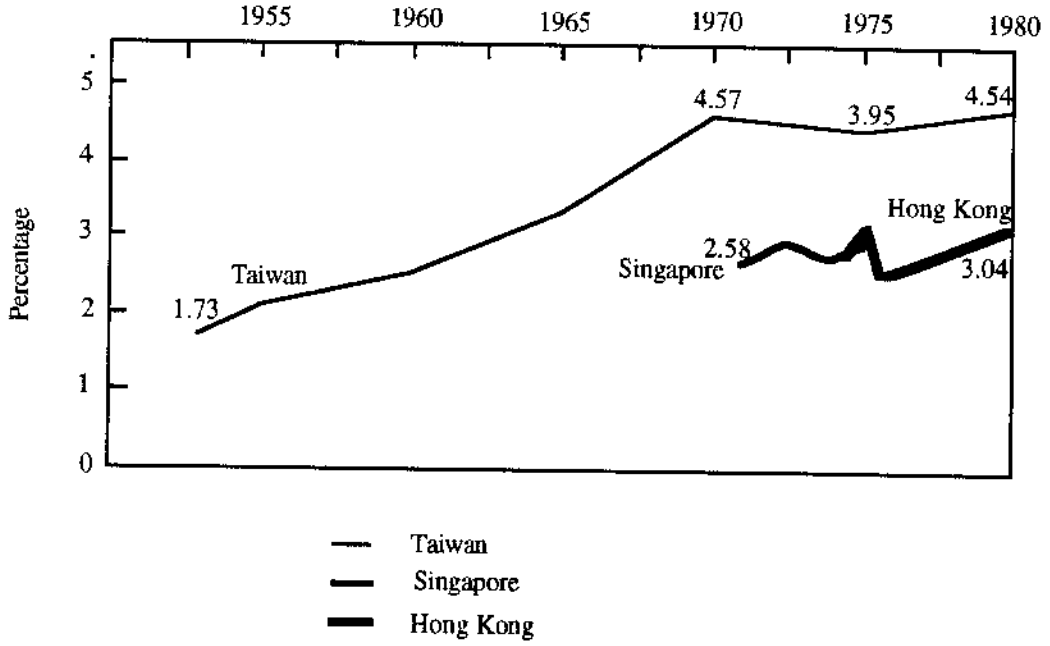


Figure 11. Funding strategy.

Models of Higher Education

The higher education systems of Taiwan, Singapore, and Hong Kong are shown in Figures 12, 13, and 14, respectively. The Ministry of Education stands at the head of both Taiwan's and Singapore's education systems. The bureaucracies of these two systems are quite the same. Yung and Welch (1991) indicated that, in Taiwan, the Ministry of Education has a great deal of power over higher education. It is in charge of all administrative matters, appointing the presidents of public institutions and approving the appointments of the presidents of private institutions through their board of trustees. It controls the enrollment, tuition rate, general

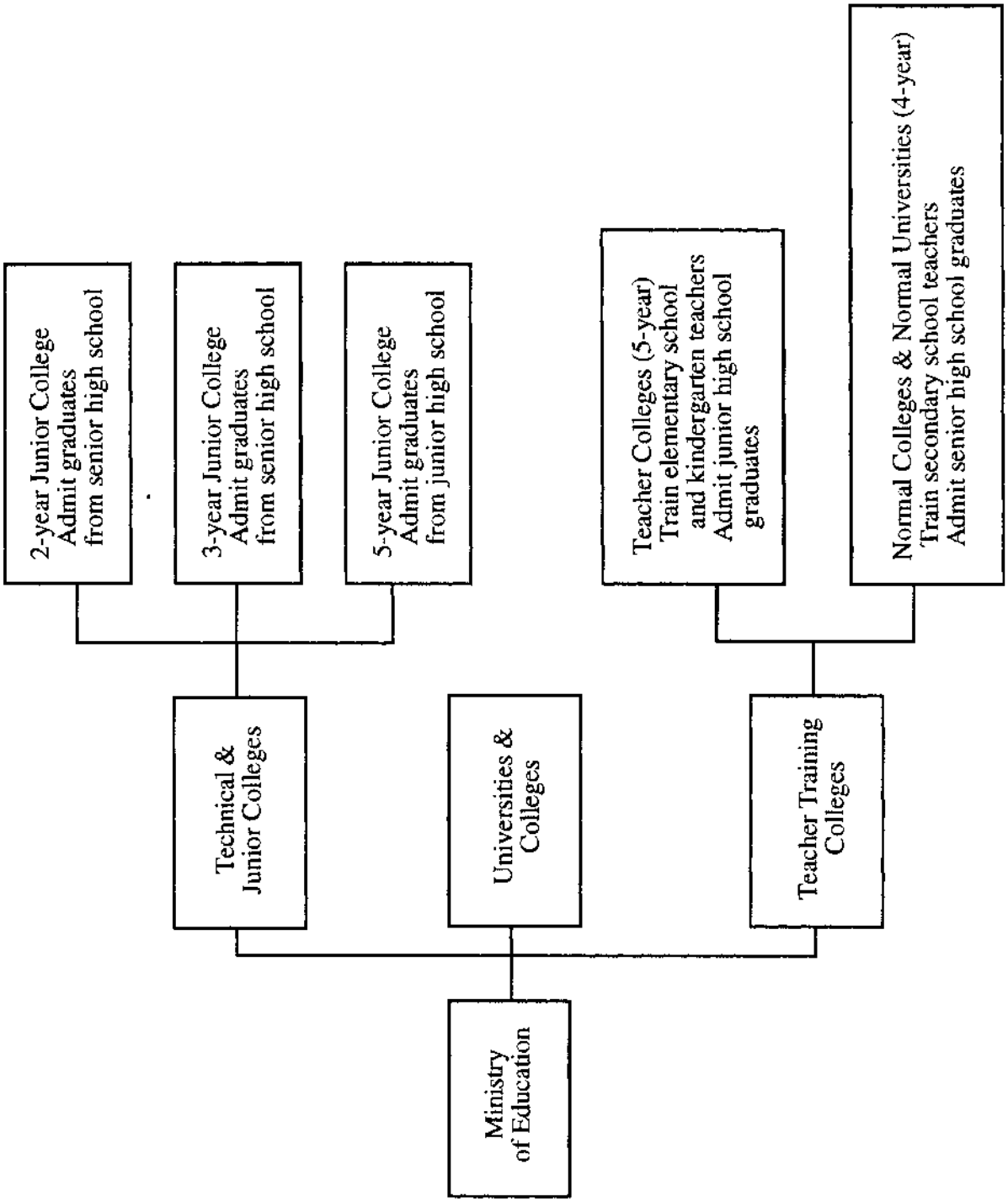


Figure 12. Taiwan's higher education system.

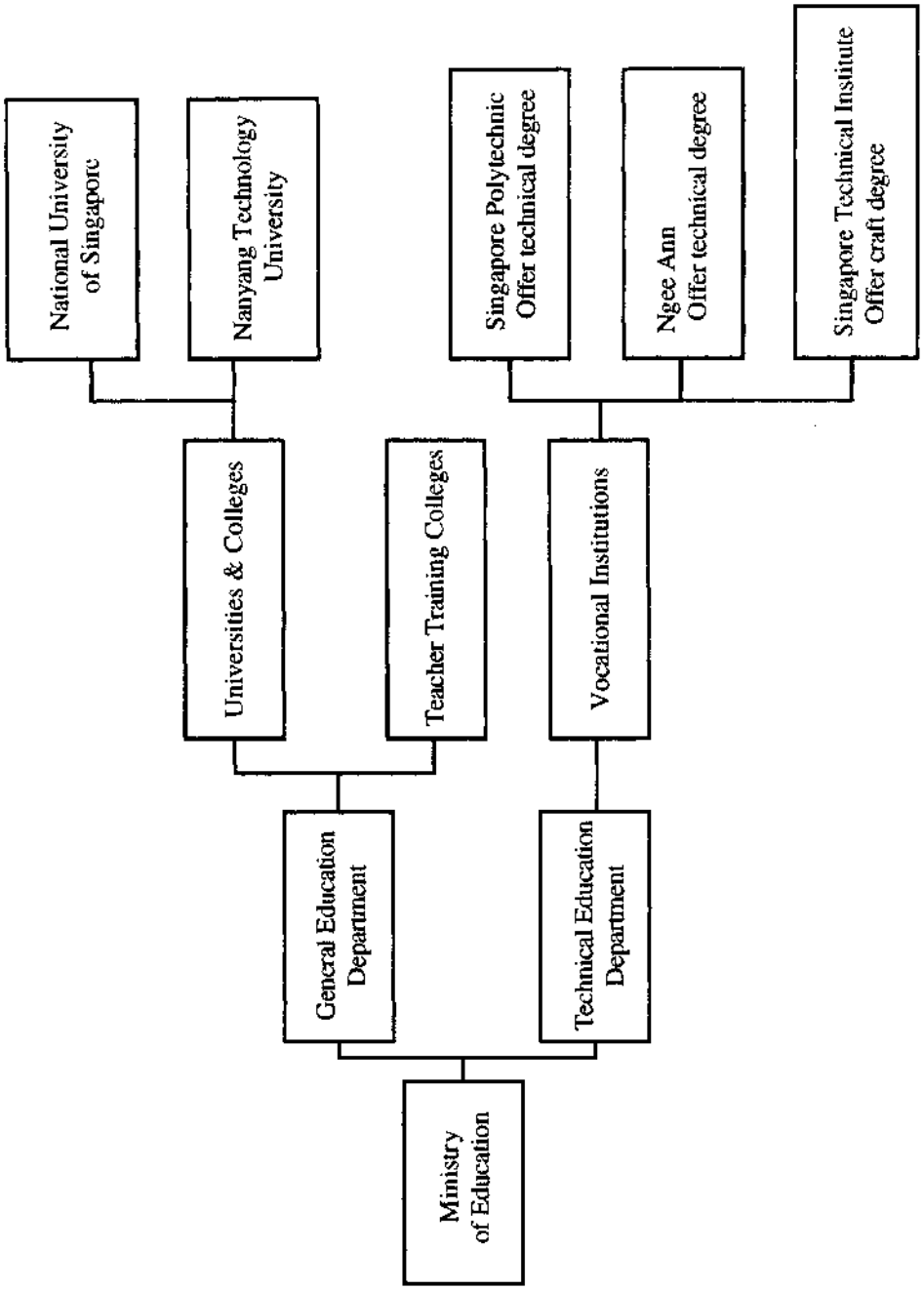


Figure 13. Singapore's higher education system.

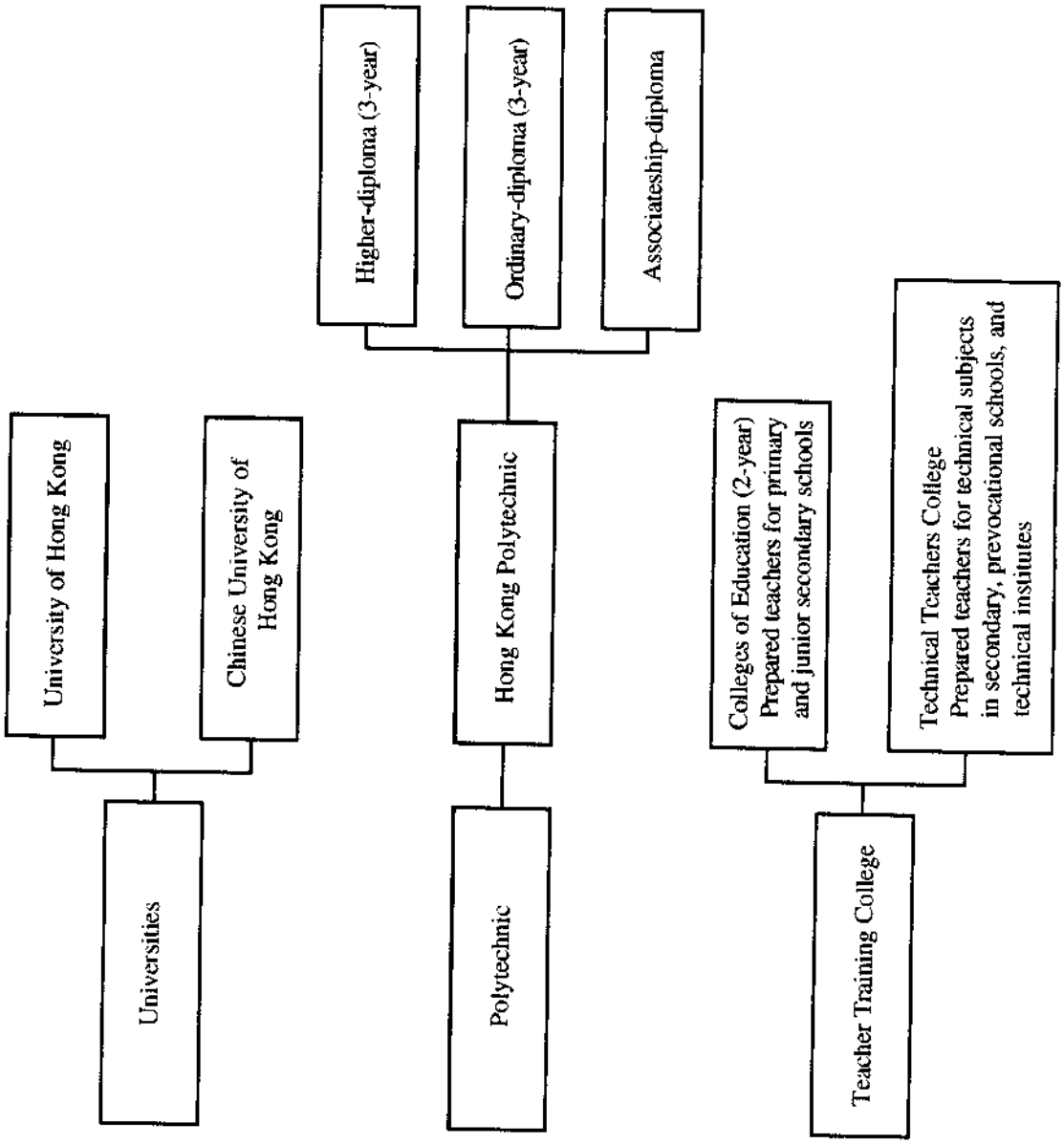


Figure 14. Hong Kong's higher education system.

education courses, required departmental courses, and minimum credits for graduation. The ministry also functions as the final authority in all faculty and student appeal cases. In Singapore, because the higher education institutions are largely state financed, the government, through the Ministry of Education, maintains strong control over the institutions' policy direction. In Singapore, the Ministry of Education has limited university autonomy and has directed the higher education institutions to respond and adapt to the major social changes and needs (Law, 1992). In Hong Kong, the Ministry of Education does not exist in the education system. Luk (1994) noted that all higher education institutions in Hong Kong are self-governing corporations, even if they draw their income mainly from government grants. The financing of these institutions is under the administrative control of the University and Polytechnic Grants Committee. The government indicates to the University and Polytechnic Grants Committee the extent and direction of development. The higher education institutions discuss their plans for achieving this development with the University and Polytechnic Grants Committee, which then makes recommendations to the government on the programs and the funds necessary to finance them.

Although Taiwan, Singapore, and Hong Kong give more attention to the development of vocational and technical education, Singapore is the only country in which the Ministry of Education is divided into two separate departments: the General Education Department and the Technical Education Department (see also Figures 12, 13, and 14). Doraisamy (1969) stated that the main objective of the Technical Education Department is to expand vocational training to meet the rapidly growing requirements for

technical manpower needs. In Taiwan there is no general education department or technical education department under the Ministry of Education. The importance of vocational and technical education, however, is clear, due to the establishment of a vocational and technical education system parallel to the general education system (Chang, 1990).

There are three types of higher education institutions, including colleges and universities, vocational and technical institutions, and teacher-training colleges in Taiwan, Singapore, and Hong Kong. Every higher education institution in Taiwan is under the control of the Ministry of Education, whereas in Singapore, they have a limited autonomy, and in Hong Kong they are self-governing. In order to have access to colleges and universities in all three countries, students must take an entrance examination. For example, colleges and universities in Taiwan instituted the Joint College Entrance Examination (Smith, 1984). With this system, all high school graduates who want to further their study in colleges and universities must sit for the Joint College Entrance Examination. After taking the examination and receiving their scores, students fill in a list of their preferred departments and their preferred colleges and universities, based on their scores and the minimum requirement for each department set by the Ministry of Education. Thus, students' admission is based solely upon their scores on the entrance examination. In Hong Kong, admission to colleges and universities is based upon passing the matriculation examination.

In Taiwan and Singapore, colleges and universities emphasize science and technology. They encourage students to study applied science in order to meet the demands of the changing economic structure. In Singapore,

especially, to avoid duplication and to facilitate administration, the School of Education was transferred to teacher training colleges (Tapingkae, 1976). Then the Nanyang Technological University was established as a separate engineering institute to produce the highly skilled manpower needed for a sophisticated and capital-intensive economy.

The second type of higher education institution is vocational and technical institutions. Until 1980 there were 77 junior colleges in Taiwan. The junior colleges are divided into two categories--5-year junior colleges and 2- or 3-year junior colleges--based on the qualifications of the students. In Singapore there are three vocational and technical institutions, including Singapore Polytechnic, Ngee Ann Technical College, and Singapore Technical Institute. In Hong Kong there is only one vocational and technical institution, Hong Kong Polytechnic.

Diplomas are awarded in every vocational and technical institution in the three countries. In Taiwan, diplomas are awarded in two levels. One is for students who graduate from a 5-year junior college, and the other is for students who graduate from a 2- or 3-year junior college. In Singapore and Hong Kong, diplomas are awarded in three different levels for students who graduate from vocational and technical institutions. The difference, however, is in the name. In Singapore the highest level is the professional degree, whereas it is called higher diploma in Hong Kong. In Singapore the middle level is called the technician degree, which in Hong Kong is called the ordinary diploma. The lowest level is the crafts degree in Singapore, which is called the associateship diploma in Hong Kong.

In term of degrees offered by vocational and technical education institutions in the three countries, Taiwan's vocational and technical education is similar to Singapore's vocational and technical education. Each vocational and technical institution in these two countries offers only one type of degree; for example, Singapore Polytechnic offers a technical degree, and Singapore Technical Institute offers a crafts degree. In Hong Kong, however, every vocational and technical degree is offered from one institution, Hong Kong Polytechnic.

The third type of higher education institution is the teacher-training colleges. In Taiwan there are two kinds of teacher training colleges (Ministry of Education, 1988). Teachers' colleges train teachers for primary schools. The normal colleges and normal universities train teachers for secondary schools. Both type of institutions have a period of study of 5 years with 4 years of academic study on campus and 1 year of teaching practicum at either primary or secondary schools. They admit high school graduates. In both types of teacher training colleges, students are exempted from tuition charges and enjoy living allowances. In return, students are committed to serving on assigned teaching jobs after graduation (Liang, 1991). Neither Singapore nor Hong Kong has this kind of offering. In Singapore there is only one type of teacher training college that serves and responds to the needs of the central government (Hammond, 1995). The teacher training college is responsible for the training of all teachers from primary to secondary school teachers. In Hong Kong there are two types of teacher training colleges. Colleges of education are responsible for training teachers for primary and secondary schools. This type of teacher training

college is similar to the combination of teachers' colleges and normal colleges and normal universities in Taiwan, and teacher training college in Singapore. Another type of teacher training college in Hong Kong is the technical teachers' college, which trains teachers of technical subjects in secondary, prevocational schools, and technical institutes.

Examinations are widely used to determine students for teacher education. In Taiwan as well as in Singapore, entrance examinations are taken by all graduates of high school (Hammond, 1995). However, the admission policy in Hong Kong is different from both Taiwan and Singapore. In Hong Kong, students who intend to further their studies in teacher education must undergo two interviews and a practice test for certain subjects (Government Secretariat, 1995). The first interview involves the candidate's attitudes toward teaching and adaptability to the working environment. The second interview assesses the candidate's competence with the language requirement of the academic programs, which is conducted in either English or Chinese. The practical test is for candidates who intend to study physical education, music, art and design, technical drawing, or computer literacy.

A Single Model of Higher Education System

The models of higher education used by Taiwan, Singapore, and Hong Kong from 1945 to 1980 were not identical; nevertheless, they came to the same conclusions about economic development. In this case, it cannot be said that one model is better than the other. An emerging industrial country with a social and economic background similar to that of Taiwan, Singapore, or Hong Kong would find that adoption of those higher education models

would be appropriate. For instance, an emerging country with a social and economic system similar to that of Taiwan, would find Taiwan's higher education model appropriate for adoption in that country. On the other hand, if an emerging industrial country has social and economic criteria dissimilar to those of Taiwan, Singapore, or Hong Kong, a single model of higher education, which is described below, would be appropriate with an adjustment to suit the national resources, cultural background, and structure of trades and the labor force.

Figure 15 shows a single government-oriented higher education model for a possible country that wants to become an industrialized country. Private institutions are outside this model. The system of education is centralized and is under the control of the Ministry of Education, which is responsible for all educational planning. The Ministry of Education, which is similar to Taiwan's and Singapore's higher education models, stays at the top of the pyramid. It has total control of all administrative matters dealing with education, approving of the establishment of higher education institutions, appointing the presidents of public institutions, and approving the appointments of the presidents of private institutions. It determines the pattern of schools' curricula, which consist of general education courses, required courses for each department, and minimum credits required for graduation. It also determines the number of student enrollment and tuition rate fees.

The following are reasons why the Ministry of Education should have total control of all educational matters. The first concerns central goals. If a country is to develop, it needs goals and guidelines. The Ministry of

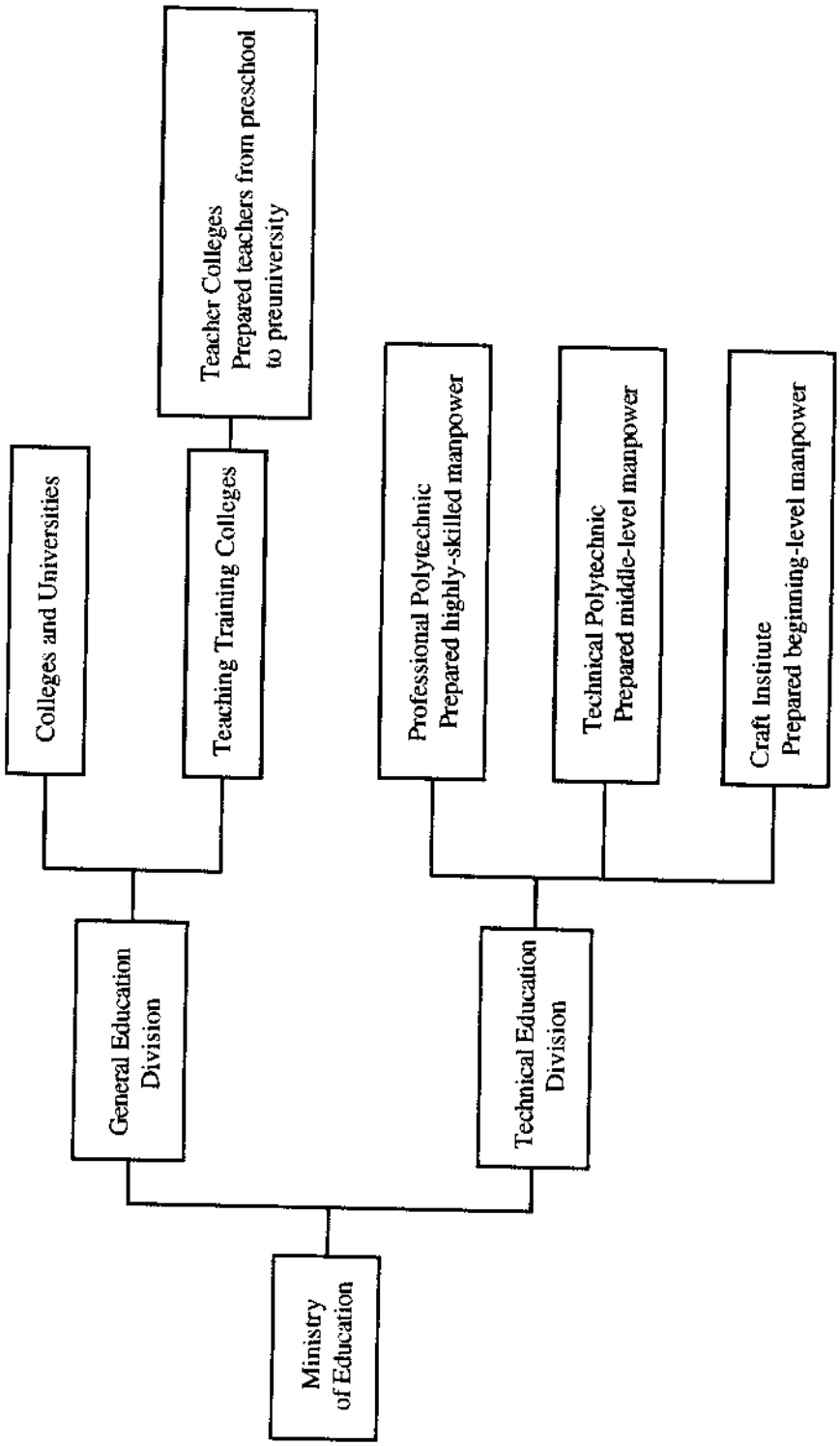


Figure 15. Higher education model.

Education can set goals and guidelines for the educational system then pass them down to each institution to ensure that every institution throughout a country heads in the same direction. As Liu and Armer (1993) demonstrated, education has positive effects on economic growth when the government attempts to design the curricula to meet economic needs and when the government guarantees the quality of the output. This supports the idea of the top-down management of the Ministry of Education. Furthermore, this system should work well in a country that has a diverse population that differs in religion, sets of beliefs, and value systems. It also should work well in a country with a large geographic area. The second reason is from a timing standpoint. Time is everything. If a country wants to survive in the world economy, its people have to be educated now so that they will have the skills they need. The government cannot waste time by simply giving a direction and hoping that, at some point, the institutions will respond and adapt their education policies to meet the social needs. However, self-governing higher education institutions (similar to Hong Kong's higher education model) would work only if there are people like Hong Kong's people, refugees from mainland China, who devoted themselves to building a new nation (Vogel, 1991).

Under the Ministry of Education, there are two separate divisions (the same as Singapore's higher education model). One is the General Education Division, and the other is the Technical Education Division. The Technical Education Division is separated from the General Education Division because there is evidence in Taiwan, Singapore, and Hong Kong which indicated that vocational and technical education is a factor in economic

development for these three countries (Oshima, 1993; UNESCO, 1979). Therefore, universities and colleges should consider vocational and technical education equally important.

The general education division is responsible for two types of educational institutions--colleges and universities and teacher training colleges. In colleges and universities, a 4-year study period is required for graduation, except in the department of medicine. Students must take both general courses, which are required by all students despite their majors, and elective courses. During the first 2 years, students are required to take only general courses; they will select their majors in the third year.

In order for high school graduates to be admitted to any college and university, the following criteria are used. First, exam scores are collected throughout students' high school years. During the high school years, students must take examinations that are provided by the Ministry of Education. Second, students must sit for the entrance examination, which is similar to Taiwan's, Singapore's, and Hong Kong's higher education models. The entrance examination is held once a year. After taking the examination and receiving their scores, candidates have to provide a list of their preferred departments and their preferred colleges and universities, based on their interests as well as their scores and the minimum requirements set for each department by the Ministry of Education. This model includes the entrance examination even if there is documentation that it has caused problems for many students, ranging from suicide to leaving the nation for study in the United States (Sammour & Eddy, 1994). The reason is that a developing country, to begin with, does not have the funds to make higher education

accessible for every student. Thus higher education institutions should be able to enroll as many students as they can teach and to accept only those students who have the knowledge and ability to benefit from their studies. The entrance examination, according to Harman (1994), serves that purpose.

However, there is an indication that most students who enter tertiary education come from the upper social and income groups because they have had the best tutors that money can buy (Harman, 1994). Thus, in this model, admission into an institution of higher education is not based solely on the entrance examination; it also based on scores from examinations throughout the high school years. This admission policy can ensure that the limited resources of a country are not wasted, because not only are well-prepared students admitted into higher education institutions, but also the drop-out rates are low. Consequently, a country will have the best human resources for its future development.

In terms of educational finance, all public colleges and universities are supported by a government, and students pay for only a fraction of the cost of their education. A government must invest its money in education in much the same way as the governments of Taiwan, Singapore, and Hong Kong did on their educational budgets. According to Psacharopoulos and Woodhall (1985), education is a source of investment. It helps to create future income by giving people the knowledge and skills they need to obtain better jobs and to receive higher earnings and, therefore, to improve their standard of living, which has a direct impact on economic development.

In this model, there is only one category of teacher training college that prepares teachers from primary to secondary schools. As in Taiwan's and

Singapore's higher education models, primary school teachers are trained as generalist teachers because they teach more subjects than secondary school teachers, who are trained as subject specialists and teach only one subject area. A period of study for both primary and secondary school teachers is 4 years, which is similar to Singapore's and Hong Kong's higher education models. During their 4 years, students need to take general education, professional training to assist them in teaching more effectively, academic specializations, and practicum (close to Taiwan's and Singapore's higher education models). This type of institution admits high school graduates. After finishing the 4 years of study, students will receive bachelor's degrees.

Today, there is a growing concern regarding the supply and demand of teachers and ways of attracting and retaining highly qualified teachers in every part of the world, especially in rural areas (Hammond, 1995; Neumann, 1994; Savelsbergh, 1994). To overcome this problem, this model proposes the same procedure that has been used in Taiwan. Students in teacher training colleges are not only exempted from tuition charges, but they also accept living allowances. In return, they commit themselves to serve on assigned teaching jobs after their graduation. With this system, a government assures the availability of an adequate number of teachers in every part of a country.

The Technical Education Division, the other division under the Ministry of Education, is responsible for all vocational and technical institutions. The objective for this division is to expand vocational and technical education to meet the supply of skilled manpower needs for economic activities. The Technical Education Division organizes the curricula in vocational and

technical institutions and ensures that the courses and curricula developed are relevant and meet the requirements of the industries. This procedure tends to work very well in Taiwan, Singapore, and Hong Kong (Law, 1992; Singh, 1991; Sweeting, 1993). In this model, vocational and technical institutions are divided into three difference types, associated with the degree they offer. The first is called a professional polytechnic, the second is called a technical polytechnic, and the third is called a crafts institute. To determine admissions, each institution holds an internal examination, with the standards set by the Technical Education Division under the guideline of the Ministry of Education.

The professional polytechnic institute offers a professional degree. The purpose of this type of institution is to produce the highly skilled manpower needed for sophisticated jobs. It admits high school graduates for a 4-year period of study. The graduates of professional polytechnic institutes are awarded a degree similar to a bachelor's degree from colleges and universities. The technical polytechnic institute offers a technical degree. The main goal of this type of institution is to prepare for middle-level technical manpower in various fields. It also admits high school graduate students for a 2-year period of study. The crafts institute offers a crafts degree and admits junior high school graduates for a 3-year period of study. This degree prepares for low-level technical manpower.

Limitations

The limitations of this model are as follows:

1. It excludes private higher education institutions who can contribute much to a nation, as South Korea has proven with more 2-year private

colleges than public as a developing nation. The South Korean model is one also to consider for developing nations(Eddy & Chen, 1989).

2. It ignores the research of private higher education in the success of a nation's growth in economic, political, and other factors. The latter has had some effect in all three territories, which have limited numbers of higher education institutions.

3. It rules out elementary and secondary school systems. The study by Krusemark and Forsaith (1996) indicated that the top-scoring countries in science and math include Taiwan and South Korean in secondary student achievement tests. These countries have Saturday classes, and many of the parents have sacrificed to tutor their children as well as send them to afternoon and evening study sessions. Thus, it is the elementary and secondary school systems of these three territories that should be given more credit for the economic success of these Asian nations. This model does not deal with these educational institutions, but it does here provide evidence for the success of elementary and secondary schools as far as the students succeeding in science and math testing compared to students in other nations.

Conclusions

The conclusions of this study are similar to the findings of previous studies. For example, Corso (1988), Githiora (1989), Jung (1990), Hamouri (1992), and Lee (1983) all found that education as a form of capital investment in a society is not only an essential ingredient for economic development, but is also an important factor in building a nation. Results indicated that investment in education provides the equality of personal

income distribution and improves the status of the low-income group. In addition, Kondonassis (1992) suggested that both economic and non-economic forces contribute to a nation's development (see Figure 16). Human resource is considered as a non-economic factor. The human factor associated with a proper education played a crucial role in the impressive development of the three newly industrializing countries.

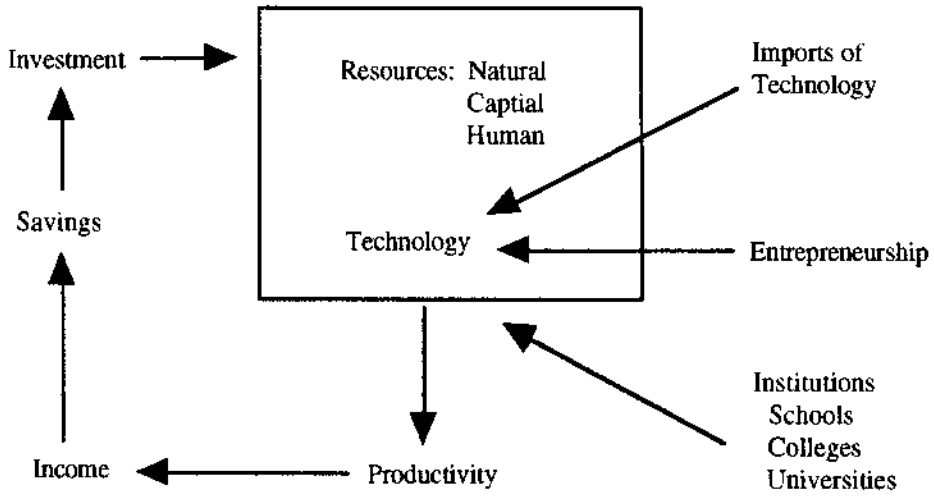


Figure 16. Economic development.
From World Economic Development (p. 21) by A. J. Kondonassis, 1992, Norman: The University of Oklahoma Press.

Virasai (1977) found that education systems were created and developed to meet the needs of societies. When societies changed, the needs changed, and so did the education system. The findings of Virasai's study concur with this study. When Taiwan, Singapore, and Hong Kong shifted from import substitution to export-oriented toward the global market, their education systems had to implement changes to accommodate their new

needs. As a result, these three countries put their emphasis on vocational and technical education. Hollenbeck (1992) and Nespoli (1991) found similar results indicating that vocational and technical education provided students with the knowledge and skills they needed in a world of technology.

The review of literature for this study supported Rosenfeld's (1992) study that economic development, at one point, relied on the attractiveness of a low-wage force to mass-production manufacturing industries. However, traditional mass-production manufacturing procedures have been diminished by technological competition. Competitiveness now requires attention to quality and productivity, which is why a country needs well-trained and skilled workers to perform the jobs.

What the future holds for these Asian territories is uncertain. Singapore seems to have the best future, without governmental influence from Communist China. Hong Kong will be controlled by China in 1997, so its educational institutions will suffer from micromanagement by the Communists. Taiwan is under the shadow of the Communists, who continue to harass its citizens with 1996 missile explosion practices and media propaganda of a Chinese takeover in the near future. Communist China's influence will continue to cloud the higher education climate of Taiwan and Hong Kong well into the 21st century and beyond. Only an ideological change in China will provide the best hope for future improved higher education conditions in these countries (Eddy, 1994).

Recommendations

Not long ago Taiwan, Singapore, and Hong Kong were classified as underdeveloped countries. They collectively became known as newly

industrializing countries in a short period of time. The rapid economic growth of these three countries has continued even if they are limited in natural resources and have relatively small domestic markets. These three countries have accomplished their remarkable social and economic fulfillment through the educational and vocational development of their people. Thus, their success story can be a valuable lesson to any developing country that wants to be the next newly industrializing country.

In the case of Thailand, the following information is provided from the results of the study of these three countries which might improve its higher education and society in the 21st century. But first, Thailand's current education system is reviewed.

In Thailand, there are two authorities in policy planning in the education system. The first is the Ministry of University Affairs, and the second is the Ministry of Education. The Ministry of University Affairs is in charge of curriculum development at all the universities, both state and private. The ministry also conducts the administration of personnel affairs at all the state universities. State institutions receive almost 100% of their annual operational funds from the central government through the ministry. Education below the university level is under the strict control of the Ministry of Education.

In higher education, there are three types of institutions: state and private universities, teachers' colleges, and polytechnic institutes. The university/college council oversees policy planning and regulates the affairs of the institution in almost every aspect. However, the final power rests with the Ministry of University Affairs. The colleges for vocational and technical

training do not have such a governing council, but are directly controlled by the Ministry of Education. For admission to higher education for bachelor's degree programs, all applicants must compete in an entrance examination administered by the Ministry of University Affairs and the Ministry of Education. The selection criteria are based on the scores made in the exam.

In the following section, a single higher education model in this study is applied to Thailand's current higher education system.

Under the Ministry of University Affairs, there should be two separate divisions: the General Education Division and the Technical Education Division. The General Education Division is in charge of all colleges and universities, as well as the teachers' colleges. On the other hand, the Technical Education Division is in control of all vocational and technical institutions. The Ministry of University Affairs will work closely with both the General Education Division and the Technical Education Division to ensure that education programs are coordinated and systematized with the proposed industrialization plans of the government. These three categories of higher education institutions--colleges and universities, teachers' colleges, and vocational technical institutes--are given equal importance. Graduates from these higher education institutions will receive bachelor's degrees.

The entrance examination is still in use to admit students into higher education institutions because the available seats are not equal to the number of high school students who graduate. However, to prevent a situation in which only wealthy students, who can support tutors, can obtain access to higher education, collected scores from examinations given throughout the high school years will be included in the college admission policy. These

examinations will be administered by the Ministry of University Affairs and the Ministry of Education to assure that these examinations are standardized throughout the country.

If Thailand wants to be the next successful newly industrialized country, it needs skilled people to perform the jobs. In order for people to be skilled, they need some sources of education. An education starts in some institutions. An institution needs teachers, because without teachers, nothing can be completed. Therefore, the Thai government must pay more attention to its teachers' colleges. Based on a proposed model of higher education, students who attend this type of institution should receive free or inexpensive education and be promised jobs after graduation, which will attract a large number of talented students. After they graduate from a teachers' college, the students will be assigned teaching jobs in various parts of a country.

Education is a driving force of economic development. People need to be prepared before economic growth can happen. Thus, if Thailand wants to continue toward the goal of being competitive for tomorrow, the Thai government must develop its human resources today.

APPENDIX A

LETTER FROM GOVERNMENT INFORMATION OFFICE: REPUBLIC OF CHINA

Republic of China

Government Information Office

July 18, 1995

Mr. Em-Amorn Kumnuch
Ph.D. candidate
College of Education
Department of Technology & Cognition
University of North Texas
P.O. Box 13857
Denton, Texas 76203-6857
U.S.A.

Dear Mr. Kumnuch:

Your letter to Dr. Jason C. Hu of July 6, 1995 has been referred to me.

I have forwarded your letter to the Ministry of Education because they are in charge of education affairs. I am sure that the ministry will provide you with materials for your research.

Please contact my colleagues stationed in our Houston office, if they can be of forther help to you.

Sincerely yours,

Kao Jen-hwan
Director
Department of International
Information Services

cc: Information Division
TECO in Houston

The Ministry of Education

Address : 2 Tientsin Street • Taipei 10041 • Taiwan, ROC
Telephone : 322-8888 • Fax : 341-6252 • Telex : 11636 Inform

APPENDIX B

LETTER FROM NANYANG TECHNOLOGICAL UNIVERSITY: SINGAPORE

NANYANG TECHNOLOGICAL UNIVERSITY
NATIONAL INSTITUTE OF EDUCATION

Telephone: 4695151
Telegram: EDUCATOR
Telefax: 4695968

469 Bukit Timah Road
Singapore 1025
Republic of Singapore

Ref:

NIE 048/G/73 Vol 9

11 September 1995

Ms Em-Amorn Kumnuch
Ph D Candidate
College of Education
Department of Technology & Cognition
University of North Texas
P O Box 13857
Denton, Texas 76203 - 6857

Dear Ms Em-Amorn Kumnuch

This is further to my letter dated 4 August 95.

We would like to inform you that there is this publication by the Teachers' Training College, a predecessing institution of the National Institute of Education (NIE), entitled "150 Years of Education in Singapore" which may be of use to your research.

You may wish to enquire about the book from your university library.

Yours sincerely

Miss Chan Guet Har
Assistant Manager, Public Relations
National Institute of Education

Tel : 460 5016
Fax : 469 5968

APPENDIX C
LETTER FROM MINISTRY OF EDUCATION: SINGAPORE

MINISTRY OF EDUCATION

KAY SIANG ROAD
SINGAPORE 1024
REPUBLIC OF SINGAPORE

P O Box 746
Telephone 473 9111 (44 lines)
Telefax 475 6128
Telebox GVT 036
Cable "EDUCATION"

Ref. No
ED N14-14-004

Tel. No 4709207
FAX : 4714816

14 July 95

Mr Em-Amorn Kumnuch
Ph.D candidate
Higher Education
University of North Texas
Department of Technology & Cognition
P.O.Box 13857
Denton, Texas 76203-6857

Dear Mr Kumnuch

I refer to your letter dated 30 June 95.

2. You may wish to write to the following universities and polytechnics :

National University of Singapore
10 Kent Ridge Crescent
Singapore 0511
Tel : 7756666
Fax : 7795481

Nanyang Technological University
Nanyang Avenue
Singapore 2263
Tel : 7911744
Fax : 7919516

Singapore Polytechnic
500 Dover Road
Singapore 0513
Tel : 7751133
Fax : 7721971

Nanyang Polytechnic
Lower Delta Road
Singapore 0316
Tel : 2731183
Fax : 2732649

Ngee Ann Polytechnic
535 Clementi Road
Singapore 2159
Tel : 4666555
Fax : 4687326

Temasek Polytechnic
51 Grange Road
Singapore 1024
Tel : 2355252
Fax : 2351686

National Institute of Education
469 Bt Timah Road
Singapore 1025
Tel : 4695151
Fax : 4695968

Yours sincerely

MARCIA MOHAN (MRS)
for PERMANENT SECRETARY (EDUCATION)

APPENDIX D

LETTER FROM UNIVERSITY GRANTS COMMITTEE: HONG KONG

大學教育資助委員會
香港夏慤道十號
和記大廈二樓二〇二室

UNIVERSITY GRANTS COMMITTEE
Suite 202, 2/F, Hutchison House,
10 Harcourt Road, Hong Kong.
Please quote our ref. in your reply.

本署檔號 OUR REF.: UGC/GEN/90/77 VIII

來函檔號 YOUR REF.:

電　話 TELEPHONE: 2524 3987

電報掛號 TELEGRAPHIC ADDRESS:
'UGRANTS HONG KONG'

傳真機號碼 FAXLINE NO.: 2845 1596
電子郵遞 E-MAIL: UGC@UGC.EDU.HK

2 August 1995

Mr Em-Amorn Kumnuch
Ph.D. candidate
Higher Education
University of North Texas
P.O. Box 13857
Denton
Texas
USA

Dear Mr Kumnuch,

I refer to your letter of 7 July 1995 requesting for information on the Hong Kong higher education system.

A copy of the "Higher Education 1991-2001 An Interim Report" published by this Secretariat and extracts of the Hong Kong Annual Report - "Hong Kong 1995" published by the Hong Kong Government have been enclosed for your reference. Should you need further information on higher education in the earlier years, you may refer to the previous issues of the Hong Kong Annual Report.

Yours sincerely,

(Mrs Josephine Yung)
for Secretary-General
University Grants Committee

l-ant

APPENDIX E
LETTER FROM THE ASSOCIATION OF COMMONWEALTH UNIVERSITIES

THE ASSOCIATION OF COMMONWEALTH UNIVERSITIES

JOHN FOSTER HOUSE 36 GORDON SQUARE LONDON WC1H 0PF CABLES: ACUMEN LONDON WC1 TEL: 0171-387 8572

Patron: Her Majesty the Queen, Head of the Commonwealth

Fax: 0171-387 2655
+ 44 171 387 2655 (International)

Registered charity No 314137

Mr. E. Kumnuch,
College of Education,
Department of Technology and Cognition,
University of North Texas,
PO Box 13857,
Denton, Texas 76203-6857
USA

Our Ref.: AG

Airmail

24 August 1995

Dear Mr. Kumnuch,

Thank you for your recent enquiry.

I am enclosing some information taken from one of the ACU publications, the Commonwealth Universities Yearbook 1995-96, describing the higher education system in Hong Kong, which I hope you will find helpful.

I am also enclosing a printout from our library catalogue at the ACU, of material which may be relevant to your research. I am afraid that I am not able to suggest any individual publications which cover your area of interest comprehensively. However, as you will be able to see, there are a number of publications which describe the history of various universities which you may find useful to obtain.

I am afraid that the ACU cannot provide or loan copies of these publications. Your university library may be able to obtain some of these publications for you.

I hope this is helpful.

Yours sincerely,

A. M. Gane

Anna Gane (Ms)
Information Assistant

Enc.

WP41"HISTORY"

APPENDIX F

LETTER FROM INTERNATIONAL BUREAU OF EDUCATION

organisation des nations unies pour l'éducation, la science et la culture

BUREAU INTERNATIONAL D'ÉDUCATION
INTERNATIONAL BUREAU OF EDUCATION

Adresse postale / Postal address:
Case postale 199
1211 Genève 20
Suisse / Switzerland

Téléphone: (41) (22) 798 14 55
Câble: Intereduc Genève
Télex: 415 771 BIE
Téléfax: (41) (22) 798 14 86

Adresse / Street address:
15, route des Morillons
1218 Grand-Saconnex
Genève

IBE/95/INF/238

22 August 1995

Dear Mr Kumnuch,

Many thanks for your letter of 15 August.

Enclosed you will find the photocopies of the IBE's "International yearbook of education" and the references to the two other books, as mentioned in my E-mail.

Do let me know, if I can be of further help.

Yours sincerely,

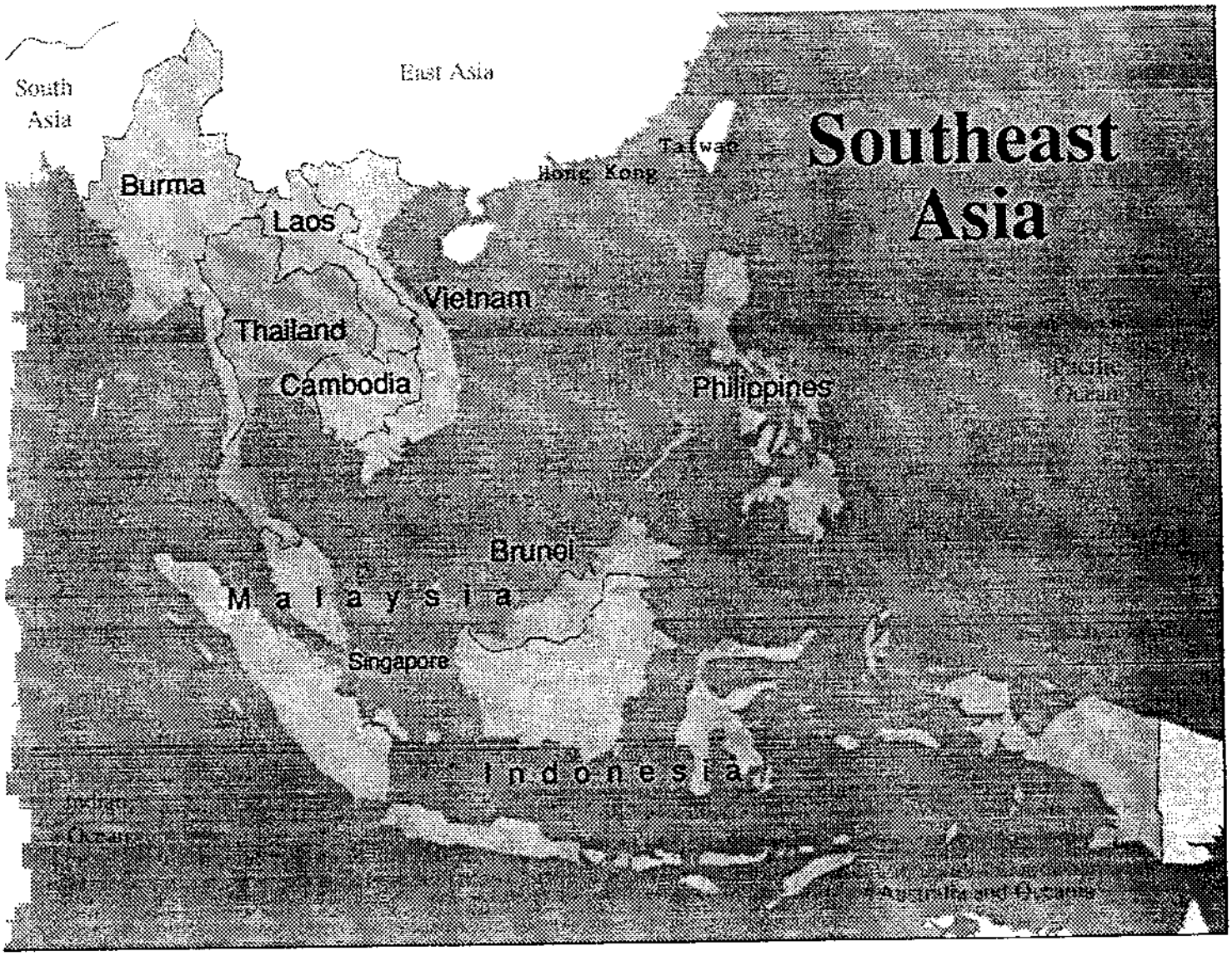
Felicity Nacereddine

Felicity Nacereddine
Documentalist

Mr. Em-Amorn Kumnuch
University of North Texas
Box 5155
DENTON, TX 76203
U.S.A.

APPENDIX G

ASIA MAP


South Asia
East Asia
Southeast Asia
Taiwan
Hong Kong
Burma
Laos
Vietnam
Thailand
Cambodia
Philippines
Brunei
M a l a y s i a
Singapore
I n d o n e s i a
Australia and Oceania

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