PHILOSOPHY,
RATIONALE AND SYSTEMS OF
TECHNICAL AND VOCATIONAL EDUCATION
AND TRAINING

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Summary

The development of technical and vocational education and training (TVET) in the developing member countries (DMCs) of the Asian Development Bank will require strategies for each country which take into account the unique economic, social and political contexts of the country concerned. While some lessons can be learned from the experiences of developed countries, the greatest source of ideas and policy options are available from among the developing countries themselves. The importance of sharing ideas and experiences and participating in cooperative ventures and schemes cannot be underestimated. Some of the major issues and ideas raised in this paper are:

* the crucial importance of strategies to alleviate illiteracy and poverty for effective participation in TVET;

* the importance of ensuring adequate provision of both general education and specific training elements in a country's TVET system;

* the importance of ensuring that policies for the development of education and TVET are part of an overall integrated plan for social, economic and industrial development;

* the importance of linking TVET policies targeting youth unemployment with initiatives to create employment opportunities for successful TVET graduates including the stimulation of new or expanded enterprise operations; and

* the importance of developing more cooperation between formal institutionally-based TVET programs and informal industry-based TVET programs including shared resources, joint plans, staff exchanges, cooperative curriculum and resource development and the establishment of credit-transfer agreements and jointly developed career-ladder TVET links.
In particular, more liaison and joint activities between Ministries of Education and of Labor, and peak industry representative bodies should be encouraged. Funding should be used where possible as a lever to ensure higher levels of integration and cooperation.

As was recently highlighted in an economic assessment by the (Australian) Westpac Banking Corporation, the Asian and Pacific region is poised and well-placed for a rapid industrial and economic growth through the 1990s. Clearly, this will be accompanied hopefully with significant improvements in the average standard of living. TVET in each of the DMCs of the Asian Development Bank has a crucial and important role to play in this anticipated growth and prosperity.

**Synopsis**

The paper provides a comprehensive review of the philosophy, rationale and systems of TVET, drawing on developments and countries' experiences from around the world. Particular emphasis is given to the typical contextual, operational and planning issues facing TVET authorities in developing countries. Philosophical debates are examined concerning such matters as:

* formal versus informal training
* school-based TVET versus postschool TVET
* general education versus vocational training
* comprehensive versus job-specific training
* government-run TVET versus industry or privately-run TVET
* government-funded TVET or *user pays*
* government versus enterprise priorities and policies
* integration of education, economic and industry planning
* linking institutional and work-based vocational training
* centrally-controlled or locally-managed TVET systems
* the respective roles of Departments of Education and of Labor in TVET

The paper addresses a number of crucial factors which influence the rationales likely to be adopted for TVET systems in the DMCs of the
Asian Development Bank. These include changes in industrial, political, social and economic situations; the impact of international trade policies and developments; the implications of growing global ecological awareness and the importance of harnessing new technologies for both local initiatives and worldwide competitiveness. It is in this context that the paper focuses on those philosophies, rationales and their associated structures and strategies considered most suitable for future TVET systems in the Bank’s DMCs.

I. Technical and Vocational Education and Training (TVET) Defined

For the purpose of this paper, technical and vocational education and training (TVET) includes:

* both formal and informal technical education
* both formal and informal technical training
* both formal and informal vocational education
* both formal and informal vocational training
* prevocational education and training
* diversified vocational secondary education
* both government-run and privately-run TVET
* technical and vocational retraining

The terms technical education or technical training will be used interchangeably to mean the same thing and specifically relate to those trade, technician and other courses in engineering and related disciplines (electrical, mechanical, civil, etc.).

The terms vocational education (VE) or vocational training (VT) will be used interchangeably to mean the same thing and specifically relate to courses of study for nonengineering (i.e., nontechnical) occupations in such fields as agriculture, commerce, business, tourism, hairdressing, home science, welfare and information systems.

VE and VT are further classified into three broad categories:
Agriculture Education and Training (AET). This includes all agricultural extension courses and those providing training for occupations in forestry, fisheries and horticulture.

Commercial (or Business) Education and Training (CET). This includes courses for occupations in such areas as wholesale and retail trading enterprises, restaurants, hotels, transport industries, business firms, law firms, information processing operations, social services and personal services.

Home Economics (or Home Science) Education and Training (HEET). This includes courses aimed at home-based or cottage-industry activities such as cooking, tailoring, dressmaking, cosmetology, etc.

Formal Education and Training. Education and training provided by public or private schools/training institutions normally under the Ministry of Education or equivalent involving highly-structured courses with well-defined objectives, clearly defined entry and graduation criteria, and performance-based examinations and assessment. It is usually conducted in a classroom environment and uses accredited syllabus, documentation and teaching materials.

Informal Education and Training. Education and training received outside of public or private schools/training institutions. It is relatively unstructured and takes place typically in working environments, in rural and urban community venues, through the mass media, within community groups and as an incidental part of daily living.

Nonformal Education and Training. A variety of education and training programs distinct from the more established and structured formal schools, training institutions or apprenticeship systems. They are usually distinguished by relatively unstructured curricula, less rigid entry and graduation requirements, less prescriptive objectives and assessment systems more oriented to informal continuous personal feedback than formal tests of predefined performance. They are targeted at both adults and youths and include programs such as Extension Education, Outreach Schemes, Adult Education or Continuing Education.
Prevocational Education and Training. Prevocational education and training provides a preparation for later mainstream vocational education and training. It is usually part of general education either in secondary schools or immediately postschool. It aims to develop basic practical skills and to introduce students to the nature and additional requirements of the world of work. It is usually not intended to prepare people for employment directly but is intended to facilitate interest in a vocational area and to develop attitudes and foundation skills that will enhance success both in further vocational studies as well as eventual entry to the workplace.

Apprenticeship. A vocational training scheme usually involving a structured program of one to four years' duration. It generally comprises part-time training in enterprises and part-time theoretical instruction in schools or institutions under the responsibility of its sponsors, employers, labor department or education authority.

II. Philosophical Issues Examined

A. Economic Context

The evolution and development of TVET in both a developed or a developing country is critically dependent upon the economic context of that country. No two countries are ever in identical circumstances or for that matter even similar circumstances. Care must therefore be taken when evaluating the nature, success or appropriateness of a TVET system in a country to assess the peculiarities of the economic circumstances of that country. This will include:

* the size of its gross national product,
* the distribution of wealth across the country’s population,
* the size and nature of its national debt,
* its foreign exchange rate,
* the extent of domestic and overseas investment in the country,
* its balance of trade,
* the trends in the domestic and international markets of its principal commodities, i.e., prices, demand and supply of goods and services,
* the natural resources of the country,
* the nature and relative size of the country's principal imports and exports,
* its principal industries,
* the country's potential for industrial diversification and/or expansion,
* trends in industrial restructuring including industrial rationalization, the targeting of niche markets, the development of sunrise industries, the promotion of small business enterprises, and the encouragement of local investment by multinational and transnational corporations,
* the productive efficiency and effectiveness of both its human and physical resources,
* the costs of labor as reflected in average salary levels relative to other developing and developed countries,
* the level of investment in high-technology equipment, systems and processes,
* the size and nature of its trained labor force relative to the overall size of the country's population and in relation to both current and emergent industrial technologies (in that country),
* its level of unemployment and the demographic distribution of that unemployment (i.e., between youths and adults, between trained and untrained, between rural and urban, between secondary and tertiary industries, etc.),
* the extent of both industry and government investments in education and training and the level of commitment to (or even capacity for) the ongoing funding of the maintenance and further development of education and training, and
* the extent and nature of overseas aid and other forms of assistance and support.

While this list does not exhaust all of the parameters which might define the economic context of a country, it does serve to indicate the complex factors which have an impact on the development of TVET in that country. It necessarily follows that the most feasible, effective and suitable form of TVET will inevitably be unique to the country concerned. While it is often useful to look at approaches taken in other countries
for ideas, the development of TVET in a country must reflect its unique economic situation as well as its related social and political environment.

Notwithstanding this uniqueness, there are a number of significant worldwide trends which have significance for the economic context of TVET in the Bank’s DMCs.

The first is the trend towards regional economic communities. This trend, as evidenced in the ongoing development of the European Economic Community, has significant implications for the balance of world trade. The recent developments in the Eastern Soviet Bloc countries towards more demographic government and towards closer relations with the West imply even greater trade changes within Europe with a flow-on effect to all world markets. For developing countries, this implies the need for even higher levels of regional economic and industrial cooperation within the Asian and Pacific economic communities. It also suggests the need for careful identification of future market opportunities for strategic industrial restructuring to adjust to, and take advantage of, new potential markets. TVET is a critical element in preparing for and achieving such economic objectives and related adjustments.

The second trend is the overwhelming shift in all countries of employment opportunities away from secondary or manufacturing industries towards tertiary or service-oriented industries. Even where countries are achieving significant improvements in productivity and overall production outputs in secondary industries, this has been primarily through structural changes involving a more effective use of technology and the reskilling of a small workforce rather than through the use of a larger, albeit highly-skilled, workforce. It is in the burgeoning tertiary sector that labor market opportunities are being created. Tourism, finance, office management, administration, health services, personal services, information systems, desktop publishing, management consulting, and even education and training itself are increasingly becoming the vocational opportunities most available to young and adult workers.

This implies that within TVET there is a growing significant shift away from Technical Education/Training towards Vocational Education/Training. This will require significant structural changes to the traditional TVET curriculum, teaching and physical infrastructures. The importance
of drawing tables, machines, workshops and teachers with backgrounds in traditional trades and technician occupations is declining in the face of the escalating importance of computers, computer-machine interfaces, modern office communications technology, high-technology learning environments and teachers with backgrounds in knowledge systems and information processing, control technology and interpersonal communications. This has major implications for those in TVET systems with responsibility for curriculum design, human resource planning and future development of physical resources.

The third trend is a movement away from specialization towards more broadly skilled work forces. This has grown from an increasing awareness that higher productivity can be achieved where workers exercise a range of skills within work teams. It is claimed, and there is some evidence to support these claims, that higher levels of worker satisfaction and work commitment result when workers are able to practice a variety of tasks in a team arrangement. This leads to higher-quality work outputs and a general increase in the productivity level. In addition, the multiskilled capability of each worker makes possible the completion of an integrated set of related tasks which might previously have been performed in sequence by a number of different specialized staff. The restructuring of workplaces to achieve these new work arrangements is having a major impact on the way schools, institutions and other organizations provide TVET. Typically, TVET is being required to:

* Provide courses organized in modular format (that allows the development of flexible combinations of skills when and as required).

* Be competency-based (module objectives are stated in the form of measurable knowledge, skills and attitudes with clearly defined standards indicating the contexts and parameters within which the competencies will be assessed).

* Provide flexible entry and exit opportunities (that enable students to access training in specific skills areas where and when required).
* Be individually-paced (to enable more able students to achieve and demonstrate their competencies in minimum time, allowing them to quickly return to productive activity. At the same time, less able students can be provided with sufficient time to achieve and demonstrate the required competency levels).

* Provide a sequencing of modules that gradually moves from broad-based to more specialized skills and knowledge (e.g., initial modules typically include workplace communications, use of hand tools, occupational health and safety, keyboarding, etc., whereas later modules progressively introduce higher-order, more technical and specialized skills in areas such as fluid power, computer control, robotics, fault diagnosis, etc.).

* Be able to assess, recognize and give full credit for knowledge, skills and attitudes achieved from sources other than in TVET systems. This includes experience gained in the workplace, self-instruction or training through private agencies or unknown overseas institutions or organizations.

B. Social Context

In a developing country, a detailed understanding of the social context of TVET is also crucially important in any consideration of its current operations or the appropriate directions for future development. In this regard, the extent to which all citizens of the country have sufficient basic skills, attitudes and awareness of TVET to take advantage of education and training opportunities that might be offered is a critical factor. The educated elite of a country are ironically those least in need of TVET but usually those most likely to take advantage of available opportunities because of their awareness, their thirst for knowledge (and the power it brings), their positive attitudes to learning, and their possession of the essential learning skills and the critical foundations of literacy and numeracy required for success in TVET. Unless positive intervention is undertaken to break this cycle of disadvantage, the gap between the educationally advantaged and the educationally deprived can only increase. This leads to restricted TVET participation
and a potentially limited labor force. One of the resulting economic effects is to produce a growing number of unemployable citizens creating a welfare, and therefore economic, burden on the government. Another effect is the underutilization of the potential production/service output of the country that would be created if a larger proportion of the population had relevant productive knowledge and skills. This can represent a huge net economic loss to the country either in potential exports or import replacements. This loss of income further exacerbates the capacity of governments to budget effectively for education, in general, and TVET, in particular, and compounds the overall situation. It is for these reasons that special efforts are now being made to assist DMCs and other developing countries to break this crippling cycle created by high levels of illiteracy and lack of numeracy.

Not unrelated to this literacy/numeracy factor is the economic capacity of citizens to participate in TVET. The direct costs of TVET for students: fees, books, tools, transport, etc., and the indirect costs: employment foregone, higher standard of clothing, meals at institutions, etc., often create burdens which the poorer citizens of the country could never ever contemplate. The wider the gap between the rich and the poor, i.e., the larger the proportion of the profoundly poor in a country, the smaller will be the participation rate of citizens in TVET in that country. This implies the need to minimize whenever possible the fees charged for TVET, particularly for those courses and training opportunities having most relevance to the poorer sections of the community. It also demonstrates the importance of suitable student support arrangements such as public and private scholarship schemes, student financial assistance systems, government or industry-based traineeship programs, etc. This is particularly true for basic education and training programs that provide skills for entry into and ongoing participation in the workplace.

Other social factors that impinge on TVET include -

* the cultural diversity of a country,
* the level of unemployment, particularly youth unemployment,
* the standard of communications and transport within a country,
* the social status of educated or trained citizens,
* the balance between young and old in the population,
* the values and ethical standards reflected throughout the community,
* the stability of family relationship, and
* the extent of law and order including the incidence of drug trafficking, murder and violence, and corruption.

C. Political Context

The political context of TVET, indeed education generally, is intimately entwined with the social and economic contexts. Political agenda invariably involve tensions between various policy objectives. Examples of the political tensions involved in educational policies are given below:

* An education or training system that rewards achievement, initiative and competence is also seen to be in danger of producing an elite class of highly paid technocrats. This has the potential of leading to serious social inequity and consequential political unrest. Governments are therefore frequently caught in a dilemma: should the primary aim of education be to develop talent and potential to its fullest or should it be the egalitarian motive of ensuring that all members of society have whatever educational preparation is necessary for them to participate equitably in community activities including work?

* Good economic management requires tight control of government spending. However, the development of an effective education system requires extensive developmental and recurrent expenditure, particularly for TVET. The commitment of the necessary funds is usually tempered therefore by the political imperative for a government to be perceived as exercising restraint in public spending.

* Education is the means for developing the skills and shaping the attitudes required for a productive and competitive industry. It also produces a more informed electorate who will be inclined to question intelligently and challenge corrupt or incompetent government. There is a tendency therefore for governments to restrict
selectively either the curriculum content of courses or the extent to which certain groups of students can access courses. Resistance to these tendencies produces inevitable political tensions.

* Education, including TVET, must continue to address issues such as conservation, environmental protection and occupational health and safety. However, such education and training is regarded by some managers in industry as prejudicing industrial opportunities and/or efficiencies. As such, there is frequently considerable political tension surrounding government policies on such critical educational initiatives.

* Planners in government (and industry) generally recognize the wisdom of structuring education and training around long-term objectives and broadly-based objectives that enable individuals to be flexible and adaptable in their response to the uncertainty of future industrial processes or production techniques. Production or marketing managers on the other hand are usually pre-occupied with the short-term and highly-specific skill needs of current production processes and products. This frequently leads to vigorous debates as to whether TVET should be directed at short-term specific skills when required or rather at more general objectives with a longer-term focus aimed at providing students with skills of adaptation and adjustment to change. This tension is inevitably reflected in the political policies of governments with policies often oscillating from one extreme to the other.

The most important aspect of the political context in which TVET operates in a country is the complex interaction between all elements of a government's policies but particularly their relationship with TVET. Curiously, TVET is simultaneously regarded as an important means for such purposes as:

* social reform
* industry restructuring and development
* the achievement of special industry policies
* reducing youth unemployment
* raising export capacity
* ensuring adequate technical support for the military
* raising the level of adult literacy
* the achievement of environmental policies
* the achievement of effective technology transfer

Such program goals are invariably required to be achieved in the context of economic restraint, leaving TVET administrators with the unenviable task of balancing insufficient resources across several equally critical and sensitive government and community policy objectives. It is critical therefore that TVET administrators ensure that all members of government are aware of the importance of TVET and support the allocation of sufficient resources.

D. Technology Transfer and/or Usage

The role of TVET is critical in the process of technology transfer, development and usage particularly in developing countries. The capturing of relevant technology and exploiting it within a developing country’s own emergent industrial base is not achieved by imprinting on the country a highly-developed technology refined elsewhere. Squires (1987), Varghese (1988) and Yoong (1986) are but a few of the commentators that advocate the selective adoption of suitable technologies. They argue that the technology must be selected to fit within an integrated process of planned development involving many agencies within both industry and government. This includes research and development organizations, universities, TVET institutions, planners and administrators, and those politicians particularly responsible for industrial and economic development, education, training and finance.

In a sense, the technology must be planted, must take root and must grow within the unique environment of the developing country concerned. In proposing this approach, both Ghosh (1987) and Varghese point to the unsatisfactory imprinting experiences of India in contrast to the way in which Japan has approached the transfer of technology from elsewhere. They deduce that once a technology is targeted, its transfer should be negotiated. It should then be systematically transferred, absorbed, adapted, locally modified, evolved, disseminated and applied
within the developing country's own industrial research and development and TVET structures. This inevitably takes time but eventually will produce an indigenous technology, different from that which was originally transferred but much more relevant and can be effectively used within the country concerned.

In addition, Squires and Ghosh both point to the proven benefits of cooperative development and application of technologies among developing countries within regions such as Asia and the Pacific. Singh (1986:178) cites the recurrent theme of ministerial conferences in the region emphasizing the critical importance of this form of international cooperation among developing countries.

TVET is clearly an important link in what Varghese calls the innovative chain. Teachers and instructors must be closely involved with their industrial colleagues in the development and modification of new indigenous technologies and their applications to local industry. They in turn must incorporate into their course curricula the skills, knowledge and work attitudes required for the effective use of the new technologies. Varghese argues that this should be a vital focus of vocationalization of secondary schools. He suggests that there are too few technical schools and colleges to ensure rapid and sufficiently widespread dissemination of new indigenous technologies. He suggests that vocational programs in secondary schools provide a more effective means of doing so.

As indicated earlier, the future areas of innovative exploitation of new technologies are more likely to be in the tertiary and quaternary sectors of industry rather than the more traditional secondary or manufacturing sector. Given these trends and the rapid advances in communications technology, the future opportunities for developing countries to absorb, adapt and apply new technologies will probably lie in the knowledge, information processing and telecommunications areas. It is suggested that these areas would be worthwhile for consideration as targets for the approach suggested by Varghese and others.

E. Scale and Nature of Industrial Activity

As outlined in the section above, the scale and nature of industrial activity of a developing country is inevitably different from that of devel-
oped countries and indeed of other developing countries. The industry base of a country will usually reflect its use of its own available natural resources as well as its historical experience in the development and/or transfer of technology. Thus, many developing countries have both subsistence and export industries in such areas as fishing, coconut processing, palm oil production, animal production for food, rice growing, vegetable and fruit growing, etc. Some countries have become a base for multinational companies who use the country concerned as an assembly or value-adding location and reexport finished products that were previously imported as component parts. Some countries have an industry base which focuses on the export of raw materials such as petroleum, phosphate or rubber. Still others have successfully developed local technologies and export products either worldwide or regionally or both.

Clearly there are benefits in, wherever possible, processing or adding value to raw materials before they are exported. Hence, dressed timber or even kit-homes are more profitable exports than timber logs. Similarly, steel, steel assemblies or machines are more profitable than iron ore. In the modern context, suites of software packages and turnkey operating systems with flexible peripherals are more profitable than basic computer systems.

The profile of these existing and emergent industry structures will determine where the TVET emphasis should be for that country. However, the lead times for skills-needs analysis, curriculum design, facilities development, teacher training and actual student instruction require early and interactive involvement of educationalists and trainers in industrial development. The importance of integration of education and training planning with that of economic and industrial development initiatives cannot be too highly stressed.


As indicated in the sections above, there are inevitable tensions between many government policies such as industry development, social welfare, occupational health and safety, environmental conservation, defense, etc. These are predictably reflected in pressures on
education systems to ensure that educational programs including TVET positively support government positions in the respective policy areas. To avoid conflicts in policy implementation, it is crucial that there is effective coordination and integration of various government and industry policies with those of the minister(s) responsible for TVET. There is potential for serious confusion and waste if TVET programs targeting technical skills do not have content on critical issues such as occupational health and safety or environmental conservation that are consistent with national and international policies in these areas. It is also important that such content matches stand-alone courses designed to train professional staff or administrators working in these specialized fields.

G. Education of the Person

While much of the debate on education and especially TVET focuses on the needs of industry and commerce and the importance of ensuring that skills formation focuses on the development of an effective and productive work force, it is important to consider the significant role education and TVET plays in the development of the person.

The personal fulfillment and self-actualization that educational achievement brings to a person yields a multiplier effect through the growth in self-esteem and motivation in that individual. These in turn are key factors underpinning the level of enthusiasm, new ideas, creativity and interest that the person may then bring to the workplace. In the case of many developing countries, significant proportions of their populations are illiterate and participate minimally in either work or community life. Developing the person for these people means bringing them in the first instance to a level of literacy and basic education that may then open the door to further educational and training opportunities and possibility of more productive employment.

Singh (1986:88) claims that illiteracy in the developing countries of the Asian and Pacific region is the single most important problem. He points to numerous studies that have shown that literacy is directly related to productivity and to better health and nutrition awareness. Literacy, according to these reports, also enhances community responsiveness to public social services and innovations. The other multiplier
effect of a literate adult population is the way literate parents stimulate the education of children thereby stemming illiteracy at its source. Singh estimates that some 618 million illiterate men and women, aged 15 years and above, live in the Asian and Pacific region. This represents about three quarters of the total illiterate adult population of the world. He also draws attention to the disproportionate level of illiteracy among women in the region relative to men: 46.6 per cent illiteracy rate for women compared to 16.8 per cent for men. It is not surprising then that the Governors of the Asian Development Bank, as reported in the ADB Quarterly Review (May, 1989), have endorsed new initiatives having greater emphasis on poverty alleviation with particular recognition that women play a key role in the poverty (and related illiteracy) alleviation process. The Governors note that because of their low levels of school participation and the associated low literacy levels, as well as constraints on their access to credit, the potential contribution of women to their country’s economic development is severely under-utilized.

Beyond basic literacy and numeracy, personal development includes education in personal hygiene, population control, food preparation and nutrition, consumer awareness, job-seeking techniques, assertiveness and self-defense, first aid, management of personal finances, child care, human relations, communication skills, local and national geography and history, environmental conservation, physical fitness, art and dance, and national cultural values and philosophies.

H. Lifelong Education

The rate of change throughout the world has had a major effect on peoples' need to adjust to new life circumstances at work, at home and in the community, generally. For developing countries, the rapid advances in international communications and transport, as well as the influence of multinational and cross-national corporations, have accelerated the advent of the global village. Countries are therefore unavoidably drawn into participating in the use of modern consumer goods and into adopting modern manufacturing, farming, fishing, transport and office technologies. Workplaces are restructured, jobs redesigned and new enterprises are created to replace those that may have become obsolete.
In this context, the previous education and training patterns that provided once-off education and training as preparation for a single full working life are no longer suitable. By the time he or she reaches 40 years of age, the modern worker will have occupied several jobs as well as adjusted to several generations of consumer goods. People must now pursue a lifelong quest for knowledge and skills in an endeavor to keep pace with both their rapidly changing work and home environments.

TVET must therefore be structured to accommodate ongoing access with built-in relationships between related courses and mechanisms for appropriate credit transfer within multiple entry and exit arrangements. To provide the necessary flexibility both for student access as well as periodic redesign of course material in specific areas of change, it is desirable that courses are built on a modular structure. Where there is a likelihood of considerable intraregional worker mobility, it is further desirable that these modular course structures are standardized on a cooperative intercountry regional basis.

I. Training for Transferability

Another aspect of the need of people to accommodate an ever-increasing rate of change in their life either at work or at home is the need to develop the skills necessary to transfer previously learnt knowledge, skills and attitudes to new work or life situations. Whether it is learning to operate the new home video or stereo, the new washing machine or the new car, whether it is learning to operate the new computer-controlled lathe, the robot or the integrated office computer system at work, people must have the ability to adjust their existing competencies to the new situation.

TVET and schools must therefore more deliberately teach people how to learn. According to the learning theories of Ausubel, Bruner and others this is achieved by the development of more ordered hierarchies of concepts and by teaching people how to use more effectively cognitive skills to organize their existing knowledge as well as to relate new information to that existing knowledge and process it accordingly. Thus TVET will be required not just to teach the technical content and performance specified in the vocational objectives of a course but it will increasingly have to actually teach students the learning process itself.
The ability to be adaptable and to rapidly adjust to new equipment, tools, materials or processes is likely to become an increasingly marketable personal commodity in the future highly-competitive quest for employment. The importance of incorporating these transfer skills objectives into future curriculum will therefore become significantly important.

J. Competency-Based Education and Training

There is a strong move around the world to ensure that all TVET is competency-based. By this is meant a system of education and training that emphasizes the specification, learning and demonstration of those competencies that are of central importance to a given task, vocational activity or occupation. Competence is defined for the purpose of Competency-Based Education and Training (CBE/T) as a set of prescribed and assessable knowledge, skills and attitudes (KSAs) defined within the hierarchy of Jobs-Duties-Tasks that specify the vocational activity or occupation. Competence includes the higher order KSAs involved in designing, interpreting, evaluating, analyzing, creating, planning, troubleshooting, diagnosing, etc. as well as the relatively simpler KSAs involved in cutting, joining, fitting, machining, measuring, soldering, painting, etc. It involves KSAs that vary from being specific to generic and from being essential to only elective.

Not unrelated to this international move towards CBE/T is the trend towards establishing central agencies that act as an official reference point or clearinghouse for Competence of Skill Standards. The establishment of the National Council for Vocational Qualifications (NCVQ) in the United Kingdom and the National Training Board (NTB) in Australia are examples of such agencies. They play a key role in defining occupations in particular industries in terms of the Competency Specifications that must be used by TVET institutions conducting education or training programs to prepare people to work in those occupations. They also provide a process for the certification of skills or competence achievement gained through a variety of means including formal and informal TVET, experience in the workplace and through self-study.

This focus on skills standards demands that education and training organizations more clearly define the objectives of their programs in competency terms and adopt competency-based assessment tech-
niques to measure both the formative and the terminal achievements of students. This requires clear, unambiguous and specific descriptions of the KSAs for each testable competence together with the conditions under which they are to be measured and the assessment criteria to be used. Typically, competency-based test items are expressed in the form:

Given “X”, “Y” and “Z” in a specified situation, the student will perform “A”, “B” and “C” under conditions “P”, “Q” and “R” according to criteria “E”, “F” and “G” (e.g., specified precision, finish time and smoothness of operation).

The systematic use of CBE/T including competency-based assessment across a country is profitably supported by the establishment of National or Regional Banks of Validated Test Items. Such Item Banks can then be upgraded and maintained on the basis of the item analysis of competency-based test items used within CBE/T applications. This implies a centrally coordinated process for the generation, availability, use and analysis of test items in terms of the skill competences prescribed within authorized skills standards.

K. Formal versus Informal Education

The term informal vocational education or training is used to describe the development of skills outside of the organized formal processes of education, usually in the workplace. It typically includes the acquisition of skills and knowledge through informal discussions with superiors or workmates and/or through copying and practicing work processes and problem-solving techniques used by fellow workers. Such skills acquisition can be very effective and yields competencies that are specifically relevant to that workplace. Over time and with a wide variety of related work experiences, workers can also develop a high degree of skills transferability.

A key issue within TVET is how to recognize and certify the possession of knowledge, skills and attitudes developed in this way. Too often, such workers are required to undertake a formal course of instruction to satisfy a licensing or certification requirement when they
already possess the skills in question. This is not only an unnecessary duplication and waste of TVET resources but is a waste of the student/worker's time and can be so demotivating and frustrating as to cause them to withdraw not only from their studies but often from the work force, too. It is not surprising then that many countries are seeking to improve the linkages between formal and informal TVET, particularly in terms of assessing and crediting competence gained in ways other than in formal programs.

L. Long-Term versus Short-Term Education and Training Objectives

Not unrelated to the above issue is the ongoing debate as to whether TVET should focus on short-term or long-term outcomes. Those advocating the short-term approach argue that industrial productivity is best achieved by concentrating training on the skills and knowledge needed immediately by workers in the workplace. If persons are required to use special welding techniques in a particular application, then according to this theory, they should receive detailed instruction in these techniques just prior to their use. Competence is thereby guaranteed and a high quality of finished product results. One of the arguments usually used to support this approach is that a person's competence in a set of skills or knowledge declines rapidly over time unless it is regularly practised or refreshed. In the example given above, special welding skills learned three years earlier are unlikely to continue to be adequate for a job unless they have been constantly used over the three-year period. In addition, it is likely that the welding techniques will have been modified over that period either through the upgrading of equipment or changes to the procedures used.

The advocates of the contrary position, the long-term perspective, argue that such an approach is wasteful and potentially creates an inflexible work force which is slow to respond to change. Because each new technique or task requires special instruction before being introduced, there are inevitable substantial training delays built into the service or production process. The preferred approach, according to this theory, is to train the workers to be adaptable and to readily transfer their skills and knowledge from one generation of techniques, equipment or
processes to the next. These workers are educated at a more general or comprehensive level and are taught more generic skills. In addition they are encouraged to recognize the similarities and differences between the old and the new and to adjust their skills and knowledge accordingly. This long-term approach is that which is typically contained within formal technical education institutions while the former short-term approach is that which often characterizes informal or industry-based vocational training.

Both approaches can be justified in terms of their supporting arguments. In practice, however, the most useful option is always some combination of the two. This involves some on-the-job training when required. The extent of the training needed, however, is minimized because of the ease with which workers can assimilate new knowledge and techniques due to their earlier comprehensive technical education.

The danger to be avoided is the polarization of policies to the extreme of one approach or the other. It is for this reason also that many countries are seeking to link more closely off-the-job formal TVET with on-the-job informal TVET by providing improved coordination between the two and regarding both as essential components of a single, overall, integrated TVET process.

M. TVET as an Industry

An interesting phenomena in recent years has been the growing recognition of the importance of TVET as an industry in its own right. In many developed countries and some developing countries, the operation of TVET as an enterprise capable of exporting education and training to other countries is being fostered and supported. Apart from the economic benefits to the country concerned, it provides an important mechanism both for technology transfer and for optimizing the use and exploitation of scarce and increasingly expensive worldwide and regional training resources.

Even within a country, industrial enterprises large enough to establish in-house training centers frequently offer training services to local enterprises on a fee-for-service basis. This provides an important mechanism for providing trainees and apprentices of small companies and businesses with opportunities to learn skills which would otherwise be unattainable because of the limited scale of their firm’s operations.
Governments are also recognizing that government-sponsored formal TVET institutions can offset their operating costs by providing additional specialized services to industry and commerce on a fee-for-service basis.

These trends are particularly important in ensuring the availability of means to share the cost burden of training, to provide access to training for all companies (and employees within them), and to enable TVET to be seen as having productive potential and not just a budget liability on a country’s economic resources.

N. Equity and Equality of Opportunity

The issue of equity and equality of opportunity in providing access to TVET is a particularly important one in a developing country. As has been already outlined in the sections above, many factors contribute to create situations of disadvantage. These include:

* Illiteracy and lack of numeracy
* Economic disadvantage
* Geographic disadvantage
* Physical or mental handicap
* Language barriers
* Cultural barriers or discrimination
* Attitudes and/or policies that discriminate on the basis of gender, race or religion

Special efforts, policies and initiatives are required to ensure that these potential barriers to access to TVET are at least minimized and, as far as is practicable, removed.

O. General Education versus Specific Vocational Training

The issue of general education versus specific vocational training is a perennial focus of debate in both developed and developing countries. There is no conclusive answer as to which emphasis is the more
successful. Indeed, there are examples of countries in which each operates effectively as the main TVET thrust.

In Japan, for example, the essential thrust of secondary education is towards the general approach. There is little evidence of any move to vocationalize secondary education as is occurring in many other developed and developing countries. Neither is there a system of formal postsecondary technical education on the scale that exists in many countries. Instead the main thrust of TVET occurs in the workplace where specific vocational training relevant to a particular firm’s processes and products is provided for all workers in the enterprise. McCormick (1988) argues that this is due to the fact that, while lifetime employment in a firm only covers a minority of the labor force, it provides the major dynamism to the development of the education system. The general education approach of secondary education and formal postsecondary TVET serves the purpose of developing high levels of cognitive skills including literacy and numeracy. The Japanese education process is claimed by McCormick to function as a talent sorting system. He observes that in the highly competitive Japanese labor market, employers value high achievement in the education and formal TVET system as an indication of both general ability and a capacity for hard work. They do not expect that recruits selected for employment will have many useful specific vocational skills. These are developed through in-house training once recruits have become employees and are part of the firm.

McCormick notes that this approach by Japanese employers is reflected as a cultural norm in Japan in which ability plus hard work lead to achievement which in turn leads to elite status and employability. Thus, considerable pressure exists within Japanese families for every member of the family to assist the children to succeed in their general studies at school and beyond. Academic achievement is not only the key to employment and a fulfilling career but is seen as a measure of a family’s diligence and honor. While this example illustrates a country in which general education is the predominant approach up until employment, it also underlines the importance of understanding the way in which the cultural values and customs impact upon a particular country’s system of education and/or TVET.
In contrast to the Japanese approach, a number of countries such as Australia, Brazil and United Kingdom and other developing countries are pursuing policies to incorporate a more specific vocational emphasis in both secondary education and formal postsecondary TVET. This is partly in response to a rising level of youth unemployment and the need to make school leavers more competitive on the labor market. Another factor is the need to provide vocational options in the senior curriculum for the increasing numbers of students who stay on in school but who do not aspire for tertiary studies. Unlike their Japanese equivalents, employers in these countries seek as far as is possible recruits with knowledge and practical skills that can be immediately applied in the workplace. Manifestations of these policy emphases are:

* the establishment of occupational skills standards through bodies such as the NCVQ in the United Kingdom and the NTB in Australia
* the provision of competency-based education and training
* the introduction of vocational subjects into the secondary school curriculum
* the availability of a system for the assessment and certification of competence in skills gained outside of formal TVET institutions
* industrial recruitment policies that require specific vocational skills of applicants prior to employment
* resistance to TVET courses that incorporate substantial components of general education, and
* the formation of bodies to promote the development of both public and private vocationally-oriented course options such as the MSC (Manpower Services Commission) in the United Kingdom or the SENAI (National Industry Training Service) in Brazil.

The vocationalization of secondary education that is occurring in many countries is in most cases primarily a response to high levels of unemployment in the youth labor market. It is particularly important that the types of education and training programs targeted in such policies are linked to related employment creation initiatives or are in fields of study with an anticipated growth in employment prospects. This further emphasizes the importance of integrating TVET policies with other
policies of government and industry. The difficulty of youth unemployment is only further exacerbated if special vocational training does not lead to improved employment prospects. Severe frustration and disenchantment can be the result if the only effect of such training is to increase expectations (after considerable personal effort) in terms of employability or anticipated salary level without any real likelihood of work opportunity in a restricted labor market. If, as a result of such training, the only effect is further unemployment, such students will be justifiably bitter and cynical. Alternatively, if the only employment opportunities are through the displacement of other appropriately qualified workers from their jobs because the newly trained applicants are more highly qualified, the resultant effect is to artificially inflate the recruitment specifications of such jobs. Over time, this tends to produce a situation in which the qualifications and associated training needs begin to be determined by the labor market rather than the skills and knowledge requirements of the position itself. This builds unnecessary cost into skills training and erodes the competitiveness of such enterprises and countries.

In short, the vocationalization of secondary education as part of TVET must be closely meshed with constructive labor market initiatives. Increasing the level of vocational training without linking it to adequate future employment opportunities is likely to only compound the political and social problem of youth unemployment. The cost of establishing and conducting such vocational education is also very high. If it is actually not required then taken together with the social and political effects cited earlier, it has the potential of being an exercise in expensive futility.

III. Rationale and Recent Experiences of TVET Systems in Developed Countries

In this chapter, some issues and developments associated with the rationale, structure and operations of TVET in a number of developed countries are described. Only an outline of the issues or developments is provided. It is hoped that in this way the reader will gain an awareness of the similarities and differences in developments both in terms of other
developed countries as well as examples of developing countries discussed in the next chapter.

For each country, a profile is provided which is intended to allow broad comparisons to be made of the nature and scale of the different economic, social and political contexts within which TVET is operating in that country. As is always the case with data of this kind, the collection criteria and the collection date varies from country to country. The data should therefore be seen as indicative only and intended for comparisons of scale and pattern rather than for precise comparisons. For readers wishing to understand more fully the limitations of the data provided in the profiles, they may wish to refer to the source document:

1989 Britannica Book of the Year
Encyclopaedia Britannica, Chicago, US
"World Data" pp. 524-877

The reader is particularly encouraged to compare the indicators of wealth in the form of GNP per capita; the retention of students in systems progressing from first to second to third levels; the percentage of the adult population regarded as literate; and the scale, nature and balance of imports and exports as well as the overall size of the population and related statistics.

In the profiles, the “1st Level” is typically primary, the “2nd General” typically all secondary education having a general approach while “2nd Vocational” includes TVET and some teacher training conducted in schools and special purpose institutions. Informal TVET or TVET in industry is not usually included. “3rd Level” is higher education and is mainly university and some teacher training.

A. Australia

Australia comprises six states and two territories each having its own government with a single Australian Commonwealth Government presiding in the national interest. In this arrangement, the states have responsibility for statewide TVET operations and policies while the Commonwealth Government, through the process of special purpose
funding, exercises an initiating and coordinating influence over the separate TVET and other educational operations in each state. The bulk of TVET in Australia is provided in postsecondary institutions called Colleges of Technical and Further Education. In some states such as Victoria, there are also technical secondary schools. Indeed, there is no uniform structure across states and territories. During the 1980s, there have been established State Training Authorities in each state and territory across Australia. These bodies exercise a coordinating and monitoring role with respect to industry-based training particularly for trade apprenticeships and operator level traineeships. They have special responsibilities for ensuring the standards of on-the-job training and for the certification of persons completing the on-the-job and off-the-job training requirements of apprenticeships and traineeships.

Over recent years, many states have reorganized ministerial arrangements to bring all postsecondary TVET under one ministry, usually the Ministry of Labor. This is intended to endeavor to create a more coordinated approach to the conduct of the several formal and informal TVET components in the state concerned. Hence in Queensland all postsecondary TVET falls under the portfolio of the Minister for Employment, Vocational Education and Training. In New South Wales, Technical and Further Education is under the portfolio of the Minister for Education and Youth Affairs, while the State Training Authority is under the responsibility of the Minister for Industrial Relations and Employment. The arrangements for TVET in Australia have continued to be in a constant state of flux in recent years as respective state and Commonwealth Governments have searched for better ministerial and structural arrangements that will yield a more coordinated national TVET system that matches the specific needs of industry.

In 1988, the Commonwealth Government established a Ministry of Employment, Education and Training which in conjunction with the Commonwealth Ministries for Industrial Relations and for Industrial Development has been particularly successful in promoting an integrated national interstate cooperative approach to the overall restructuring of Australian industry.

The Commonwealth Minister for Employment, Education and Training has worked with his Commonwealth colleagues and with his fellow state Ministers to produce a coordinated TVET response to the training
needs of new industrial awards aimed at streamlining workplace structures and operations with particular emphasis on improved skills formation. Alongside tripartite industrial negotiations involving employers and trade unions, parallel negotiations are occurring among postsecondary education and training authorities to develop a nationally coordinated system of TVET. The emerging key elements of the TVET system are:

* articulated training arrangements matched to career structures defined in industrial awards;

* nationally regulated occupational skills standards set by industry and maintained by a newly established National Training Board which will provide the benchmarks for both industrial work classifications as well as the training objectives for the programs conducted by TVET institutions within each industry area;

* nationally consistent, competency-based modular courses with opportunities for students to progress at their own pace;

* integration between informal and formal elements of TVET through greater recognition and credit for training undertaken in industry or private training institutions; and

* more provision for the assessment, recognition and certification of knowledge and skills gained through experience in the workplace, through self-study or through study at institutions of unknown standards such as overseas institutes, etc.

In addition to these postsecondary TVET developments, there are special efforts being made to vocationalize secondary education. Both on an interstate and individual state basis, initiatives are being taken to increase the vocational options within the final two years of secondary school. Many of these initiatives involve cooperative schemes between secondary schools and postsecondary TVET institutions. In addition, industry is being encouraged to take a much more active role in secondary education. Special technology subjects are being introduced throughout the secondary curriculum and in some states, such as New
South Wales, special Technology High Schools and Special Purpose High Schools are being developed.

**Country Profile**

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<td>Literacy (% of population)</td>
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Principal imports (Total - US$000,000) 29,900

- Machinery 29.9% * Basic manuf'tures. 16.4%
- Transp. equip. 11.0% * Chemical prods. 9.2%
- Fuels & lub's. 4.6% * Food 4.3%

Principal exports (Total - US$000,000) 28,900

- Crude mat'l's. 27.7% * Food 22.3%
- Solid fuels 20.4% * Textile Fibers 10.8%
- Petrol'm. prods. 5.2% * Equipment 7.3%

**B. Japan**

TVET in Japan is provided by a range of institutions including Combined Upper Secondary Vocational/Technical Colleges (Koto Senmon Gakko); Special Vocational Training Schools incorporating a substantial cultural component (Senshu Gakko); Miscellaneous Vocational Schools (mainly privately-run) (Kakushu Gakko); and a range of in-house training programs conducted by companies for their own
employees (Collins, 1989). Notwithstanding this range of provision, the primary objective of students through secondary school and until employment is to achieve a high level of performance in general education and to qualify at the highest levels for entrance to university. A person's status in Japan is primarily indicated by his level of general educational achievement. As stated earlier, in Japan:

\[ \text{Status} = (\text{Educational Achievement}) = (\text{Ability + Hard Work}) \]

It is not surprising then that 50 per cent of upper secondary courses offer only general courses, 31 per cent offer both general and vocational courses, while a mere 19 per cent offer only specialized vocational courses. In 1986, only 26.5 per cent of upper secondary students (which includes the equivalent of technical colleges) were enrolled in vocational courses. The main thrust of vocational training occurs in industry after a person has been employed, recruitment for employment being based on merit as indicated by the level of performance in general education.

It is interesting to note the observation of McCormick (1988) that in Japan, vocational education and training are not perceived as problematic for school leavers but rather for the mid-career worker who must cope with the changing business and technological environment. McCormick does not see any evidence that Japan will move in the direction of the vocationalization of secondary education as is being pursued by many developed and developing countries. Indeed, he argues that there are important lessons to be learned from the Japanese preoccupation with the achievement of cognitive competence prior to employment; while leaving the more specific vocational skills formation for industry in the workplace.

### Country Profile

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**Philosophy, Rationale and Systems of TVET**

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<th>Education expenditure (% of GNP)</th>
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<td>(includes all 2nd level)</td>
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<td>No. of students (3rd level)</td>
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<td>Literacy (% of population)</td>
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**Principal imports (Total - US$000,000)**

- Food 15.9%
- Equipment 12.8%
- Petrol'm. prods. 4.5%
- Crude petrol'm. 13.9%
- Chemical prods. 7.9%
- Wood 4.2%

**Principal exports (Total - US$000,000)**

- Motor veh'les. 19.6%
- Iron/steel 5.5%
- Chemical prods. 5.1%
- Textiles 3.7%
- Office Equip. 6.3%
- Tape recorders 3.7%
- Sci./opt. equip. 4.1%
- Electron tubes 3.6%

**C. Union of Soviet Socialist Republics**

TVET, or at least vocational education, has always been an important element of Soviet education. For most Soviet children, vocational training begins from the very first day they enter a kindergarten or primary school. O'Dell (1988) explains that right from those first classes at school, each child has at least a couple of lessons a week which are called *Trud* (labor). These lessons continue throughout their school career and have three main components:

- Practical skills
- Socialization for work
- Vocational guidance

The labor lessons incorporate practical experience on farms and in factories close to the schools. The content of the labor lessons is tailored to the industry focus of the particular area or region. Unlike many developed and developing countries, young people in the USSR do not
Technical and Vocational Education and Training

experience much difficulty in finding employment. There is a continuing demand for workers of most types. Hence the imperative for the vocationalization of education is different from that of most other countries. O'Dell points out that the major problem for vocational training in USSR is the structural complexity and bureaucratic interference that complicates the Soviet educational system as well as the problems created by the lack of modern plant and equipment and up-to-date curriculum material.

These problems are being addressed by President Mikhail Gorbachev who is quoted as saying, "Of prime importance is the preparation of workers, a preparation which begins in the schools and is carried further by PTUs (Vocational Technical Schools) and higher education institutions." Central to these reforms is the policy to introduce more SPTUs (Secondary Vocational Trade Schools) in conjunction with major enterprises of more than 2,000 workers. These are to have an industry focus and will provide a training base for workers of smaller nearby enterprises. There is to be less emphasis on learning from older workers directly on-the-job and more from highly trained instructors in schools and colleges. There is also to be a reorganization of the schools and colleges. The main thrust of this is towards a simpler and less bureaucratic structure. The major challenge facing the reforms is the provision of adequate equipment and trained teachers in the critical areas of technological change.

Country Profile

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Principal imports (Total - US$000,000) 37,700
* Equipment 41.4% * Food 16.1%
* Consumer goods 13.0% * Raw materials 8.1%
* Fuels & lub's. 5.2% * Chemical prods. 5.3%

Principal exports (Total - US$000,000) 42,400
* Petrol'm. prods. 35.7% * Equipment 15.5%
* Fuels 10.8% * Raw materials 8.5%
* Chemical prods. 3.4% * Wood prods. 3.3%

D. United Kingdom

In 1982, the Prime Minister, Mrs. Margaret Thatcher, announced the launching of the Technical and Vocational Education Initiative (TVEI). TVEI is an interventionist strategy intended to transform technical and vocational education and training away from the traditional academic mould which had operated through the 1960s and 1970s to one that emphasizes a closer relation between TVET and industry particularly in the training of specific skills for young workers in new and emerging technologies. While the initiative started as a pilot, in 1986 it was extended without warning to every Local Education Authority in Great Britain (Saunders, 1988).

The essential elements of TVEI are:

* Training should be part of an articulated ladder, i.e., each course of study should link to subsequent training or career opportunities.
* Courses should include a structured work experience component.
* Course designs should be responsive to local and national shifts in employment opportunities.
* Courses should consist of components which lead to the development of both generic and specific skills required in a particular occupation.
* Courses should lead to nationally recognized qualifications.
* Courses are managed/designated by the Local Education Authority under the auspices of the Manpower Services Commission.
(MSC) (rather than by schools or Further Education Colleges under the Department of Education and Science).
* Funding is provided under highly accountable contract arrange-
ments between the providing institution and MSC (although the 
funding usually covers many extra costs beyond that provided in 
traditional funding arrangements).

While the TVEI has been effective in promoting a change in the 
conduct of TVET in Great Britain, there are many who criticize its 
tendency to create (unwittingly) an enclave effect due to the combination 
of its pilot nature, the more lavish funding and staffing arrangements, 
and the distinctive, interventionalist nature of imposed teaching/learning 
strategies.

### Country Profile

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<tr>
<td>GNP per capita (US$)</td>
<td>8,920</td>
</tr>
<tr>
<td>Education expenditure (% of GNP)</td>
<td>5.2%</td>
</tr>
<tr>
<td>No. of students (1st level)</td>
<td>4,520,800</td>
</tr>
<tr>
<td>No. of students (2nd level, general)</td>
<td>4,080,000</td>
</tr>
<tr>
<td>No. of students (2nd level vocational)</td>
<td>506,600</td>
</tr>
<tr>
<td>No. of students (3rd level)</td>
<td>352,419</td>
</tr>
<tr>
<td>Literacy (% of population)</td>
<td>100%</td>
</tr>
</tbody>
</table>

**Principal imports (Total - US$000,000)**

* Equipment 34.9% * Food 9.3%  
* Chemical prods. 8.9% * Textiles 3.7%  
* Paper prods. 3.4% * Iron/steel 2.1%

**Principal exports (Total - US $000,000)**

* Equipment 36.1% * Chemical prods. 13.2%  
* Petrol'm. prods. 10.6% * Nonmetal prods. 3.3%  
* Instruments 2.9% * Iron/steel 2.7%
E. United States

TVET in the United States is provided through vocational schools or vocational streams in secondary schools; technical institutes; Junior (or two-year or community) Colleges; and some industry-based training. The fastest growing area of TVET is the two-year college. In 1963, there were 634 such colleges but by 1983 this had grown to some 1,271 and this growth has continued since (Windschuttle, 1989). Their attractiveness lies in the fact that not only do they offer job-oriented instruction designed to prepare students for immediate employment but they also act as a very effective means of transition between school and university.

Wilms (1988) suggests that the enthusiasm for vocationally-oriented education in the United States is based more on perceptions of outcomes and what he calls the American Dream rather than actual benefits and results. By the American Dream, he means the rags to riches belief that has provided the motivation for upwardly-mobile American generations since it was popularized in the books of the 19th century American author, Horatio Alger. In this belief, TVET plays a key role in opening up the doors of opportunity in two ways. First, by making learning more interesting because of the more practical orientation of vocational education. Second, by providing valued skills that ensure entry into higher education or more sophisticated work opportunities. Wilms suggests there is considerable evidence to indicate that these beliefs are more perceived than actual.

Wilms points out that the clearest gains in American vocational education occur when a course concentrates on a particular vocational area and the student has an opportunity to enter employment in that vocational area immediately after completion of studies. Wilms also observes that more generically-oriented education with a general education base yields more lasting benefits than narrow skills training which might be seen as being more relevant. He proposes, however, that the popular view based on the American Dream is that anyone who works hard and gets immediate results will get ahead. There is a tendency to ignore the importance of content and longer-term objectives. Rhetoric and anecdote, he suggests, frequently suffice for concrete evidence.
From these observations, it is important for developing countries, in reviewing their TVET structures, to carefully examine the hard evidence of real achievements and benefits rather than be swayed by the popular perceptions that may be embedded in the country’s folklore, culture or beliefs. People’s reasons for participating in TVET may not be based on sound information but rather communitywide misconceptions.

**Country Profile**

<table>
<thead>
<tr>
<th>Area (sq km)</th>
<th>9,529,063</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population (total) (1988)</td>
<td>246,113,000</td>
</tr>
<tr>
<td>Population (15-29) (% of total) (1988)</td>
<td>24.2%</td>
</tr>
<tr>
<td>GNP (US$000,000)</td>
<td>4,221,750</td>
</tr>
<tr>
<td>GNP per capita (US$)</td>
<td>17,500</td>
</tr>
<tr>
<td>Education expenditure (% of GNP)</td>
<td>6.8%</td>
</tr>
<tr>
<td>No. of students (1st level)</td>
<td>31,704,000</td>
</tr>
<tr>
<td>No. of students (2nd level, general)</td>
<td>13,734,000</td>
</tr>
<tr>
<td>(includes all of 2nd level)</td>
<td></td>
</tr>
<tr>
<td>No. of students (3rd level)</td>
<td>7,117,000</td>
</tr>
<tr>
<td>Literacy (% of population)</td>
<td>95.5%</td>
</tr>
<tr>
<td>Principal imports (Total - US$000,000)</td>
<td>406,241</td>
</tr>
<tr>
<td>* Equipment</td>
<td>43.8%</td>
</tr>
<tr>
<td>* Manufact’d prods.</td>
<td>29.2%</td>
</tr>
<tr>
<td>* Fuels &amp; lub’s.</td>
<td>10.9%</td>
</tr>
<tr>
<td>* Food</td>
<td>5.1%</td>
</tr>
<tr>
<td>Principal exports (Total - US$000,000)</td>
<td>254,122</td>
</tr>
<tr>
<td>* Machinery</td>
<td>27.5%</td>
</tr>
<tr>
<td>* Transport equip.</td>
<td>15.4%</td>
</tr>
<tr>
<td>* Manufact’ed prods.</td>
<td>14.4%</td>
</tr>
<tr>
<td>* Chemical prods.</td>
<td>10.4%</td>
</tr>
<tr>
<td>* Food</td>
<td>7.6%</td>
</tr>
</tbody>
</table>

**IV. Rationale and Recent Experiences of TVET Systems in Developing Countries**

In this chapter, some issues and developments associated with the rationale, structure and operations of TVET in a number of developing
countries are described. Only an outline of the issues or developments is provided. It is hoped that in this way the reader will gain an awareness of the similarities and differences in development both in terms of other developing countries as well as examples of developed countries discussed in the previous chapter.

As in the chapter on developed countries, a profile is provided which is intended to allow broad comparisons to be made of the nature and scale of the different economic, social and political contexts within which TVET is operating in each country. As is always the case with data of this kind, the collection criteria and the collection date vary from country to country. The data should therefore be seen as indicative only and intended for comparisons of scale and pattern rather than for precise comparisons. For readers wishing to understand more fully the limitations of the data provided in the profiles, they may wish to refer to the source document:

1989 Britannica Book of the Year
Encyclopaedia Britannica: Chicago, US
"World Data", pp. 524-877.

The reader is particularly encouraged to compare the indicators of wealth in the form of GNP per capita; the retention of students in systems progressing from first to second to third levels; the percentage of the adult population regarded as literate; and the scale, nature and balance of imports and exports as well as the overall size of the population and related statistics.

In the profiles, the "1st level" is typically primary, the "2nd, general" typically all secondary education having a general approach, while "2nd, vocational" includes TVET and some teacher training conducted in schools and special purpose institutions. Informal TVET or TVET in industry is usually not included. "3rd Level" is higher education and is mainly university and some teacher training.
A. Bangladesh

Formal postsecondary TVET in Bangladesh is conducted in both Technical Training Centers (TTCs) and Vocational Training Institutes (VTIs). There are 11 TTCs operated by the Ministry of Labor and Manpower. There are also some 48 VTIs operated by the Ministry of Education. In addition, some vocationally-oriented courses are provided within secondary education.

A major concern in Bangladesh is that many of the TVET courses being conducted in the TTCs or the VTIs are not sufficiently relevant to the needs of industry. This leads to a paradoxical situation that, in spite of a high demand for trained workers, the level of unemployment among trainees qualifying from TVET institutions is high (ILO, 1987).

A critical problem in Bangladesh is the very high levels of poverty and illiteracy. This in turn acts as a major limitation on the extent to which most members of the population can take advantage of TVET opportunities even when provided. Unless these problems of illiteracy and poverty are tackled along with a coordinated TVET/industry initiative, there is a danger that these problems will continue to be perpetuated.

Country Profile

| Area (sq km) | 143,990 |
| Population (total) (1988) | 107,756,000 |
| Population (15-29) (% of total) (1988) | 24.6% |
| GNP (US$000,000) | 16,070 |
| GNP per capita (US$) | 160 |
| Education expenditure (% of GNP) | 1.9% |
| No. of students (1st level) | 10,776,000 |
| No. of students (2nd level, general) | 2,745,000 |
| No. of students (2nd level, vocational) | 34,840 |
| No. of students (3rd level) | 44,464 |
| Literacy (% of population) | 33.1% |

Principal imports (Total - US$000,000)

- Crude oil 7.8%
- Wheat 5.7%
Philosophy, Rationale and Systems of TVET

* Refined petrol'm. 6.2%  * Vegetable oils 5.7%
* Iron 3.5%  * Textiles 3.3%
* Synth. fabrics 2.9%  * Cement 2.8%

Principal exports (Total - US$000,000)
* Jute prods. 31.8%  * Clothing 29.0%
* Frozen shrimps 10.0%  * Hides 4.5%

B. India

TVET in India is a major function of the Department of Education of the Ministry of Human Resource Development. In 1976, a major program for the vocationalization of senior secondary education was started resulting in considerable increase in the provision of TVET in both secondary schools and postsecondary institutions.

In 1986, there were some 7,000 vocational teachers within the formal postsecondary area of TVET alone. The Indian Government has set in motion a major initiative to increase participation in formal postsecondary TVET. This participation stood at about 2.5 per cent in 1987 and targets have been set for 10 per cent by the end of 1990 and 25 per cent by the end of 1995 (Alrillo, 1987).

In addition to the formal TVET, industry-based TVET is provided by some 1,500 industrial training institutes or centers. Approximately 50 per cent of these are conducted by the Government with the remaining 50 per cent being run by private enterprise. These institutes and centers come under the general administration of the Ministry of Labor. In 1987, there were some 264,000 student places available through this form of training. An issue of some concern in India is the need to ensure more effective coordination of the education and training initiatives between the secondary, formal postsecondary TVET, and TVET within industry.

In many ways, India has been an outstanding developing country in the extent to which it has encouraged technological development and technology transfer. This has included the use of technology such as satellite communications for educational purposes. Commentators such as Ghosh (1987) are critical that TVET is lagging behind in providing the skills infrastructure that can support the technologies either transferred
or indigenously developed. Ghosh argues that it is crucial, given the Indian experience, that the development of TVET, the effective use of educational technology and general technological development are closely linked and integrated.

**Country Profile**

Area (sq km) 3,166,414
Population (total) (1988) 801,806,000
Population (15-29) (% of total) (1988) 39.5%
GNP (US$000,000) 213,440
GNP per capita (US$) 270
Education expenditure (% of GNP) 3.7%
No. of students (1st level) 86,465,189
No. of students (2nd level, general) 43,230,690
No. of students (2nd level, vocational) 3,196,963

(includes 2nd level, voc. and 3rd level)

Literacy (% of population) 40.8%
Principal imports (Total - US$000,000) 13,902
  * Machinery 18.5%  * Petrol'm. prods. 13.3%
  * Gems 7.4%  * Iron/steel 7.2%
  * Chemical prods. 5.2%  * Electrical equip. 4.3%

Principal exports (Total - US$000,000) 8,724
  * Gems/jewelry 16.5%  * Clothing 9.7%
  * Machinery 7.0%  * Leather goods 6.3%
  * Cotton goods 4.5%  * Tea 4.4%

C. Indonesia

In Indonesia, the Directorate of Technical and Vocational Education in the Ministry of Education and Culture is responsible for the development and operation of technical and vocational schools. There are some 30,000 technical teachers in approximately 1,000 junior and senior secondary schools and some 22,000 vocational teachers in an equivalent number of postsecondary vocational schools throughout the
country. In addition, the Directorate of Manpower and Placement in the Ministry of Labor operates a range of industry-based TVET. Apart from the fixed-location training facilities, the Directorate of Manpower and Placement provides mobile units which bring TVET programs to remote areas.

It is important to note that the predominant fields of TVET study are commercial: 40 per cent and manufacturing/engineering: 39 per cent with only 3.4 per cent being in agricultural programs. This reflects a familiar pattern among many developing countries in Asia. Singh (1986) is critical that this continuing low level of enrollment in agricultural education will lead to an insufficiently skilled labor force to support the required modernization of the agriculture sector of Asian economies.

As with many Asian countries, illiteracy is a major problem in Indonesia with an overall illiteracy level of some 32.7 per cent which masks an illiteracy rate of 22.5 per cent for males in contrast to 42.5 per cent for females. It should also be noted that the average level of illiteracy in rural areas is considerably worse than that in the urban areas:

<table>
<thead>
<tr>
<th>Rural</th>
<th>Male: 27%</th>
<th>Female: 48%</th>
<th>Total: 38%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban</td>
<td>Male: 9%</td>
<td>Female: 24%</td>
<td>Total: 17%</td>
</tr>
</tbody>
</table>

Singh and others point to the importance of implementing a priority strategy to raise the level of literacy among women and girls arguing that from the cultural, economic and social viewpoints, it represents one of the best investments a country can make in its future.

### Country Profile

<table>
<thead>
<tr>
<th>Metric</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Area (sq km)</td>
<td>1,919,443</td>
</tr>
<tr>
<td>Population (total) (1988)</td>
<td>175,904,000</td>
</tr>
<tr>
<td>Population (15-29) (% of total) (1988)</td>
<td>40.8%</td>
</tr>
<tr>
<td>GNP (US$000,000)</td>
<td>82,110</td>
</tr>
<tr>
<td>GNP per capita (US$)</td>
<td>500</td>
</tr>
<tr>
<td>Education expenditure (% of GNP)</td>
<td>2.5%</td>
</tr>
</tbody>
</table>
No. of students (1st level) 26,550,015
No. of students (2nd level, general) 7,680,417
No. of students (2nd level, vocational) 1,106,106
No. of students (3rd level) 806,470
Literacy (% of population) 74.1

Principal imports (Total - US$000,000) 10,718
- Machinery 26.7% - Chemical prods. 14.0%
- Mineral prods. 12.0% - Transp. equip. 11.3%
- Base metals 11.1%

Principal exports (Total - US$000,000) 14,805
- Crude petrol'm. 31.0% - Natural gas 18.7%
- Plywood 6.8% - Petrol'm. prods. 6.1%
- Coffee 5.5%

D. Malaysia

The responsibility for TVET in Malaysia is shared among various government agencies and private organizations. The Ministry of Education, through the Division of Technical and Vocational Education, operates 9 technical schools as well as some 27 vocational schools. The Ministry of Labor conducts a range of industry-based TVET programs through its industry training institutes. An indication of the relative scale of these operations can be gained from a comparison of the number of teachers/instructors employed in 1986:

- Technical schools — 350 teachers/instructors
- Vocational schools — 870 teachers/instructors
- Industry training institutions — 550 teachers/instructors

Apart from the programs administered by the Ministries of Education and Labor, other formal and informal TVET training is provided through the Ministry of National and Rural Development, the Ministry of Youth, Culture and Sports and a number of public and private corporations.

Hunt (1987) points out that Malaysia's achievements through the 1970s and 1980s in both industrial reform and development and asso-
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associated initiatives in education in general, and TVET in particular, are impressive performances. He notes that the economy has been substantially transformed and the living standards of people considerably improved. A comprehensive education system has been constructed and the levels of literacy and the educational qualifications of its population considerably raised. However, he is critical that the full potential of what might have been achieved has not been reached. He notes the tendency alluded to earlier in this paper that educational opportunities are frequently accessed more readily by the educationally elite and the economically affluent rather than those most in need, i.e., the illiterate and the poor. Notwithstanding this criticism, much has been achieved to provide equality of access across the diverse cultures of Malaysian society.

Country Profile

| Area (sq km) | 330,434 |
| Population (total) (1988) | 16,965,000 |
| Population (15-29) (% of total) (1988) | 39.5% |
| GNP (US$000,000) | 29,500 |
| GNP per capita (US$) | 1,850 |
| Education expenditure (% of GNP) | 6.6% |
| No. of students (1st level) | 2,274,452 |
| No. of students (2nd level, general) | 1,302,048 |
| No. of students (2nd level, vocational) | 23,145 |
| No. of students (3rd level) | 109,545 |
| Literacy (% of population) | 72.6% |

Principal imports (Total - US$000,000)

* Electron tubes 17.8%  * Petrol'm. prods.  5.0%
* Steel prods. 2.4%  * Grain 2.1%
* Crude petrol'm. 1.5%  * Raw sugar 1.0%

Principal exports (Total US$000,000)

* Electron tubes 15.3%  * Crude petrol'm. 13.9%
* Forest prods. 13.0%  * Rubber 8.7%
* Palm oil 7.2%  * Natural gas 3.9%
E. Myanmar

TVET in Myanmar is conducted under the auspices of both the Ministry of Labor and the Ministry of Education. Programs falling within the ambit of the Ministry of Education include vocationally-oriented courses in secondary education and a range of formal TVET courses, including trade and other formal technical and commercial training courses. The Ministry of Labor has responsibility for a range of TVET courses conducted in employment and in the private sector. It also has responsibility for the National Vocational Training Center which plays a key role in the training of training officers, craft instructors, supervisors and skills testing administrators.

Since 1972, the Ministry of Labor has progressively updated and implemented a National Vocational Training Program. The main objective of the program is the promotion of systematic training in industry for various grades of skilled workers and supervisors. This has included the establishment of group apprenticeship schemes, increased operative training and the further training of skilled workers. Major current initiatives include the setting of National Skills Standards and the development of a system for Competency-Based Testing and Certification particularly at trade level (ILO, 1987). This testing/certification process is targeted at recruitment, promotion within employment and terminal course assessment.

Special efforts are made by the Government to integrate TVET into both short and long range National Development Plans. Raising the quality and relevance of TVET is seen as an important element of those plans and an essential prerequisite for the achievement of national economic and industrial goals.

Country Profile

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Area (sq km)</td>
<td>676,577</td>
</tr>
<tr>
<td>Population (total) (1988)</td>
<td>39,952,000</td>
</tr>
<tr>
<td>Population (15-29) (% of total) (1988)</td>
<td>28.4%</td>
</tr>
<tr>
<td>GNP (US$000,000)</td>
<td>7,450</td>
</tr>
<tr>
<td>GNP per capita (US$)</td>
<td>200</td>
</tr>
</tbody>
</table>
Philosophy, Rationale and Systems of TVET

Education expenditure (% of GNP) 1.6%
No. of students (1st level) 5,369,641
No. of students (2nd level, general) 1,591,927
No. of students (2nd level, vocational) 17,000
No. of students (3rd level) 255,866
Literacy (% of population) 78.5%

Principal Imports (Total - US$000,000) 600
  * Ind'l. raw mat'l's. 45.8% * Equipment 37.7%
  * Constr'n. mat'l's. 14.8% * Tools/parts 13.1%
  * Transp. equip. 8.5% * Consumer goods 5.9%

Principal exports (Total - US$000,000) 384
  * Forest prods. 45.2% * Agric'l prods. 31.8%
  * Minerals/gems 11.2% * Animal/marine prods. 5.0%

F. Singapore

In Singapore, the Ministry of Education is responsible for TVET at the secondary and preuniversity levels. Two polytechnics under the supervision of the Ministry of Science and Technology offer postsecondary technical courses. In 1985, they employed about 1,670 teachers and instructors.

Apart from the formal TVET, the Vocational and Industrial Training Board (VITB) is responsible for all industry-based TVET and continuing vocational education programs in the country. The VITB was established in 1979 and runs 16 training institutes and a variety of other programs in industry locations. It employs about 1,700 officers and instructors.

Singapore is notable among the developing countries for its performance in achieving a high standard of economic development, in developing considerable social cohesion, and in establishing a secure economic position in its region and worldwide. Central to its strategies and performance has been the success of its educational system, particularly TVET. Of particular importance has been the skillful use of human resources and its well-integrated economic, industrial, social and
educational planning and policy development. It provides an outstanding example of technology transfer and the way in which a small developing country can work effectively with multinational and transnational corporations to establish a base of high-technology production, marketing and distribution.

Singapore's political leadership has been exemplary in limiting corruption and in ensuring that poorer members of Singaporean society are assured of basic educational and health services, a modest income and adequate housing. In this way, a very favorable context has been generated in which TVET effectively supports the thrust of economic and industrial planning.

**Country Profile**

<table>
<thead>
<tr>
<th>Area (sq km)</th>
<th>622</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population (total) (1988)</td>
<td>2,641,000</td>
</tr>
<tr>
<td>Population (15-29) (% of total) (1988)</td>
<td>27.0%</td>
</tr>
<tr>
<td>GNP (US$000,000)</td>
<td>17,160</td>
</tr>
<tr>
<td>GNP per capita (US$)</td>
<td>7,410</td>
</tr>
<tr>
<td>Education expenditure (% of GNP)</td>
<td>4.4%</td>
</tr>
<tr>
<td>No. of students (1st level)</td>
<td>280,889</td>
</tr>
<tr>
<td>No. of students (2nd level, general)</td>
<td>201,125</td>
</tr>
<tr>
<td>No. of students (2nd level, vocational)</td>
<td>27,001</td>
</tr>
<tr>
<td>No. of students (3rd level)</td>
<td>44,746</td>
</tr>
<tr>
<td>Literacy (% of population)</td>
<td>82.9%</td>
</tr>
</tbody>
</table>

**Principal imports (Total - US$000,000)**

- Crude petrol'm. | 12.5% |
- Office equip. | 4.7% |
- Elect. equip. | 3.7% |
- Petrol'm. prods | 5.8% |
- Telecom. equip. | 4.6% |
- Textiles | 3.2% |

**Principal exports (Total - US$000,000)**

- Petrol'm. prods | 16.0% |
- Telecom. equip. | 8.6% |
- Rubber | 2.5% |
- Office equip. | 11.7% |
- Clothing | 3.5% |
- Elect. equip. | 2.3% |
G. Thailand

TVET in Thailand is under the administration of several ministries. The Ministry of Education undertakes technical and vocational education through the Institute of Technology and Vocational Education (ITVE), particularly for technician training. The Department of Vocational Education (DOVE) is responsible for some 13 schools and conduct other technical-level courses. The King Mongkut's Institute of Technology (KMIT) under the University Board also offers technical training in various levels. It is estimated that there are about 4,800 technical teachers in the public formal education system in Thailand.

The National Institute for Skills Development (NISD) under the Department of Labor of the Ministry of Interior, on the other hand, was established in 1969 to provide preemployment training for out-of-school youths, upgrading training for skilled workers who already work in industries, and foreman and trainer training courses.

Relative to many other Asian countries, Thailand has low levels of illiteracy, although as with other Asian countries, the situation is worse for women than with men and in the rural areas than in the urban areas. However, even in a country as successful economically, industrially and socially as Thailand, there is still scope for a major improvement in the level of illiteracy within its community, particularly among rural women.

<table>
<thead>
<tr>
<th>Urban</th>
<th>Male: 6%</th>
<th>Female: 18%</th>
<th>Total: 12%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rural</td>
<td>Male: 14%</td>
<td>Female: 32%</td>
<td>Total: 23%</td>
</tr>
</tbody>
</table>

**Country Profile**

- Area (sq km): 513,115
- Population (total) (1988): 54,862,000
- Population (15-29) (% of total) (1988): 38.3%
- GNP (US$000,000): 42,440
- GNP per capita (US$): 810
V. Strategies to Meet the Specific Problems of Developing Countries

The strategies to meet the problems of developing countries in the development of TVET will inevitably vary from country to country. However, developing countries have more in common with each other than they do with developed countries. Hence, the use of cooperative projects in which groups of countries work together to resolve common problems is likely to have more probability of success than trying to adopt strategies and techniques which might have worked in the context of a developing country because of the different economic, political and social factors that operate in such countries. This section proposes a number of strategies that might be considered for adoption within a program of cooperative ventures.

One particular cooperative model that is worth considering is the attachment of senior staff from one developing country to work on a cooperative project in a nearby developing country. Such an arrangement has the following suggested advantages:
* The visiting project staff would not feel constrained by the policies and traditional structures and approaches with which they would be familiar from their home country.

* The staff would nonetheless identify with the typical context of a developing country and, therefore, would be likely to produce a relevant and feasible outcome in their assignment.

* The administrators/educators of the host country would identify with the assigned project staff because of their developing country status. However, the visiting project staff would still have the status of external consultants and thereby have more freedom than project staff appointed from within the host country.

* The visiting project staff would take back to their home country new insights into the problem which was the focus of their project. These they could then apply in their home country context.

* The interaction between visiting project staff and the administrators/educators in the host country would over time build up a network of contacts. This would strengthen the cooperative bonds between participating countries as well as providing the means for the ongoing sharing of ideas and information.

The use of suitable consultants and advisors from developed countries would, however, still be useful in many cases. The above cooperative model either alone or in conjunction with such advisors would be likely to be an effective long-term strategy. Such an approach could be applied to each of the suggested strategies below.

A. Developing Balance between General and Specific Vocational Education

It is clear from the experiences of both developing and developed countries that there are important benefits to be gained from both general and specific vocational education. General education provides enhancement of cognitive skills, literacy, numeracy and general knowledge that facilitates adaptability in the face of change and the ability to transfer existing knowledge and skills to new situations. Specific vocational education provides immediately useful skills and the opportunity to be productive within a specific industrial process or operation. Devel-
Coping countries should endeavor to ensure that both forms of education are provided within their TVET system. Caution must be exercised to avoid locking into one extreme or the other. In considering specific vocational education, courses should target industrial and commercial products and services which are part of the country’s plan for economic and industrial development. In many cases they will be conducted in an industry setting or in a cooperative arrangement between the TVET institution and industry.

B. Linking TVET with Industrial and Economic Development

The importance of this link has been stressed throughout this paper. Relevant staff within TVET at both the national and regional levels should ensure ongoing liaison with their government and industry colleagues who are involved in planning economic and industrial development. Systems of information exchange and the opportunities to regularly discuss the relationship between TVET and industrial/economic planning should be created. The use of joint newsletters, exchange of key reports and other documents, opportunities to comment on draft papers and invitations to submit ideas or comments on implications or impacts of plans should be encouraged. Most important of all is the need to ensure that economic/industrial planners and decisionmakers understand the critical role of TVET in supporting development as well as the required lead times involved in designing and implementing TVET initiatives. TVET representatives should be consulted in planning negotiations/discussions right from the beginning of a planning initiative so that they may make constructive inputs before plans are locked in. This involvement also allows the TVET representatives to set in motion any preliminary activity necessary within the TVET system in preparation for economic/industrial development.
C. Exploring New Models of Cooperation between Education Authorities and Industry

One recurrent observation in the paper is the importance of education and industry authorities working cooperatively together. This should go far beyond just sitting on each other’s advisory committees or attending periodic meetings. Some of the options for increased cooperation are:

* construction and use of joint training facilities either on a TVET site, on an enterprise site or on a site jointly leased by TVET and industry
* exchange of staff so that industry expands its training expertise and TVET extends its awareness of current technology
* joint overseas missions so that both TVET and industry may be cooperatively involved in technology transfer
* contracting of TVET staff to work on industry-based training projects
* contracting of industry staff to work on TVET-based training projects
* joint training ventures between industry and TVET including the export of training to other countries
* joint train-the-trainer activities between industry and TVET institutions
* involvement of TVET staff in industry-based research and development
* joint TVET/industry initiatives to alleviate illiteracy and lack of numeracy in the workplace

D. Establishing Industry Skills Standards

One development that provides a valuable aid to ensuring improved recognition of qualifications both within and across countries is the establishment of national or regional skills standards. This involves the tripartite development and endorsement of sets of skills standards which define trade and other occupations within industry and commerce. Such
skills standards can act as the benchmark for course development, for competency-based performance assessment or for occupational classification within industrial awards or occupational licensing/registration processes.

The standards are usually based on assessable tasks or operations which must be performed within prescribed criteria under controlled conditions.

Skills standards are important means of establishing national qualifications certification processes such as are carried out by the National Council on Vocational Qualifications in the United Kingdom or the recently established National Training Board in Australia.

E. Meeting the Challenge of Youth Unemployment

Apart from a limited number of countries such as the Soviet Union, youth unemployment is a critical issue for most developing and developed countries. TVET plays a key role in providing education and training opportunities for young people who leave school and need to compete on the difficult labor market. The main objectives of such programs are:

* to provide young people with a base of vocational skills that are attractive to employers,
* to provide job-seeking skills that enable young people to search for jobs, to prepare for interviews and to present themselves and their skills in the most favorable light,
* where there are difficulties in terms of literacy, numeracy, language, confidence or basic practical skills, to incorporate suitable study programs to overcome these.

In most countries, however, the level of youth unemployment is a huge problem. Employers often prefer more experienced workers. They are reluctant to pay substantial salaries to young people who lack experience and general background.

It is crucial, therefore, that training schemes aimed at youth unemployment involve an integrated strategy that ensures:
* the creation of employment opportunities in the fields for which the training programs are directed. This may involve some creative approaches such as the encouragement of small business enterprises, the establishment of cooperative ventures and the expansion of existing industries into new markets, initiatives that will lead to a higher demand for more youth labor.

* cooperative strategies between Ministries of Education, Labor, Employment and Industrial Development to ensure that youth wages are competitive, that industry development is linked to the training initiatives and that industrial relations concerns are resolved.

* adequate information is provided to young people on the training programs and on the close relationship of a particular training to future industrial development and related job opportunities.

* adequate information is provided to employers and those involved in industry and economic planning to ensure that they factor youth workers graduating from training programs into their plans and development strategies.

* a commitment among industry executives and government administrators that they will support the training initiatives and creation of youth employment opportunities contained in any integrated program to reduce youth unemployment.

Above all, governments must avoid training programs for unemployed youths that do not lead to genuine employment opportunities. As described earlier, this leads to frustration, cynicism, withdrawal and inevitable social disruption.

F. Improving Literacy and Numeracy

As described earlier, the combination of illiteracy and lack of numeracy represents the single most limiting factor on the social, economic and industrial development of the Asian and Pacific region. It is timely that 1990 is International Literacy Year and the Asian Development Bank and others see the alleviation of illiteracy and related poverty as critical priorities for future project initiatives.
Tackling illiteracy is a difficult task because the most profoundly illiterate are difficult to trace and contact. Even when identified, it is difficult to encourage them to take advantage of any opportunities provided. Most are reluctant to reveal or demonstrate their disadvantage. This requires atypical outreach approaches and small group or one-on-one teaching/learning strategies that enable each person to progress to suitable levels of literacy and numeracy to enable participation in mainstream TVET courses. A wide variety of techniques, technologies and expertise must be exploited if any significant inroad is to be made on this burgeoning problem. The use of specially trained tutors, special satellite transmissions, videos, purposely designed kits, individually paced materials, and culturally targeted instructional packages all have a place in a concerted attack on the problem. Of special importance is the targeting of young girls and young mothers as the highest priority group. It is this group that can create the greatest multiplier effect within countries where illiteracy and lack of numeracy are most significant. The influence of women on their children, husbands and parents cannot be underestimated. A significant break in the cycle of illiteracy in this group will flow automatically to young children, hence reducing illiteracy in the long-term at its source.

TVET administrators, therefore, should look closely at how Adult Literacy Centers, Literacy Outreach Programs and Home Tutor Literacy Schemes may be organized with special emphasis on young women and mothers.

G. Developing Ways of Recognizing Competence

An important development in many countries that has been cited a number of times in this paper is the establishment of means for assessing competence gained through experience in the workplace, through self-study or through an education/training institution of unknown standard. This implies a national/regional system for competence assessment and certification. Authorized assessment centers could conduct (on a cost-free basis) tests of a person's performance against skills standards set for a particular occupation. The center would issue a certificate verifying the person's level of achievement which could then be used as a de facto qualification for purposes of employment, entry
into further education, salary negotiations or for advanced standing or exemption in a part of a program of study. As suggested in the paper, such centers would operate using national or regional banks of validated test items with a coordinated process for the generation, analysis and updating of the test items contained in the bank.

H. **Resourcing TVET**

The perennial problem of TVET in all countries is its high cost and the limited funds available from government. Many options are being explored by countries to resolve these difficulties including:

1. Levy/grant schemes
2. A system of user pays with the definition of user including both students and employers
3. Cooperative programs between government-run TVET institutions and industry (in which operating costs are shared)
4. Enrollment fees with a system of scholarship or exemptions
5. Encouragement of free enterprise private training providers with processes for government accreditation of the institutions and the courses they run
6. Voucher schemes in conjunction with (5) above that enable governments to assist disadvantaged groups who may not have the money to pay the inevitably large enrolment fees involved.
7. The use of competence assessment which allows able persons to undertake self-study or to learn on-the-job and to obtain certification based on performance assessment. Limited TVET resources are then able to be focused on those unable to develop competence in these ways but require more structured learning environments.

Each of these options has its strengths and weaknesses and there appears no one best option. A country’s resourcing strategy should seek to focus resources on the highest priority needs and to find creative ways of sharing the cost burden of training. Special measures must always be implemented to ensure equity of access to those with education, financial or other forms of disadvantage. While the use of educational
technology may provide a means of providing more cost-effective delivery of TVET, care should be taken in assessing the real benefits and costs. The relevance of the technology to the social, cultural and economic circumstances of a country must be assessed. A technology-based solution that works in one country will not necessarily work or be appropriate in another. A full assessment of claimed benefits, a careful study of the impact and implementation issues of an initiative and a careful study of cost feasibility in terms of both government expenditure and user costs should all be undertaken before a technology-based education program is implemented.
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