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ABSTRACT
               Trends in articulation arrangements for technical and
vocational education (TVE) in the South East Asia region were studied. A key
feature of articulation is the existence of pathways that allow graduates of
one course of study to progress to other courses. Effective articulation
opens up advancement for individuals and helps to create a flexible workforce
which allows countries to capitalize on opportunities that advance economic
growth. Two precursors for effective TVE articulation are (1) general
availability of primary and secondary education; and (2) a higher education
system that has some capacity to accept other than secondary school graduates
into undergraduate courses. Broad availability of TVE/higher education
articulation appears to correlate with economies that have a significant
services sector, high technology industries and substantial manufacturing
capacity and that tend to enhance the status of TVE. (Approximately two
thirds of the document consists of country profiles of Australia, Indonesia,
Malaysia, the Philippines, Singapore, and Thailand, which include overviews
of the economic and educational status of each country, of postsecondary TVE,
and of each country's articulation arrangements. Seventy-six endnotes and a
list of individuals interviewed are appended.) (CG)

UNEVOC
International Project on Technical and Vocational Education
Projet international pour l'enseignement technique et professionnel

RMIT
UNIVERSITY

TRENDS IN ARTICULATION ARRANGEMENTS
FOR TECHNICAL AND VOCATIONAL EDUCATION
IN THE SOUTH EAST ASIAN REGION

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UNEVOC is the International Project on Technical and Vocational Education which was launched by UNESCO in 1992. Its purpose is to contribute to the development and improvement of technical and vocational education in Member States.

UNEVOC aims to foster the international exchange of ideas, experience and studies on policy issues; strengthen national research and development capabilities; facilitate access to data bases and documentation; promote innovations in staff development; and support international cooperation.

TRENDS IN ARTICULATION ARRANGEMENTS FOR TECHNICAL AND VOCATIONAL EDUCATION IN THE SOUTH EAST ASIAN REGION

OVERVIEW

Background
This study seeks to investigate trends in articulation arrangements available to students who undertake technical and vocational education (TVE) courses in a number of countries in the South East Asian region. Particular reference is made to Australia, Indonesia, Malaysia, the Philippines, Singapore and Thailand.

The countries selected were representative of states at varying degrees of evolution as regards their educational development. Australia being at the edge of the South East Asian region, was included as an example of a country having an interesting history of articulation practices.

A significant impetus for this study was the work which was undertaken for the development of the 1994 UNESCO UNEVOC *Case Studies on Technical and Further Education in Asia and the Pacific* project (1) which investigated factors which impact on the status of TVE in Australia, Bangladesh, China, Fiji, India, Indonesia, Iran, Japan, Korea, Malaysia, Pakistan, Thailand and Vietnam.

These *Case Studies* cited the limited opportunities for articulation due to the terminal nature of many TVE courses in a number of countries, and was seen as significant factor effecting the status of TVE.

For the purpose of this study technical and vocational education (TVE) will be regarded as also encompassing technical and vocational education and training (TVET). TVE is usually seen as having a focus on formal programs of study resulting in an academic award, (usually a Certificate or Diploma). Vocational training is normally directed at short term development of specific skills. In practice, there is usually some overlap between vocational education and training, and TVE courses will generally incorporate significant exposure to relevant skills training.

Articulation
The key feature of articulation in an educational sense is the existence of pathways which allow graduates of one course of study to progress, or 'articulate', to another.

Articulation is usually thought of in a context of provision of pathways 'upwards', especially from TVE to university, but 'reverse articulation' also applies to traffic between higher education and TVE.

The possibility of articulation arrangements between related courses at the same level, is a further example of educational articulation, but may not be perceived as such.

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Articulation is important because it is related to opportunity. Articulation is related to status, because 'dead end' courses which do not have pathways to further study opportunities, have less status than programs which do provide further options.

Articulation is significant on the broader scale, and at the national level.
Nations which have structured or encouraged their educational system to provide effective articulation arrangements, are better placed to capitalize on opportunities that advance economic growth, particularly when technological change or other forces demand a response. A workforce educated in an open ended system will more easily make the transition to new types of employment as they emerge.
All countries which are the subject of this study have some provision for articulation from TVE programs, although such provision is sometimes limited in scope.

Credit transfer arrangements through the granting of course credits for recognized studies previously undertaken, are frequently an important facet of articulation arrangements. Credit transfer may occur when institutions agree to formally recognize studies undertaken by students in a sending institution, with the granting of an agreed amount of credit in a particular course, or courses, by the receiving institution.

Recognition of prior learning, may be granted to an individual seeking advanced standing in a course. Such recognition may be accorded on the basis of previous studies, or non-formal learning gained through a variety of means, or be a mixture of formal and non-formal learning. In the South East Asian region, the concept of recognition of prior learning has not been widely applied to the granting of advanced standing in formal courses.

The desirability of making provision for TVE students who have the ability to undertake further studies is by no means new. For example, the 1964 UNESCO/ILO statement on *Technical and Vocational Education and Training* contended that , 'Technical and vocational education should be so organised that every person can continue his education until his potentialities have been developed' (2)

National need and individual aspirations
The question of articulation is of more concern to countries that are largely industrialized, have a sizeable services sector and significant high technology industries. Countries of this type require an adaptable well educated workforce, and widespread opportunity for further study, simply to maintain their position.

In such an environment an individual will be encouraged to undertake further education or training, perhaps in response to a desired career change, or enforced by redundancy brought about by technological change which in turn produces obsolescence of vocational skills.

It is not so much a question of having an expectation that TVE courses should be designed with the view that graduates might have the option to go on and undertake related higher level studies, but that TVE programs must be vocational. Their function is to deliver personnel able to undertake skilled work, and create a body of proficient technicians and technologists, but should not be so limited. Intertwined with these objectives, TVE courses should be structured to permit those who have the capacity, to undertake further studies aided by their TVE experience.

Many countries in the South East Asian region have had, until recently, economies based on agrarian and extractive industries. Some countries in the region, have in past decades, been subject to the effects of war and its aftermath, political or economic

turmoil, or other disruption which has resulted economic dislocation and restricted the ability of governments' to encourage the broad provision of education.

Only recently have many countries been able to provide universal primary education. The provision of secondary education, or partial secondary education (to say year 9) is still limited in some countries, particularly in rural areas and, in some cases limited by gender.

Associated with the desirability of broad provision of articulation, is the necessity of providing basic education at the primary and secondary level that is broad in nature, and results in students graduating not only with good levels of literacy and numeracy, but also with the knowledge and ability to adapt to developing circumstances.

For many countries in the region, a significant focus of TVE provision is at the secondary level.

The general availability of postsecondary technical and vocational education and higher education is something that many countries will struggle to provide for decades.

Skills training versus more general education
A criticizm made from time to time is that TVE programs can be too specialized, and directed at skills training, such skills often having little relevance to industrial needs, and personnel so trained being less adaptable than those who have undertaken education programs of a general nature. Another way of looking at this problem is that it is desirable for formal TVE courses to have as a core general aspects of education and to avoid early specialization.

It would be desirable if secondary education was general in nature to leave open further options, such as some provision of vocational education subjects. For many countries in the region, such an objective is constrained by limited funds. As it will probably be difficult to make secondary education universally available for some time, there is pressure in a number of countries in the region to provide at least some skills training for those who will, for economic or other reasons, be obliged to terminate their studies in the early years of secondary school.

In the period up to the 1980s, the World Bank was a major supporter of technical education. In recent times, the Bank has expressed a preference for broad academic secondary courses, rather than courses with a vocational bias. The economic value of vocational education has been questioned. Improved training programs in both the private and government sectors, are now promoted by the Bank, directed at immediate industrial need and following broad academic preparation. (3)

Complicating the provision of training in many countries is the somewhat fragmented nature of responsibility for program delivery which may be spread between formal and non-formal, government, private and industry based training providers. (4)

The economies of many countries in the South East Asian region have a large demand for unskilled and semi-skilled workers, and this is likely to continue. Indeed many economies are driven by the need to provide employment for those who have low levels of education and related skills. Such workers receive low wages, and if subject to higher levels of pay, then industries based on this arrangement might become uncompetitive and migrate to lower wage countries. Nevertheless, without the ready availability of well educated and adaptable personnel at all levels of a workforce, it is difficult for nations to advance to higher levels of prosperity.

Pressure for change of postsecondary education

Throughout the region the trend is for primary education to be universally available. Most nations in the region have as an objective the provision of secondary education for as many young people as possible.

A longer term issue is the changing nature of postsecondary education. The time will come when some form of mass postsecondary education will tend to become universal, particularly as national economies develop industrially. At present, the postsecondary provision of TVE is usually seen as being a quite different form of education to that provided by universities. It may be that the nature of work in the future will result in more convergence between postsecondary TVE and university education, as the need for education that leaves open future options, particularly at the lower levels of postsecondary education, becomes more widespread.

Driving such a trend might be the lessening of emphasis on skills development in formal courses, towards a broad demand for adaptable graduates, who might be able to quickly acquire specific skills as necessary. Such a concept may currently seem of limited relevance to many economies in South East Asia, but given the pace of change the emergence of such a trend may well occur sooner rather than later.

The 1996 UNESCO *Delors Report* picks up the notion of a broader role for higher education, seeing as important that universities should extend their reach as broadly as possible, 'to be places of culture and learning open to all, (and in a position to provide) --- learning throughout life'. (5)

Interestingly, the 1994 International Bank for Reconstruction and Development report *Higher Education - The Lessons of Experience* took the view that non-universities in both the government and private sectors, had an important part to play in the provision of postsecondary vocational education, with scope for articulation arrangements, noting that:
> 'In the most successful cases non-university institutions are linked with university programs through appropriate transfer mechanisms such as credit systems and equivalency provisions' (6)

Information Technology educational implications
Advances in computer based learning and delivery systems, as well as and the steady decline in the cost of such arrangements increasingly will provide long term opportunities to increase the broad provision of postsecondary education. Information technology has considerable scope to enhance the possibility of TVE graduates, and others, to undertake at least part of their studies at a place and time that meets individual need. This is an important consideration for individuals living in remote locations that do not have relevant educational institutions, or in one of the many congested cities where even getting from home to work is a slow, time consuming daily chore.

The role of private education
It is important to take cognizance of the role of non-government or privately funded education institutions in many countries of South East Asian region.

Privately funded educational institutions play a vital role, not only at the primary and secondary level, but also in the provision of technical and vocational education, and higher education. The role of the private sector in the provision of postsecondary education is often overlooked, but this sector is frequently the largest provider of postsecondary education in a country eg. Indonesia and the Philippines.

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The pressure for places in government funded universities in many South East Asian countries, has resulted in only the most academically gifted students gaining entry. In such an environment the possibility of articulation between TVE and university is very limited. In these circumstances articulation options may be more likely to occur in the private sector of education.

The international dimension of articulation
The fee paying option has been extended in recent years to the international sphere. It has become common for those secondary school and TVE course graduates in the South East Asian region who are unable to gain entry to a university, to look abroad for a place as an international fee paying student. This option has been a function of rising income levels in the region, but recent economic disturbances have tended to check this trend.

Currently, popular destinations for international study are Europe, North America and Australasia.

As the quality of education improves in some South East Asian countries, it is probable that the intercontinental nature of articulation arrangements will expand to include significant intercountry movement of students in search of further education, and some countries in the region are moving to accommodate this demand.

Study limitations
Scant published material exists on the topic of educational articulation for most countries subject to this study. As a result an important source of information was to interview a number of individuals who had significant involvement in the field of education, and in particular TVE, and higher education.

Some attempts were made to ascertain the views of representatives of industry and commerce, regarding the desirability of articulation pathways as the norm in the national provision of education, but this aspect of the study was limited, and might well be followed up by further research.

What follows is consideration of the question of articulation arrangements for TVE students in the South East Asian region, on a country by country basis.

This review is against the background of the economic development in each country and the general system of education, with particular reference paid to the provision of TVE.

Since commencing this study, most countries in the South East Asian region have been subject to serious economic disturbance, the full impact of which is yet to work through national economies. What effect this will have on national systems of education is yet to be seen. However, serious calamities of this nature frequently act as a catalyst for reflection and subsequent change.

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AUSTRALIA

The Commonwealth of Australia has a land area of about 7 million square km, and climatic regions ranging from tropical in the north to temperate in the south. Australia has a population of about 18.1 million people. Most of the population, together with agricultural activities and centres of manufacturing, are concentrated in the coastal strip along the east coast and south west coastal regions of continental Australia.

Although Australia is a substantial exporter of agricultural produce and minerals these sectors of the economy provide limited and generally declining employment opportunities. Manufacturing and construction are significant sectors of the Australian economy, but most employment growth is in the provision of services.

Gross Domestic Product Australia 1995	(1) %
Agriculture	6.1
Mining	3.9
Manufacturing	15.0
Construction	6.3
Transport/Communications	9.2
Financial services	11.2
Commerce	17.5
Education	4.4
Other Services	23.3

In Australia, the primary/secondary system of education is based on a 6 + 6 year cycle of schooling. Few barriers exist to prevent students completing 12 years of schooling. Attendance at school is compulsory from 6 until at least 15 years of age. For school leavers, entry to university undergraduate degree programs is based on performance in the relevant senior secondary (year 12) certificate course.

In former times, a number of Australian states provided secondary technical education in technical schools, that operated in parallel with more academic secondary high schools. This model of secondary education has been replaced in Australia, with secondary education courses which are general in nature.

To cater for a broad spectrum of student ability and interest, a recent trend in Australia has been to permit senior secondary students to undertake some vocational studies, which may be cross credited to vocational education qualifications. This trend is driven by attempts to improve the transition between school and employment, particularly for those students who do not wish to proceed to university at this stage.

There are 37 government funded universities in Australia, and two private universities. The small number of private universities is partly a reflection of the fact that places in undergraduate courses at government funded universities were provided on the basis that cost of tuition was largely paid by the Australian Government.

Technical and vocational education
In Australia, technical and vocational education is frequently referred to as vocational education and training (VET). In broad terms, vocational education and training covers preparation and ongoing retraining, for a broad sweep of occupations, ranging from the operative through to the para-professional level.

The delivery of formal VET programs in Australia has, until recently, mainly been the responsibility of government funded technical and further education (TAFE) colleges.

These efforts were supplemented by the training colleges of government bodies, the armed services and to a lesser extent private educational providers.

In addition, there is a well established provision of informal education and training in Australia, mainly directed at adult and community education, but often providing elements of what might be considered vocational education.

Over the last decade successive Australian Governments have encouraged much broader provision of vocational education and training through government and non-government providers, including TAFE colleges/institutes, private colleges, industry training centres, group training schemes, and in-house training arrangements. There are about 80 TAFE institutes in Australia with many operating on a multi-campus basis. Some universities also provide VET courses, mainly at the paraprofessional level.

To facilitate broader provision of vocational education and training in Australia, a number of steps have been taken to establish a more open training market which is driven by demand rather than input of resources, including:
- Establishment of a framework for qualifications, standards and assessment which apply to both government and non-government providers of vocational education and training.
- Transferability of recognition of formal education and training between providers.
- Encouragement of competition between government and non-government vocational education and training providers. This is enhanced by government funding assistance for some programs provided by non-government providers.
- A focus on competency based training directed at the needs of industry and commerce, with a shift away from time-dependant programs.
- Mechanisms for recognition of prior learning gained by individuals through formal or informal means.
- Establishment of the industry based Australian National Training Authority (ANTA) in 1994, to formulate national strategic plans and objectives for the provision of VET.

The Australian Qualifications Framework which was introduced in 1995, encompasses vocational education and training awards, as well as higher education courses delivered by universities. This framework of qualifications replaced all former certificates, advanced certificates and associate diplomas awarded by vocational education and training providers in Australia.

Australian Qualifications Framework (2)

Vocational Education & Training	Higher Education	Occupational level
	Doctoral Degree	
	Masters Degree	
	Graduate Diploma	
	Bachelor Degree	Professional
Advanced Diploma	Advanced Diploma	Technologist
Diploma	Diploma	Paraprofessional
Certificate IV		Technician
Certificate III		Skilled Trade
Certificate II		Skilled Operative/
Certificate I		Preparatory

Secondary students have the option of leaving school after about year 10, and might at that time commence an apprenticeship or traineeship. In recent years, under the Australian Traineeship system, the notion of an apprenticeship has been extended beyond what were previously considered to be traditional trade occupations.

During an apprenticeship/traineeship period a student works through a training program leading to certificates I - IV. These studies generally articulate to VET diploma/advanced diploma programs.

Given the trend for students to complete secondary school, many students enter a TAFE college, or another VET provider, and undertake a post year 12 diploma/advanced diploma course. A diploma/advanced diploma would require normally 2-3 years of full-time studies, or perhaps be a combination of part-time/full-time studies over a longer period.

Articulation
In the decades prior to the 1960s it was quite common for senior technical college students in a number of states to undertake a certificate course which articulated to a professional diploma program. In a number of instances, cooperative arrangements existed which permitted technical college diploma graduates of demonstrated ability to articulate to related university degree programs, with advanced standing.

These practices were disturbed in the 1960s when senior technical colleges in Australia were removed from the technical college system in each state, and redesignated what at the time were known as 'colleges of advanced education' (CAEs). CAEs were established to provide tertiary level studies of a more applied nature than were delivered by universities, and were the consequence of an investigation into the national provision of higher education by the 1964 *Martin Committee*. (3)

Initial CAE course offerings did not extend beyond the professional diploma courses previously conducted by the technical colleges. However, by the early 1970s the CAEs, which later absorbed many former teacher training colleges, had moved to introduce degree level programs. During the early 1990s, the CAEs underwent a further metamorphosis to become universities in their own right, or were absorbed by existing universities as a consequence of decisions by the Australian Government which required rationalization and consolidation of the higher education sector. What remained of the technical college system in Australia at the postsecondary level was reworked into what became TAFE colleges during the 1970s.

During the 1960s, when diploma courses were transferred from technical colleges to the CAEs, concerns were raised by a number of parties including trade unions and educators, regarding the loss of convenient linkages between vocational and higher education courses, but at the time were ignored, in favour of a Taylorist approach which resulted in terminal courses directed at particular occupations. Students wishing to articulate between vocational and higher education programs during this era were subject to assessment on a case by case basis, which proved to be somewhat inconsistent.

During the 1980s the efficacy of articulation arrangements for TAFE course graduates began to be questioned, and has subsequently led to a more open approach, which was the result of a number of factors including:
• The number of TAFE college graduates from paraprofessional courses that subsequently sought higher level studies increased significantly.
• The provision of TAFE courses was greatly improved both in terms of course delivery resourcing, quality and availability during the 1970s, in the wake of higher levels of government funding.
• The entry level to higher level TAFE courses gradually increased until

completion of secondary education became the norm for many courses.
- Technological change impacting on industry and commerce encouraged the existing workforce to undertake further studies, not necessarily in a field of previous study.
- Social pressure, exemplified by trade union calls for removal of artificial barriers to further study became stronger.
- Government at the national level, gradually became more interested in seeking ways to improve articulation arrangements, for a number of reasons including social justice for disadvantaged groups, and the need to improve the provision of education to enhance economic growth.
- State educational authorities became more sensitive of the need to improve linkages between vocational education programs under their control, as well as linkages between TAFE and related higher education institutions.

The 1985 report *Articulation of TAFE Middle-Level and Higher Education Courses in Australia*, by the TAFE National Centre for Research and Development chronicles the limited opportunities and difficulties faced by TAFE course graduates wishing to articulate to higher level studies at that time. (4)

In 1989, the Australian Government in the White Paper, *Higher Education, A Policy Statement,* (5) documented its concerns on the somewhat ad hoc credit transfer arrangements between TAFE and higher education and set out a number of principles that it expected higher education institutions to adopt, including:

- Transferring students should receive maximum possible credit for completed work.
- There should be continuing dialogue between higher education and TAFE institutions to establish means by which cooperative planning of TAFE courses, may facilitate credit transfer.
- Individual institutions should codify and publish information on the extent of credit which they are prepared to grant in recognition of work done in other institutions.
- Arrangements should be available so that students who believe that their previous academic study justifies exemption from particular units may have credit transfer decisions reviewed.

Many factors have created a climate which has encouraged improvements to articulation arrangements for vocational education students to undertake higher level studies, and in 1993, at least 8.3% of all students who university courses in Australia had commenced or completed a VET course. (6)

Information about pathways through postsecondary education courses is more widespread and routinely appears in TAFE college and university handbooks. Secondary students are made aware of the education pathways open to them. (7)

Higher education staff involved in the enrolment process have become familiar with the notion of articulation and where applicable credit transfer arrangements. (8)

It has became commonplace for the accreditation process in both VET and higher education, for course approval submissions to demonstrate a clear indication of articulation pathways. This concept has been taken up by the Institution of Engineers Australia as part of its course recognition process which now requires articulation arrangements to be described in all courses submitted to it for recognition and assessment.

A small number of 'dual sector' educational institutions exist in Australia that have both VET and higher education components. These institutions are Swinburne University of Technology, RMIT University, Victoria University of Technology (all in Victoria),

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the Australian Maritime College in Tasmania, and the Northern Territory University. These institutions have developed comprehensive policies to enhance articulation arrangements.

Recently, the Victorian Government announced that a number of TAFE colleges will amalgamate with universities, in part to further improve articulation arrangements.

Higher education programs offered through the distance education mode provide significant articulation opportunities for VET course graduates, particularly those in remote geographic locations, or those who otherwise find it difficult for various reasons to attend classes.

Generally, courses offered through off-campus studies have the same entry requirements and course credit arrangements that apply in respect of courses conducted on-campus, including allowances made for the entry of mature age applicants to courses. In many cases students can enrol in single subjects without prerequisites.

Reverse articulation
It has become apparent that articulation is not simply a one way traffic between vocational education and higher education.

In Australia there is widespread articulation of individuals from the university sector to vocational education programs at TAFE colleges. This might be described as 'reverse articulation'. The two-way nature of articulation between VET and higher education in Australia, is such that there is now more traffic between higher education and VET than the other way round.

Not only that, there is evidence indicating that articulation is a multidirectional phenomenon with more than half the students who migrate between vocational education and the university sectors previously enrolled in more than one tertiary course. (9)

Whereas there has been considerable dialogue over decades to bring about improvements in articulation arrangements between VET and higher education by those having an interest in this matter, 'reverse articulation' is a phenomenon which has grown without any perceived encouragement by government, educational authorities or institutions. Demand has been a function of individual need.

What is apparent in Australia is that there is now considerable community pressure for widespread provision of postsecondary education, in contrast to the situation which applied in former times when postsecondary education was seen as only being necessary for small numbers of people. The 1998 *West Committee* felt it necessary to comment on this matter with the statement that the 'national target should be near universal access to some form of postsecondary education' (10)

Given increasing pressure for individuals to undertake further education and training simply to cope with change it is apparent that the pressure to continue improvements of articulation arrangements in Australia will increase.

INDONESIA

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The Republic of Indonesia consists of more than 13,000 islands, with a population of about 195 million. The island of Java, is densely populated with about 60% of the national population, and contains the largest cities in Indonesia. The capital Jakarta has a population exceeding 15 million people.

About 50% of the population of Indonesia is still engaged in agriculture. Manufacturing and the provision of services have been sectors of the economy demonstrating increasing growth. However, recent economic disturbances have seriously effected the financial stability of Indonesia.

Manufacturing sectors include textiles, clothing and footwear, food processing, electrical/electronics, automotive, pulp and paper, and chemicals.

Gross Domestic Product	(1)
Indonesia 1994	%
Agriculture	17.4
Mining	8.4
Manufacturing	23.9
Construction	7.4
Transport/Communications	7.1
Electricity/Gas/Water	1.0
Other Services	34.8
Financial services	27.0

Indonesia has a system of primary/secondary education based on 6 years of primary education, followed by 3 years of junior secondary education and 3 years of senior secondary education.

Primary education is tending towards universal provision, although in some remote areas not all students complete 6 years of education. Efforts are being made to extend the compulsory attendance of children at school through to year 9. Currently about 45% of children aged 13 - 15 years attend junior secondary school.

Education at senior secondary school is provided through the following types of school:
- Academic Senior Secondary School (SMU)
- Technical/Vocational Senior Secondary School (SMK)
- Madrasha (Islamic) School

Academic senior secondary schools provide a 3 year curriculum which leads towards entry to a higher education institution. The majority of students entering senior secondary schooling opt for this type of education in preference to the offerings of the technical/vocational senior secondary school.

Technical/vocational senior secondary schools are seen as leading directly to the world of work, and offer 3 year programs intended to produce graduates to serve the needs of Indonesian industry at the skilled worker level. Schools of this type tend to specialize in particular vocational areas such as economics and business, engineering, agriculture, art and craft, building, etc. In 1996, there were about 3000 private and 700 government senior secondary technical/vocational schools. Enrolments in these institutions was about 1 million in private schools and 500,000 in government schools. (2)

Although senior secondary technical/vocational education schools were seen as providing a steady stream of skilled workers for the Indonesian workforce, it has been found that only about 20% of graduates proceed to employment. (3)

There is a reluctance of parents to place children in secondary technical schools. This matter was commented on in 1995 by Professor Dr Hasan Walinono, Secretary General, Ministry of Education and Culture who was of the opinion that when given the choice between secondary academic or secondary technical education for their children, 'parents tend to choose general education for their children because they can maximise their utility' (4)

Higher education in Indonesia at undergraduate degree level and above is delivered through universities, institutes and (tertiary) schools. In addition, there exists the publicly funded *Universitas Terbuka* (Open University).

Private provision of education is significant at all levels in Indonesia, particularly at the secondary and postsecondary levels. Indeed most postsecondary education is provided by private educational institutions.

The significance of the private sector in the provision of formal postsecondary education in Indonesia is reflected in the following table:

Higher Education Institutions (5)
Indonesia 1994

	Public	Private	Other government
Academies	2	380	
Polytechnics	26	8	
Schools	4	476	
Institutes	14	47	
Universities	31	248	
	76	1159	104

Private institutions of higher education in Indonesia largely concentrate on the fields of social science and humanities. (6)

Private postsecondary education has a very long history in Indonesia, extending back to the period of Dutch colonial administration. Encouragement for private education grew in the post independence period, and since the 1950s has undergone significant growth. Many public universities and institutes that have emerged in Indonesia have had their roots in private colleges, which have subsequently been taken over by the state. (7)

Postsecondary Technical and Vocational Education
Indonesian postsecondary technical and vocational education is delivered through a number of educational bodies including universities.

• Diploma courses
Full-time diploma programs up to 4 years in duration, are offered through polytechnics, some universities, institutes and academies. Courses offered at the diploma level include studies in engineering, business studies, tourism, forestry, etc.

Indonesian diploma granting entities differ in terms of their structure and awards:
Academies are single faculty institutions   - Diploma programs.
Polytechnics are multi faculty institutions - Diploma programs.
Schools often only one faculty   - Diplomas and some undergraduate degrees (S1)
Institutes have university level status   - Diplomas and undergraduate degrees.
Universities   - Diplomas and degrees to PhD.

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Diploma level courses are seen as being applicable for occupations at the advanced technician level. Diploma courses have a vocational rather than an academic focus and are designed to be terminal in nature, leading directly to employment.

Entrants to diploma level courses are overwhelmingly graduates from academic senior secondary schools, although it is possible for those from technical/vocational senior secondary schools to gain entry.

• Other programs
Also included in the category of postsecondary programs might be the non-formal programs of vocational and skills training provided by government and private entities, and industry training centres. Students at such centres may not have completed their secondary schooling, but have left school.

The Ministry of Labour and Social Welfare, through the Department of Manpower Training has 31 (BLK) Worker Training Centres offering a variety of programs:

- Initial Training Programs   (1 year)
- Single skill training   (2-3 months)
- Multiskill training integrated   (3 years)
- Short upgrading programs (8)

Groups of medium sized companies have combined to establish group training units (CGTU). Up to 40 companies are served by each CGTU. A total of 75 CGTUs have been established in Java and Sumatra, covering about 300,000 employees. (9)

The role of private Indonesian training colleges is most significant. These offer a wide variety of short and medium term training courses. Private training colleges are closely attuned to the employment market and offer courses in response to demand. It is noted that about 20,000 such institutions exist and range from small shop-front centres to substantial urban institutions. It has been estimated that about 4.5 million students annually enrol in programs provided by private training colleges, and this sector has experienced strong growth. (10)

Articulation
The scope for articulation of technical and vocational education students in Indonesia is significant but its practicalities are complicated, and not easily implemented on a wide scale at this time.

Entry to government university undergraduate degree courses from technical/vocational senior secondary schools is not possible, and reflects the intense pressure for places, which go to the most able students from academic stream senior secondary school graduates.

The possibility of entry to a government polytechnic diploma increases somewhat, but even here students from academic senior high schools tend to get more offers for placement. It appears that this is currently being looked at and may result in some modifications to the technical/vocational senior secondary school courses, possibly a bridging program for those desirous of entering a polytechnic. (11)

Generally, there is little scope for a polytechnic diploma graduate to articulate to a degree program at a government university, although this is looked at on a case by case basis. The numbers of students using this route is understood to be very small. (12)

There are some exceptions to this situation. If a student has the means, it is possible for students to circumvent the limited funded places at some government universities, including *Universitus Indonesia* (University of Indonesia), and gain entry to degree courses via fee paying extension programs. Extension programs are available to both school leavers and mature age students.

The situation in the private education sector is somewhat different. Some Indonesian private vocational colleges have links with private universities. If a graduate from a private vocational college has the ability, and the financial means, articulation/entry to a private university is possible.

The necessity to extend the availability of secondary and tertiary education in Indonesia is very great, but the resources to permit this to occur are limited, providing significant support of private education. (13) The need to improve the quality of education is also a matter for debate in Indonesia and is cause for priority consideration.

The extent of the need to expand provision of education might be seen by reference to the educational attainment of the Indonesian workforce:

Indonesian Workforce	(14)
Education Level Attained 1994	**%**
No schooling	16.3
Incomplete primary	31.5
Primary School	30.4
Junior Secondary	10.7
Senior Secondary (Academic)	5.8
Senior Secondary (Vocational)	3.8
Diploma	0.8
Undergraduate Degree	0.7

By reference to the above table it is apparent that by 1994 only about 22% of the workforce had participated in schooling beyond primary level. Clearly the ability of the Indonesian economy to advance in a number of sectors is restrained by human resources.

Technical and vocational education is under significant pressure to improve the relevance of courses. The *Link and Match* policy promulgated in 1993 by Prof Ing Wardiman Djojonegoro, the then Minister of Education and Culture, encouraged greater links between education and the world of work, particularly at the senior secondary level. (15)

There is an awareness that future planning will require an education and training system that is more directed at the ongoing needs of industry and commerce, by way of flexibility of multiple entry and exit points. (16)

MALAYSIA

The bulk of the 20.5 million population of Federation of Malaysia, live on the Malay Peninsula. Sabah and Sarawak on the island of Borneo, are less densely populated.

Over the last decade manufacturing, construction and provision of services in Malaysia have expanded, to reach 81.9% of Gross Domestic Product in 1995. In that year Malaysian agriculture contributed 13.5% of GDP, but such is the labour intensive nature of agriculture that this sector of the economy employed 18.0% of the

8.6 million workforce.

Malaysia has a public system of education which provides 6 years of primary education, followed by 5 years of secondary education. However, students from Chinese and Tamil medium schools, are required to undertake an additional year of study after the completion of primary school, which is aimed at improving competency in the national language *Bahasa Melayu*.

At the end of three years of the lower secondary school program, students undertake an examination, the *Penilaian Menengah Rendah* (PMR). Entry to upper secondary school programs is based on PMR results. At this point the less able student might leave the formal education system.

Education in upper secondary school is delivered in the following types of school:

- Normal Academic Schools
- Secondary Technical Schools
- Secondary Vocational Schools

Students undertaking the academic stream complete a 2 year course leading to the *Sijil Pelajaran Malaysia* (SPM) (Malaysian Certificate of Education) examination.
A satisfactory SPM result permits entry to a 2 year pre-university program, which concludes with the *Sijil Tinggi Pereskolahan Malaysia* (SPTM) (Malaysian Higher School Certificate)examination.

Secondary technical schools, also provide the 4 year SPM/SPTM program which includes vocational and technology electives, in engineering, commerce, home economics and agricultural science.

The secondary vocational school, offers 2 year programs designed to provide an entry to paid employment. The course has an academic core, and vocational studies comprise about 50% of the program. Successful completion of this course results in the award of the *Sijil Pelajaran Malaysia Vokasional* (SPMV) (Malaysian Certificate of Education Vocational). (2) Although the SPMV has a vocational focus, there are nevertheless articulation pathways for further study open to SPMV graduates.

There is also a extensive network of private primary and secondary schools. These institutions which are open to all Malaysian citizens, follow the national curriculum and examinations.

It should be noted that the Malaysian Government is moving to change the 6+5+2 year cycle of primary/secondary education, to 6+4+2 year cycle with 4 years of secondary education followed by 2 years of pre-university studies. (3)

In addition to extensive provision of TVE in Malaysia, there are eight government universities. Private universities emerged in Malaysia in 1997, when three were created these being the*Universiti Telekom, Universiti Tenaga Nasional* and *Universiti Teknologi Petronas*.

A significant reason for improving the Malaysian system of education is a long term Malaysian Government objective to make Malaysia an important regional centre for the provision of education.

Postsecondary technical and vocational education
Postsecondary technical and vocational education in Malaysia is provided by a mix of public and private institutions, including:

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- Government polytechnics, some universities and institutes, skills training centres, and a number of ministries.
- Private colleges described variously as schools, colleges, institutes, institutes of technology and academies.
  These entities are classified as Private Higher Educational Institutions (PHEIs).

Skills training is also encouraged under the Seventh Malaysia Plan (1996 - 2000) which recognizes the need to improve Malaysia's human resource as a key factor in national economic growth. Assistance for skill training is provided under the Human Resources Development Fund (HRDF) which makes significant contributions towards the cost of training at government and private training centres.

The HRDF is financed through levies on the manufacturing and selected service industries. Considerable training activity takes place with HRDF assistance at the enterprize level.

A recent World Bank/Government of Malaysia report investigating key factors of advancing Malaysian industry encouraged the expansion of high quality skills training in the private sector training. (4)

Many technical and vocational education courses available in Malaysia provide pathways to further study.

Government provision of TVE
Institutions providing TVE programs include:
- Industrial Training Institutes
  These institutes provide certificate level training programs of 6 months to 2 years duration, and produce skilled workers in the fields of mechanical engineering, electrical, printing and construction. Depending on the program, entry requirements range from PMR to SPM/SPMV.
- National Youth Training Institutes
  These institutes offer vocational training to young people in preparation for employment at the skilled worker level. Based on SPM entry, certificate programs are offered in various fields including automotive maintenance, electrical technology, refrigeration, electronics, construction, gardening, textiles, and hospitality. They range in duration from 12 months to 2 years. There are 7 National Youth Training Institutes.
- Polytechnics
  Polytechnics provide 2 year certificate and 3 year diploma courses in business, engineering, architecture and construction. These programs are directed at students seeking technician and middle management levels. Polytechnic courses are based on SPM/SPMV entry. There are seven government polytechnics.
- MARA Institute of Technology (ITM)
  A range of 3 year diploma courses are provided in a number of fields including business, applied science, building, interior design, engineering, computer science, tourism and hospitality management. These courses are based on SPM/SPMV entry. ITM also offers 6 month to 1 year certificate courses in hospitality based on PMR entry. ITM limits entry to bumiputra Malaysians, and has 12 campuses.
- Tunku Abdul Rahman College
  The college which has campuses in Kuala Lumpur and Penang offers 3 year diploma courses based on STPM entry in the fields of business, technology and science. A limited range of 2 year certificate courses post SPM are also conducted by TAR College.
- Ministry of Health Training and Manpower Development Division
  Provides 3 year diploma courses for paraprofessionals training for a career in the health field including nursing, dental nursing, medical laboratory technologist, health

inspection, etc. These courses require SPM for entry.
* Universities
   Of the eight government universities the *Universiti Technologi Malaysia*
   (University of Technology Malaysia) and *Universiti Putra Malaysia* (University of Putra
   Malaysia) provide a number of 3 year diploma courses based on SPM entry.

A number of Malaysian government agencies other than those listed above also offer
TVE courses and skills training programs.

Private TVE institutions
Provision of private postsecondary education in Malaysia is very extensive, having
grown significantly over the last decade or so. This growth was encouraged by limited
places being available in government postsecondary institutions, particularly universities.

Many private colleges have also developed a of range technical and vocational education
courses at diploma and certificate level.
Technical and vocational education programs offered by Malaysian private colleges
(PHEIs), although subject to Ministry of Education approval, do not have to follow
government set curriculum.

Diploma programs normally require 3 years full time tuition post SPM.
Certificate courses tend to vary in length from 6 months to 2 years post SPM. Some
courses are structured such that a certificate course feeds into a related diploma course.

There are more than 70 significant private colleges in Malaysia, and further growth in
this sector is anticipated. The expansion of private institutions has emerged from a
government stance of firm containment during the 1970s, to that of controlled
development in recent years. (5) The Malaysian Government has provided significant
encouragement to the private sector to establish technical and vocational colleges
through generous taxation concessions and legislative support which permit the
establishment of such institutions.

Hundreds of private sector training institutions also provide skills training programs.
Some private training institutions are also private higher education institutions eg.
Federal Institute of Technology, Informatics College, Workers Institute of Technology,
Kolej TAFE, and the Malaysian Institute of Management. For a training activity to
receive support under the Human Resources Development Fund the training program
must be approved by the Human Resources Development Council.

Articulation
Although Malaysian universities are under considerable pressure to accept only the best
SPTM graduates into undergraduate programs, there is some provision for those who
complete polytechnic diplomas with merit to undertake higher level studies.

For example, the *Universiti Malaya* (University of Malaya) will consider graduates
holding relevant polytechnic diplomas for entry to undergraduate degrees in a number of
fields including engineering, computer science, pharmacy and law. Likewise entry to a
number of Mara Institute of Technology degree programs is based on completion of a
related ITM diploma or a diploma from another recognized institution.

A number of private colleges deliver significant segments of degree courses, under
arrangements with foreign universities primarily in the United Kingdom, the United
States of America, Canada and Australia. A typical arrangement is that a Malaysian
college would effectively deliver the curriculum of the first year or two of the degree
course of a foreign university, with the student travelling abroad to the twinned

university to complete the course. There are other variations to this model, which include preparation by Malaysian colleges for qualifying examinations of overseas (esp. United Kingdom) professional bodies such as the UK Engineering Council; credit transfer arrangements which allow studies undertaken at a Malaysian private college to be given advanced standing at the counterpart foreign university; or delivery of a distance education course in association with a Malaysian college.

An example of such an arrangement are the activities of the Malaysian Institute of Management which offers a wide range of training courses, as well as its own certificates and diplomas, mainly in the field of management. Students who complete an MIM diploma or another relevant diploma are able to undertake studies at MIM whereby they articulate to a number of degree programs including MBAs awarded by the University of Bath (UK), University of Hull (UK), Maastricht School of Management (Netherlands), or RMIT University (Australia). (6)

Graduates of the Workers Institute of Technology 3 year Diplomas of Engineering have the opportunity to proceed to 21 affiliated polytechnics in Britain as well as colleges and universities in Australia. Advanced standing of the Workers Institute of Technology Diplomas have permitted students to gain a degree after two years of additional study. (7)

Given the economic difficulties of late, and recognizing the advanced state of private provision of education in Malaysia, the Government has encouraged many private colleges to extend their twinning programs to allow students to complete their degrees in Malaysia. This trend should obviate much of the need for study abroad by Malaysian students.

The structure of articulation arrangements which have been established in Malaysia permits broad opportunities for further educational attainment. In particular, the concept that all levels of education should provide further possibilities for ongoing studies sets the scene for future growth in response to national and individual need.

THE PHILIPPINES

The Republic of Philippines is an archipelago of more than 7,000 islands, with a population of about 70 million people. In 1995, about 36% of Gross Domestic Product was produced by manufacturing, mining, and construction, the provision of services 43%, with agriculture responsible for 21% of GDP. The Philippines has a workforce of approximately 29 million. (1)

Primary education in the Philippines is based on six years of tuition. Primary education is followed by four years of secondary education. The adult literacy rate is about 94%. Because of financial constraints not all children are able to progress to complete secondary school.

Technical education is provided at the secondary level in both government and non-government schools.

Postsecondary Technical and Vocational Education

In the decades prior to 1994, the administration of TVE was the responsibility of several bodies:

- The National Manpower and Youth Council which was established in 1966 to integrate all skills training programs in the Philippines.
- The Bureau of Technical and Vocational Education of the Department of Education, Culture and Sports, which was created in 1985 but grew out of earlier administrative arrangements that managed the provision of technical and vocational education in secondary and postsecondary schools and colleges.
- The Apprenticeship program of the Bureau of Local Employment of the Department of Labor and Employment.

Since 1994, technical and vocational education in the Philippines has been under the supervision of the Technical Education and Skills Development Authority (TESDA). This includes both government and non-government providers of TVE.

The objectives of TESDA are to:

- Help the country attain global competitiveness through improved technical education and skills development.
- Focus technical education and skills development on meeting the demand for quality middle-level manpower.
- Enhance workers' critical and creative thinking through the dissemination of the scientific and technical base of middle-level manpower development programs.
- Encourage the complementary roles of private and public institutions in technical education and skills development systems.
- Enhance character development of the citizen worker by emphasizing work ethic, discipline, resourcefulness and nationalism. (2)

Postsecondary TVE programs on offer include 1 - 2 year certificate courses directed at trade/technician education. 3 year diploma courses are also available. Fields of study include agriculture, agro-industry, computing, business and management, health, transport, languages, engineering, police studies and security. (3)

Given the influence of the United States in the evolution of education in the Philippines, it is not surprizing that a significant feature of educational provision in the Philippines is the large provision of education by non-government educational institutions. In the technical and vocational education sector the provision of about 30% of TVE institutions are government funded, with the remaining 70% of TVE institutions in the hands of non-government organizations such as corporations, religious bodies, and companies. (4)

Higher education institutions have an even higher level of non-government involvement with 950 (80%) of the 1185 higher education institutions in the Philippines being private entities. In 1995, private higher education institutions enrolled 1.3 million of the 1.7 million students in the Philippines. (5)

The growth of private sector education is a reflection of the financial constraints of successive governments, which have come to rely on the private sector to provide the bulk of postsecondary education. An outcome of this environment, is the wide variation of standards, quality of programs and facilities at both TVE institutions and universities, both public and private. The best examples of both systems are very good, but many institutions struggle to deliver quality programs.

In spite of growing demands from the Philippines economy graduates frequently find it difficult to obtain employment in the field for which they have been educated. (6)

In this environment there are negative perceptions by many young people towards technical and vocational education (7)

Articulation
As far back as the 1969-70 *Report of the Presidential Commission to Survey Philippines Education* noted the need for greater levels of articulation from elementary to secondary education, as well as pathways to higher education and TVE. (8)

There are a number of examples where TVE graduates have gone on to undertake higher level studies.

Graduates of the 3 year Diploma in Engineering at Don Bosco Technical College, in Mandaluyang City can articulate, with a one year credit, to the BSc Engineering offered by the College. The same graduates might also gain entry with credits to a Degree course at Adamson University in Manila, but would need to pass the Adamson entry examination. (9)

Although there are accommodation limitations it is nevertheless possible for graduates of trade and technician institutes to transfer to programs at the Technological University of the Philippines (TUP) if they are able to pass the entry examination. Many students undertaking higher level courses at the Technological University of the Philippines have articulated from the TUP 3 year Diploma of Technology. The Diploma of Technology leads to a 3 year full time BSc engineering degree, a 5 semester part time BEng for technician engineers, and a BTech Teacher Education directed at technician course teachers. (10) This arrangement is referred to in the Philippines as an example of a so called 'ladder curriculum'.

Graduates of the 3 year Diploma of Technology in Electrical Engineering at the Meralco Foundation Institute, in Pasig City are able to articulate to the BEng at the Mapua Institute of Technology. Some Meralco graduates have gone on to undertake a BEng at the Technological University of the Philippines. (The Meralco Foundation Institute is a non-government/non-profit entity established by a power utility company.) (11)

The Polytechnic University of the Philippines has a secondary technical school, which was originally set up to cater for those unable to gain entry to a degree course. Whilst most courses provided by the technical college are designed for those seeking to go directly to employment, the 2 year Office Administration course articulates to the Bachelor of Business offered by the Polytechnic University of the Philippines. (12)

At the more prestigious universities the opportunity for TVE graduates in the Philippines to articulate to higher education in such institutions is very limited.
For example, the opportunity for TVE students to articulate into the Bachelor of Engineering course at the University of the Philippines Manila is not an issue. There is no space available, all places are taken by secondary school graduates. (13)

TESDA is keen to ensure that TVE courses are open ended because of an awareness that terminal courses are of lesser interest to students. (14)

Intertwined with the creation of a climate for encouragement of articulation has been positive action by the Philippines Government to encourage credit transfer through the 1996 *Executive Order* by President Fidel Ramos which provided machinery for issuance of assessments of academic equivalency for prior learning. (15)

From investigations undertaken there is significant provision within the Philippines system of education for TVE graduates to articulate to higher level studies.

Given the significant provision of postsecondary in the Philippines by the non-government sector, it is anticipated that market pressures will play an important role in creating demand for articulation pathways.

SINGAPORE

The Republic of Singapore is an island state. The small land area precludes an agricultural sector of any significance. The population of about 3 million is mainly employed in service industries and in particular financial services.

The focus of manufacturing in Singapore is directed towards high technology areas including electronics/computing, petroleum refining, industrial chemicals, etc.

Gross Domestic Product	(1)
Singapore 1995	%
Manufacturing	28
Financial services	27
Commence	18
Transport/Communications	13
Construction	7

Singapore has been able to exploit its geographic location, not only in the provision of transportation services, but also acts as a provider of services to the region.

The state of economic growth in Singapore is quite different to that applying in surrounding countries, and this is reflected in a comprehensive system of education. The quality and relevance of education and training in Singapore is considered to be an important factor in the economic growth of Singapore.

Of countries in the immediate region, Singapore has the best developed provision of articulation pathways, between the various segments of the education system. Graduates of vocational education, in both technical institutes and polytechnics have significant opportunities for higher level studies.

In Singapore, the primary/secondary system of education is based on a 6 + 4 or 5 year cycle of schooling. The Singapore-Cambridge General Certificate of Education (GCE) Normal (N) level examination is undertaken after four years of secondary education. The GCE O level examination requires another year of study.

High achiever students may undertake the four year postprimary express/special stream after which they may sit for the GCE O level examination.

Students with high achievement at the GCE O levels may enter a junior college and undertake a two year pre-university program leading to the GCE A level examination. (2)

About 80% of GCE O level graduates go on to further study. Approximately 20% of school leavers will transfer to junior college/university, 40% will enter polytechnic diploma courses,

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and 20% will undertake Institute of Technical Education programs. Those who opt for employment at this stage find widespread provision of in-house training. (3)

Singapore has been able to achieve a well balanced and appropriate system of education as a consequence of considered development and implementation of policy. (4).

The New Education System in 1980, introduced ability based streaming from primary school. (5) Another driver of education policy was the report of the 1986 Singapore Economic Committee entitled, *The Singapore Economy: New Directions*, which made a number of recommendations including:
* Upgrading the median level of education of the Singaporean workforce.
* Provision of ongoing training and retraining for the workforce.
* Expanding and improving all levels of postsecondary education. (6)

Over the last decade these objectives have been met with great success.
Technical and vocational education
Those students who do not gain a place in a junior college have a number of options available for further study at government polytechnics, private postsecondary institutions, the Institute of Technical Education and other entities.

* Polytechnics
  Singapore has four well equipped government funded polytechnics that offer 3 year diploma courses in a wide spectrum of disciplines including business studies, information technology, engineering, biotechnology, interior design, multimedia, nursing and shipbuilding. Entry to polytechnic diploma courses is based on completion of the GCE O level certificate. Students with GCE A level may enter the second year of diploma programs.

* Institute of Technical Education
  The Institute of Technical Education (ITE) is a multicampus government institution that offers a wide range of vocational certificate courses to school leavers and working adults.

  ITE is also the skills standards certification authority for Singapore.

  Courses provided by ITE include studies in automation, automotive, business studies, building services, electrical, electronics, mechanical, precision engineering, and travel services. Most full time courses are of 2 years duration.

  Entry to ITE courses caters for both GCE N and O levels graduates.

  Apprenticeship training is an important facet of ITE activity with 48 apprenticeship programs being offered. Early school leavers with no formal qualifications are catered for through basic vocational training programs.

  Other facets of ITE include a Basic Education for Skills Training (BEST) program for working adults which provides basic literacy and numeracy courses, and the Worker Improvement through Secondary Education (WISE) program for adults to improve their competency in English and mathematics to GCE N level. These programs are offered to improve the workforce skill and productivity capability. ITE also offers basic skills training to working adults through several programs including a six month part-time Modular Skills Training (MOST) program for working adults, an Adult Cooperative Training Scheme (ACTS) scheme directed at workers aged between 20 and 40 years of age and conducted in the apprenticeship format, and a Training Initiative for Mature Employees (TIME) modular training

program for adults over 40 years of age. The ACTS and TIME programs may be undertaken in English, Mandarin, Malay or Tamil.

ITE programs have been designed so that they are interlinked and provide the opportunity for articulation to higher level courses. (7)

- LaSalle SIA College of the Arts
  Offers 3 year diploma courses based on completion of CGE O level, in fine arts, design, multimedia arts, drama, dance and music. Part-time students are also able to undertake the diploma courses.

- SHATEC
  The Singapore Hotel Association Training and Education Centre (SHATEC) which is under the control of the Singapore Hotel Association offers a number of diploma and skilled worker training courses for the hospitality and tourism industry.

- Singapore Institute of Management
  The Singapore Institute of Management (SIM), which is a professional body offers a range of certificate and diploma courses, mainly in the field of management.

- Private business and computer colleges
  There are a significant number of private colleges in Singapore that offer courses in secretarial training and office administration, computing and business studies.

- Industry Training Centres
  Companies and industry groups in Singapore are encouraged to establish training centres to meet their own needs. Centres that meet Institute of Technical Education requirements are granted Approved Training Centre status, and receive ITE support with curriculum development, training materials and skills training.

The extensive provision of education and training opportunities in Singapore ensures that few individuals leave school and enter the workforce without the chance of some pre-employment education and training.

Articulation
The Singapore system of education in clearly focused on the world of work, and is continually evolving to assist the upgrading of workforce skills at all levels, to meet both the immediate and long term needs of the Singapore economy and social objectives.

As a consequence, the notion of articulation to further programs of study is well entrenched, reflecting the needs of individuals to advance to higher levels of academic attainment, and other forms of education as they progress through their career.
This situation has evolved over several decades and reflects the mature nature of the Singaporean economy which is heavily dependant on high technology industries and the provision of services, which in turn encourages upgrading workforce capability.

The compact geographic nature of Singapore, coupled with an excellent public transport infrastructure, has assisted in making it possible for working students to integrate work and further study, something that is quite difficult in a number of other countries in the region. In addition, opportunities exist for participation in flexible course delivery arrangements.

There are many opportunities for further study for TVE graduates from Singaporean polytechnics, the Institute of Technical Education, and other bodies.

Singapore polytechnics will admit ITE graduates to diploma programs related to their ITE studies. Admission is based on meritorious ITE results. Depending on the level reached in an ITE program, it is possible for advanced standing to courses in some cases. For example, an ITE graduate with a 2 year Certificate in Business Studies post GCE O level, could be offered entry to the second year of a related polytechnic diploma.

Polytechnics in Singapore offer a range of advanced diploma courses. Entry to these courses are based on completion of a related diploma course. Advanced diploma courses are usually offered on a part-time basis over two years and are available in a number of fields including computer & communication systems, multimedia, building services, management, mechatronics, food technology, nursing specialisations and contract administration. Advanced diplomas were developed originally in response to a demand for further education from diploma graduates who desired higher level studies in a particular field. (8)

The polytechnics also have strong involvement in continuing education by the provision of short courses, which are directed at upgrading of those currently in the workforce. ITE also provide customised and short skills courses.

The National University of Singapore (NUS) and the Nanyang Technological University (NTU) both admit limited numbers of polytechnic diploma graduates to degree courses with advanced standing where appropriate. For example, the NUS accepts about 300 graduates from polytechnics each year, with 70 odd entering undergraduate courses in engineering, and around 200 being admitted to science and computer programs. The NUS also offers part-time Bachelor of Technology (Mechanical & Manufacturing Engineering/Electronics Engineering) courses specifically directed at polytechnic diploma graduates, to increase the stock of engineers with shopfloor experience to cope with duties of a higher technological nature. About 80 students are enrolled in this course each year. (9)

In addition to offering courses at the certificate and diploma level the Singapore Institute of Management has number of linkages with international universities to deliver selected programs at undergraduate degree, master and doctoral levels, in a number of fields including business, management, economics, mass communications, nursing, education, banking and finance. SIM's international partners include the University of Strathclyde, University of Bradford, University of London, Nottingham Trent University and Henley Management College (UK), Syracuse University, George Washington University, Rutgers University, and State University of New York at Buffalo (USA), Monash University, RMIT University and the University of Sydney (Australia). A typical arrangement for entry into most undergraduate degree courses, with advanced standing, is that entry is based on completion of a polytechnic diploma (or equivalent) in field related to the degree course.

In 1992, the Singapore Ministry of Education invited SIM to run the Open University degree program in Singapore, with an initial grant from the Singapore Government. This program is linked to the UK Open University . A number of BA and BSc degrees are offered. Entry to these courses generally requires academic achievement of at least two GCE A level subject passes, a SIM or polytechnic diploma, or equivalent. The courses offered under the Open University program adopt a flexible learning approach, so that students can organize study around employment and other activities. Nevertheless, there is strong support provided for students, including regular tutorials. Degrees under this program are awarded by the UK Open University.(10)

LaSalle SIA College of the Arts has arrangements with Queensland University of Technology and RMIT University in Australia to deliver certain degree courses. Entry to these programs is based on completion of LaSalle diplomas. For example, LaSalle has collaborated with Queensland University of Technology to offer a Bachelor of Arts in Drama. Similarly, the RMIT University Bachelor in Fine Arts course is offered through LaSalle, with advanced standing into the RMIT course based on completion of the LaSalle Diploma of Fine Arts. (11)

In addition to articulation arrangements already cited, there are a many other instances of degree level programs, including distance education programs, being provided by international universities in association with professional bodies and other entities. (12)

There is also considerable traffic from Singaporean polytechnic diploma graduates undertaking degree level studies abroad, frequently with significant advanced standing.

Extensive articulation possibilities exist in Singapore, for technical and vocational education students. These arrangements have been described as 'a multi level matrix of programs that provides linkages between the school system postsecondary technical and vocational education and training and polytechnic education through a system of *bridges and ladders'* (13)

THAILAND

Currently, about 80% of the Thai population of 60 million odd people reside in rural areas with about 20 million employed in agriculture. Around 15 million of the population are engaged in other sectors of the economy including manufacturing, construction, banking and insurance, and service industries such as tourism. (1) Although agriculture provides employment for the bulk of the Thai workforce it only accounts for 11% of Gross Domestic Product. (2)

The ability of Thailand to respond to economic opportunities is restricted by the educational level of the Thai labour force which is currently weighted towards a workforce that has only undertaken primary level studies.

Educational level of Thai labour force (3)

Primary and below	79.1%
Lower secondary	8.0%
Upper secondary (Academic)	3.3%
Vocational	3.2%
Higher education	6.4%

For Thailand to embrace economic opportunities, other than those based on labour intensive industries, there is a necessity for significant improvement in human resource development at all levels.

Primary education is compulsory, but not all children, especially in rural areas, complete 6 years of education. Nevertheless, there is an Government objective for all students to complete 9 years of education, with the longer term anticipation that within the next decade 12 years of education will be universally available to all Thai children. (4)

Currently, six years of primary education may be followed by 3 years of lower secondary education and 3 years of upper secondary education, with post secondary education provided by universities and vocational institutes.

Upper secondary level education is divided into two streams - general education and vocational education. Successful completion of the general stream results in the award of the *Matayom 6* (Certificate of Secondary Education). Completion of the vocational stream results in the award of a *Por Wor Chor* (Certificate of Vocational Education) after 3 years of study (Year 12).

The intent of the Certificate of Vocational Education was that students would leave school and enter the world of work. In practice this is not the case as between 70 and 90% of students who complete this program proceeding to a postsecondary vocational institute for higher level studies. (5) In one sense this must be considered to constitute a very high level of articulation for students who complete a TVE program, although the main intent of the Certificate of Vocational Education is to prepare students for employment.

The low percentage of Certificate of Vocational Education graduates entering the workforce is a reflection of the desirability of gaining entry to diploma and degree granting institutions, where the ultimate rewards are significantly greater.

Postsecondary technical and vocational education

At the postsecondary level, a number of Thai institutions offer a 2 year post year 12 *Por Wor Sor* (Diplomas of Vocational Education) directed at preparing technician level graduates.

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These institutions include:
- Department of Vocational Education (DOVE) technical institutes.
- Rajamangala Institute of Technology.
  (An amalgamation of 30 regional TVE colleges across Thailand.)
- King Mongkut's Institute of Technology
- Private vocational colleges (6)

Fields of study include engineering, business studies, fine arts, agriculture, textiles, and home economics and tourism.

In addition, the Ministry of Public Health provides programs for nurses, and the Ministry of Defence provides a range of postsecondary programs in military academies. (7)

It should also be noted that some Thai universities and institutes offer 2 year programs at subdegree level such as diplomas or associate degrees. Some universities also award an associate degree to students who complete the first three years of study towards a bachelor degree.

An important factor in the provision of formal postsecondary education in Thailand is the role of private universities and vocational colleges. The numbers of students attending private postsecondary educational institutions is about the same as those attending government institutions.

Thailand has a history of private postsecondary institutions dating back to the late 1960s, and it has been the policy of successive Thai governments to encourage growth in the private provision of post secondary sector, given that government financial resources to support the delivery educational programs is limited. (8) A form of quality control is exerted on private universities and vocational colleges through an approvals process which requires that minimum curriculum and resource requirements be satisfied.

Nevertheless, places at government universities and vocational institutes and colleges are highly sought after. This is particularly the case in terms of prestigious Bangkok institutions. (9)

Non-formal vocational education
A significant thrust to provide skills training exists in Thailand through the delivery of so called non-formal education programs.

Non-formal education programs are provided by many government departments, state enterprizes, private and non-government organizations, and private schools. The most important providers being the Department of Vocational Education (DOVE), the Department of Non-formal Education (DNFE), and the Ministry of Labour and Social Welfare through the Department of Skill Department (DSD).

Many non-formal education courses are directed at the development of basic vocational skills, in pre-employment programs, ranging from 3 months to one year in length. The target group is students who have completed primary education, but for one reason or another are not able to proceed to secondary education. Typically such students would come from families with limited means. The pre-employment courses include training in electrical, automotive and construction technology and would an industry training component.

Large numbers of students in the non-formal education sector undertake upgrading short courses. For example DSD offers courses in supervision, programmable logic control, welding inspection, and chemical hazard safety.

The importance of non-formal education in Thailand is such that in 1995 DOVE had about 265,000 non-formal enrolments, and DSD had 110,000 enrolments in non-formal programs, which are further supplemented by the efforts of private training providers and industry based training.(10)

The enrolment in non-formal education institutions is indicative of meeting real need. Currently these programs are not linked to higher levels of the Thai education system to any extent. As a long term objective non-formal programs would be enhanced if effective linkages could be introduced.

Articulation

Due to the highly competitive demand for places, virtually all students entering government universities do so after completion of the academic stream at a secondary school. This means that students who diverge from the secondary academic stream at the end of year 9, in reality may only proceed to postsecondary vocational programs if they are to do so in a government funded institution, such as Rajamangala Institute of Technology.

To enter a private university it would be necessary, not only to satisfy academic entry requirements, which might include an entry examination, but also pay course fees.

Provision for Diploma of Vocational Education graduates to undertake degrees, is made by King Mongkut's Institute of Technology (KMIT) and Rajamangala Institute of Technology.

KMIT North Bangkok offers Bachelor of Technology and Bachelor of Science in Technical Education to Diploma of Vocational Education graduates. It is also possible for graduates from these programs to eventually articulate to Masters and Doctor of Technical Education courses conducted by KMIT. (11)

Rajamangala Institute of Technology is a very significant provider of degree level programs for Diploma of Vocational Education graduates, offering undergraduate degrees in a number of fields including agriculture, engineering, business, arts, architecture and science. About 24% of the student body is engaged in degree level courses at Rajamangala. (12)

The DOVE Pathumwan Technical College (Bangkok) also offers a Bachelor of Engineering (Mechatronics Engineering). This college also has an affiliation with King Mongkut's Institute of Technology North Bangkok which has permitted the establishment of a Bachelor of Industrial Technology (Industrial Instrumentation Technology) course. (13)

In total about 13,000 students are undertaking degree and higher level courses at King Mongkut's Institute of Technology, Rajamangala Institute of Technology and Pathumwan Technical College. (14)

The incentive for 2 year vocational education diploma students to continue on and complete a degree is great. Not only in terms of status in gaining a degree, but also the prospect of much higher salaries which is a strong motivating force. Degree holders can expect better career paths, particularly in government employment, which has not

provided significant recognition of vocational education awards to motivate diploma students to seek a career based on their vocational education qualification. Diplomates expect less rewarding positions, where the salary payable would be significantly lower than that commanded by degree holders. (15)

Some universities such as Majeo Institute of Agricultural Technology, Prince of Songkla and Srinakharinwirot University will allow holders of the Diploma of Vocational Education to enter the third year of certain degree courses, subject to an entry examination. (16)

Nevertheless, the linkages between Thai vocational education colleges and universities might generally be seen as not being strong, and any diagram of the Thai education system invariably has no linkages shown between vocational education colleges and university programs.

Another articulation option for postsecondary education courses provided by the two open universities, Ramkhamhaeng University and Sukhothai Thammathirat Open University. These universities had a combined 1995 enrolment of 523,583 students. (17) Entry to the open universities does not require an entry examination, fees are low, and a wide range of courses are available. In spite of the large enrolment by the open universities, the self directed nature of study and length of time required to complete programs, and perhaps the open entry levels, has resulted in low course completion rates.

International linkages between Thai universities and vocational institutes is another factor which might also be touched upon. Such linkages are encouraged by the Thai government, particularly in facilitating the development and delivery in Thailand of post-graduate degrees, jointly with international universities.

A number of examples also exist where Thai universities have twinning arrangements, such that part of a degree is undertaken in Thailand and completed offshore at the partner university.

This pattern is replicated in a number of vocational education institutions. The Graduate School of Rajamangala Institute of Technology has an arrangement with the UK University of Northumbria in respect of a Master of Science (Telecommunications Engineering). King Mongkut's Institute of Technology North Bangkok has an arrangement with the UK University of Strathclyde to jointly deliver a Master of Engineering course.

The Bachelor of Engineering (Mechatronics Engineering) delivered by the DOVE Pathumwan Technical College has come about due to support by the Japanese International Cooperation Agency (JICA) since 1991. JICA has not only provided teaching equipment but also supplied the services of academic experts to assist in program delivery. (18)

Clearly, the Thai system of education is responding to economic and social changes.

Future directions include making secondary education more generally available, whilst improving standards and quality of course delivery, for all levels of education.

The pressure of numbers on Thai government funded technical and vocational institutions is very great, and simply increasing enrolments without a commensurate increase in resources, is recognised as having a direct impact on program quality. (19)

Given limits on the ability of government to fund education, the involvement of the private sector in the provision postsecondary education will grow in importance.

Vocational education in Thailand already has a high degree of articulation in current programs, but this is mainly confined to provision for articulation within the vocational education sector. There is limited opportunity for vocational education students to transfer to the higher education sector, particularly to government universities, where entry is effectively restricted to the top group of graduates from the upper secondary academic stream. Given resource limitations this is a difficult issue to address.

Currently there is very limited ability for students to advance in an educational sense from (non-formal) skills based programs, and it would be desirable to integrate courses of this type into the broader Thai system of education.

As Thai vocational education institutions move to respond to economic change, the challenge to meet the necessity to provide pathways for continuing education in a formal course format and by less structured means, will increase.

CONCLUSIONS

Articulation pathways for technical and vocational education course graduates were evident in all countries considered by this study, though such provision varied significantly, from extensive linkages between TVE and higher education, through to quite limited opportunities for articulation.

There are two broad precursors for effective TVE articulation arrangements:
   • the general availability of primary and secondary education.
   • a higher education system that has some capacity to accept other than secondary school graduates into undergraduate courses.

Many countries in the region have educational priorities that focus government funding toward improving the quality of primary education, expanding the availability of secondary education, and targeting the provision of postsecondary TVE and higher education. In such an environment the possibility of a government funding articulation pathways for TVE graduates is restricted.

The primary focus of TVE should be the education and training of skilled workers and technicians/paraprofessionals, to enable them to competently undertake work in their chosen occupation. Articulation arrangements should not compromise this objective.
On the other hand, TVE programs should be sufficiently broad to enable graduates to undertake higher level programs with some credit transfer where this is justified.

TVE courses are often regarded as being less desirable than parallel academic programs, because the academic stream usually offers better opportunities for further study or employment. This is less of a consideration when TVE courses have a core of academic studies, because such arrangements leave open the door to further study.

Constrained public funding for education has frequently encouraged private institutions to play a key role, particularly at the post-secondary level, and in the provision of skills training. There is considerable scope to expand articulation pathways for TVE graduates through private sector institutions, and this is occurring in a number of countries.

Advances in flexible delivery arrangements, and in particular information technology driven course delivery may offer significant articulation opportunities on a previously unimagined scale.

There appears to be correlation between broad availability of TVE/higher education articulation arrangements, and an economy that has a significant services sector, high technology industries and substantial manufacturing capacity. Such a national economy demands continual workforce retraining/upgrading.

Many countries in Asia have comparatively limited modern industry and are at an early stage of development. Agriculture is usually important in such states and provides significant employment. Nevertheless, an economy can be transformed within a decade or so with prudent investment, sound planning and management, together with periods of international prosperity. Intertwined with economic development is the necessity for education which complements short and long term national, economic and social needs.

Long term objectives demand a workforce that is knowledgable and adaptable. Although provision of education is always restrained by available resources it is important that such provision avoids terminal programs that limit individual growth. Governments when formulating policy for provision of education in the long term, might take into account the desirability of developing effective articulation arrangements.

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Effective articulation arrangements are a key factor in enhancing the status of technical and vocational education.

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