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TECHNICAL AND VOCATIONAL EDUCATION IN MALAYSIA:
ISSUES AND CHALLENGES

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Introduction

1. The formal school system in Malaysia has a 6 - 3 - 2 - 2 structure (Figure 1). Children of age six years plus start primary education for six years, then moves to three years of lower secondary education followed by two years of upper secondary education. A student either enters the world of work at the end of the 6 - 3 - 2 education structure or proceeds for another two years of post-secondary education or to other forms of tertiary education at colleges, polytechnics, or other training institutes and universities.

2. At the primary level, students are introduced to pre-vocational subjects covering various aspects of manipulative skills. At the lower secondary level, pre-vocational education is continued through a Living Skills subject, which further exposes students to various areas of simple vocational skills. At the upper secondary level, a student follows a course structure that covers several core subjects for the languages, mathematics and sciences. In addition to the core subjects, the student is required to take several additional subjects from a choice of several elective groups. Among the several elective groups is a vocational and technology group, which offers a choice of Technical subjects covering engineering studies, commerce, home economics and agriculture science. Subjects in this vocational and technology elective group are basically for further exposure to technical studies and are pre-vocational in nature.

3. The formal technical and vocational education system under the Ministry of Education starts at the upper secondary level, which consists of secondary vocational and secondary technical schools. The secondary vocational schools offer a course structure that covers the same core subjects as in other upper secondary academic schools. In addition to these core subjects, the vocational school student selects a group of vocational subjects in accordance with the vocational course he is following. Vocational studies make up about 50 percent of the total course content in the secondary vocational school. In the secondary technical schools, the subject offerings are more science and mathematics based while technical subjects offered are less practical in nature.

4. At the post-secondary level the formal system consists of polytechnics, which were established to produce trained manpower at the semi-professional level in various areas of engineering, commerce, and services. At the certificate level, about 80 percent of the students are following engineering courses while at the diploma level 50 percent of the students are undergoing engineering courses. Female students make up about 25 percent of the total student population. Beginning 2001, community colleges were established to provide post-secondary learning and technical training opportunities for about 40 percent of the school leaving age cohort. At the same time, community colleges also provide programs for workers requiring retraining as well as short-term courses for community needs.

5. The Technical and Vocational Education Division (TAVED) of the Ministry of Education, Malaysia established in 1964 had the responsibility of promoting technical and vocational education in the country. In October, 1995, TAVED was accorded department status and is now known as Technical Education Department with five divisions and expanded to six divisions in 2000: a) Technical and Vocational Management Division; b) Polytechnic Management Division; c) Technical and Vocational Curriculum Division; d) Research and Planning Division; e) Staff Development and Planning Division; and f) newly formed Community College Management Division. The main functions of Technical Education Department are to conceptualise policies and set the direction for the development of technical and vocational education while ensuring that the technical and vocational educational system complies with the industrialisation and modernisation programmes of the country.

6. Although technical and vocational education at the technical/vocational schools, community colleges and polytechnics is directly administered by the Technical Education Department of the Ministry of Education, training activities at both technician/sub-professional and craft levels are also carried out by other Government Ministries, Departments and Agencies for specific needs. Sub-professional certificate courses are also conducted by other public and private institutions.
Figure 1 - THE TECHNICAL AND VOCATIONAL PATHWAYS IN MALAYSIAN EDUCATION SYSTEM

- Employment
  - Universities & Higher Education Institutions
    - University Colleges
  - STPM
  - Sixth Form
  - Matriculation
  - SPM - Malaysian Certificate of Education
  - PMR - Lower Secondary Assessment
  - Lower Secondary Schools: Form 1, 2 dan 3
    - Technical Schools
  - Technical Qualifications
  - Vocational Qualifications
  - Skill Training Institutions
  - SKM/Skills
  - UPSR - Primary School Achievement Test
    - Primary Schools: Year 1 - 6

Years of Schooling: 13, 12, 11, 10, 9, 8, 7, 6, 5, 4, 3, 2, 1
Typical Age: 19, 18, 17, 16, 15, 14, 13, 12
Issues and Challenges in Technical Vocational Education

Global Challenges in Malaysian Human Resource Development

13. The issues and challenges facing Malaysia's technical and vocational education and training in the 2000's are related and well documented in the Human Resource Policy Thrusts of Malaysia as stated in the Eighth Malaysia Plan (2001-2005), which are as follows:

- Expanding the supply of highly skilled and knowledge manpower to support the development of a knowledge-based economy;
- Increasing the accessibility to quality education and training to enhance income generation capabilities and quality of life;
- Improving the quality of education and training delivery system to ensure that manpower supply is in line with technological change and market demand;
- Promoting lifelong learning to enhance employability and productivity of the labour force;
- Optimising the utilisation of local labour;
- Increasing the supply of S&T manpower;
- Accelerating the implementation of the productivity-linked wage system;
- Strengthening labour market information system to increase labour mobility;
- Intensifying efforts to develop and promote Malaysia as a regional centre of educational excellence; and
- Reinforcing positive values.

14. After aligning the above policy thrusts with the global issues like population growth; poverty; demand for education and training; technology change; trade liberalisation; knowledge economy and digital divide, the challenges in technical and vocational education in Malaysia can be listed as follows:

- Under supply of technical manpower and insufficient numbers of students choosing science and technology courses;
- Shortage of technical teaching staff;
- Relevancy of curriculum to technological, industrial, business and individual needs;
- Growth of information and communications technology
- High cost of technical education
- The need for flexible delivery system;
- The need to improve institutional management; and
- The need to create programs and pathways for students at all levels and capabilities.

Addressing the Issues: Current Approaches and Strategies

Shortage of Technical Manpower

15. With rapid industrial growth, the demand of technical manpower in the last few years far exceeds the supply provided by both private and public institutions. Projections indicate that the demand for technical manpower in the future is also going to far exceed the supply. The rapid changes in technology, especially in manufacturing, which has started utilizing automation and robots, require a workforce that is flexible, highly skilled and competent. At the same time, there is a decline in the number of students choosing science and mathematics at the secondary level. These problems if not resolved will seriously hinder the country's progress towards industrialization.

16. To overcome the problem of under supply of technical manpower, a program of expansion of technical and vocational education was initiated in 1999, mainly to respond to the projected shortages of technicians and engineers in the Seventh Malaysia Plan and expected to continue beyond the year 2000 into the Eight Malaysia Plan...
Plan. At the same time, this program also provide opportunities to the increasing number of applicants for both the technical and vocational streams in the schools, majority of whom are concrete learners with different learning capabilities. Among the strategies under this program are:

- Construction of new technical secondary schools with emphasis on the vocational stream;
- Introduction of vocational courses in a number of existing secondary technical schools;
- Offering vocational subjects in secondary academic schools;
- Increasing the number of classes in academic schools taking technical subjects like engineering drawing and engineering technology;
- Expanding and reviewing the school curriculum on Information Technology;
- Reviewing and updating the existing vocational curriculum;
- Introducing four new technical subjects (agro technology, entrepreneurial studies, food management, and apparel studies) in secondary technical schools; and,
- Continuing the skills training courses on flexible basis.

17. The expansion program, when completed, will have significant impact on the participation of upper secondary students in technical and vocational education. By the year 2005, the relative participation rate in technical and vocational education would have increased to about 33 per cent (based on the cohort of upper secondary students in that year).

18. To encourage and increase the number as well as attracting and raising the interest of students taking science and mathematics subjects, Ministry of Education through the Technical Education Department has embarked on a contextual teaching and learning approach. Overseas and in-country staff development program for academic teachers and technical and vocational instructors was implemented, with scope of training ranging from curriculum design to contextual delivery and assessment. Currently, the Ministry has also expanded this program to academic schools.

19. In line with increasing the flexibility of the education system, the Ministry of Education has recently introduced the open certification for the national examination conducted at the end of eleven years of schooling, Sijil Pelajaran Malaysia. With the open certification, students can choose a combination of subjects, including those from technical and vocational clusters. The move will definitely give opportunities for more students to take technical and vocational subjects and thus significantly intensify the impact of the program to expand technical and vocational education.

**Shortage of Technical Teaching Staff**

20. In the technical vocational educational system, there is a shortage of qualified technical and vocational teachers and lecturers. Most staff are recruited directly after they graduated from universities and colleges based on their academic qualifications and do not have industrial work experience. At the same time, qualified personnel with work experience are not willing to become teachers due to the unattractive salary scheme.

21. One strategy to retain and attract staff is to provide salary incentives. Teachers with vocational skills are now categorized as critical and are being provided with an allowance of 5 percent on top of their salaries as compared to their counterpart academic teachers. Technical and vocational teachers have better opportunities for in-service training and skill upgrading. A scheme whereby lecturers are given full pay training leave and training allowances for 12-week Industrial Attachment Program was started in 1999. The scheme provides an opportunity for lecturers not only industrial work experience but also to obtain professional qualification from bodies such as Institution of Engineers and Surveyors.

22. As new polytechnics are planned and built, and existing ones expanded, there is a need to supply these institutions with trained technical staff. To meet this need, the Polytechnic Staff Training Center known as Tun Hussein Onn Institute of Technology (ITTHO) located at the Batu Pahat Polytechnic site was established in 1994. Until today, ITTHO has trained hundreds of staff with bachelor’s degree in engineering and masters degrees in technical education. In 2001, ITTHO was accorded a university college status and known as Tun Hussein Onn University College of Technology (KUiTTHO) specializing in the technical field. The
transformation has expanded its role in providing the manpower needed not only for the polytechnics but also for industry and other institutions.

Curriculum Relevancy

23. One of the challenges facing technical and vocational systems is to ensure that the curriculum is relevant. To determine this relevancy, the Ministry of Education conducted the following studies:

- A system-wide tracer study of polytechnic graduates which focussed on the needs of graduates and employers;
- Studies to determine the specific curriculum-related needs of employers and also to determine the type of new technologies to be introduced in the polytechnics;
- Studies to increase the productivity and capacity of the technical and vocational institutes; and,
- Curriculum development and review activities based on academic, skills and employability standards.

24. The Technical and Vocational Curriculum Division in the Technical Education Department has just completed the process of reviewing and assessing the effectiveness of the semester system at polytechnics. Several modifications are introduced in the new semester system to suit teaching and learning in polytechnics. These modifications are a result of the review of the curriculum, which also takes into account recommendations from various studies and views from industries and employers. The new semester system and curriculum will be implemented in Semester June 2002.

25. Realizing the growing importance to master Science and Mathematics towards the development of knowledge workers, the Technical and Vocational Curriculum Division is in the process to review the vocational curriculum and has plan to introduce Applied Mathematics and Applied Science subjects in the vocational stream at the school level. The subjects use contextual methodologies, which will suit vocational students learning styles, thus developing their interests and consolidating their knowledge and understanding in these subjects. The contextual approach compliments effective teaching and learning, enabling students to master abstract ideas in these subjects and also relate them to the real world of occupational setting. These subjects will initially be offered to vocational students in 2005.

26. Another program that is specially designed to ensure a smooth transition from school to the world of work is the School-to-Work Program. Its primary goal is to assist concrete learners to acquire related workplace training and skills. The School-to-Work Programs consists of three components: school-based components, work-place component, and connecting activities. The first contains special topics in both core subjects and electives that students must learn while the second consists of applied knowledge, generic skills, and specific work-place skills that students must acquire. Since its piloted inception in 1998, over 3,000 students have participated in this program. Currently, the program is being evaluated and will be expanded if necessary. However a more comprehensive vocational program has been introduced in phases in academic schools beginning January 2002, so as to enable more students, especially the less academic ones, to get jobs, start their own businesses or further studies in the relevant fields. A total of 22 vocational subjects grouped into five clusters i.e. Manufacturing, Construction, Computer Technology, Home Economics, and Agro technology will be offered. Students will be allowed to take one or more of these subjects in combination with the core compulsory subjects such as Malay Language, English Language, Mathematics and History.

Growth of Information and Communications Technology (ICT)

27. In line with this growth, Malaysian Polytechnics have taken steps towards having an Educational Management Information System (EMIS). One polytechnic has such one system in place. For EMIS to be a reality also in the newer polytechnics that are being planned and those under construction, they will be equipped with the latest ICT infrastructure and info structure. For the older polytechnics, they are in the process of being upgraded with similar ICT equipment. Once all polytechnics have the necessary ICT infrastructure and equipment in place, a nationwide EMIS connecting all polytechnics and the Technical Education Department will be a reality. At the school level, the Technical Education Department is currently working on an Information Technology Plan for the secondary technical schools. This plan takes into account the current IT status of those schools and compares them with the start-of-the art IT. From this comparison, the necessary
hardware, software and other non-physical requirement can be determined to enable these schools to provide e-
learning environment.

High Cost of Technical Education

28. The escalating high cost of technical vocational education has prompted the Technical Education Department to consider various measures to increase the efficiency of the technical vocational education system. One is to introduce a program called Time Sector Privatization (TSP). It is a cost-recovery program that permits the private and public sector to make use of the training facilities available at the polytechnics for an agreed fee. Through the TSP program, polytechnics help in contributing towards skill training and upgrading of private and public sector by conducting training for them. The program is carried out after normal teaching learning hours and during semester breaks. Through TSP, polytechnics have not only optimised their usage of facilities but have earned substantial sum of money, thus helping to offset some expenses such as purchase of training materials and the maintenance of equipment in workshops. TSP has also helped polytechnics to strengthen their industrial linkage with industries.

Towards More Flexible Delivery

29. In a move to provide opportunities and lifelong learning, the Technical Education Department is offering polytechnic courses on a part-time basis to qualified and other non-traditional students who due to various reasons cannot undergo the full-time courses. Through the “learn as you earn” concept, the program helps to increase knowledge as well as upgrade the technical qualifications of workers. The curriculum is same as the full-time students except that classes and workshops are held on during the weekends.

30. The Technical Education Department is also negotiating with the idea of e-learning program by possibly offering polytechnic programs via distance learning to workers who do not have the logistics to enrol in traditional campuses. Plans are underway to gradually digitise and modularise subjects so that these subjects can be electronically accessible through internet. The delivery of instruction through distance learning and web-based learning will not be cost effective but also provide greater access regardless of time and physical constraints.

31. In line with the principle of providing equal access and equal educational and training opportunities, the Technical Education Department and the Special Education Department have worked together to introduce polytechnic courses for students with special needs. Curriculum specifically focussed on the training of these students was developed in order to upgrade their technical knowledge and skills so that they too can eventually contribute towards the development of the country.

Need to Improve Institutional Management

32. In order to establish an efficient technical and vocational education system to meet the expanding and changing manpower needs, institutional management need to be continually improved. Under World Bank loan assistance 1999-2002, the Technical Education Department is working on the following quality improvement projects:

- To expand the annual full-time training capacity of the polytechnic system by establishing about 8,000 additional training places through construction of one new polytechnic and about 12,000 to 15,000 additional training places through the expansion of six existing polytechnics;
- To upgrade the quality and availability of staff through the recruitment and training of new and existing polytechnic staff;
- To increase the efficiency of the polytechnic system through the provision of a wider scope of services, increase quality of service delivery, better capacity utilization and the lowering of unit costs; and,
- To promote a more decentralized polytechnic management and financing system.

33. Additionally, in line with the quality assurance approach, polytechnics have made efforts to be ISO-certified. To date, the Polytechnic Management Division and all polytechnics have attained ISO certification.
34. In an effort to improve post-secondary opportunities, the Ministry of Education has been entrusted with the task of establishing a large number of community colleges. Unlike the Polytechnics, these colleges provide schooling as well as technical training for school leavers. At the same time, programs are developed for workers requiring retraining as well as short-term courses that would fulfill the needs of the local community.

35. The curricular for these colleges are practice-based, modular in nature, and support cluster of occupational skills. Unlike the skill training approach, students will be provided with opportunities to continue to the highest level of education of education that they are capable of attaining. The linkages and articulation between the technical schools, community colleges, polytechnic, and other tertiary institutions in terms of credit transfer will lead to a system of technical and vocational education which is extremely flexible and meets the needs of all types of students. Currently there are 13 community colleges in operation and will eventually expand to be established at every parliament constituency in the country.

Conclusion

36. This paper presents a brief description of the current status of technical vocational education as it relates to the Polytechnics and Community Colleges at the post-secondary level and Vocational and Technical Schools at the secondary level. Although the issues facing technical and vocational education in the country are not new, they are nevertheless complex and interconnected and require a comprehensive system-wide planning approach. TAVED has over the years responded to the many challenges facing the system by formulating innovative and forward looking strategies. The Department of Technical Education has to take over where TAVED left off and bear the responsibility of ensuring that the nation’s vision to become industrialized by the year 2020 will be achieved.

References
