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ABSTRACT

Education has a place of high priority on India's development agenda. The technical/vocational education (TVE) system is multisectoral with each ministry responsible for labor force development in that sector. The TVE programs in the formal education system are either state delivered or financed. The higher secondary vocational education program is the emerging mode for skill training for informal and unorganized sectors and aims to the educational requirements for self-employment. Technician education is primarily the responsibility of the polytechnic; the Ministry of Labor looks after craftsworker and apprenticeship training. Educational policy formulation is a complex exercise, carried out at many levels by all concerned agencies. India has passed less educational legislation than many other countries. Steps being taken to improve TVE include a major World Bank-financed scheme that addresses the present weaknesses. TVE problems are identified by public officials, voluntary organizations, mass media, and education. Future directions of improvement are as follows: introduction of first degree-level vocational courses; internal resource generation through the vocational program outreach studies in schools; creating and expanding the open learning system for greater flexibility in delivery and for wider outreach, and effective linkage with industry and the world of work; an entrepreneurial orientation to TVE; and articulation between TVE and general education. (YLB)

UNEVOC

CASE STUDIES ON TECHNICAL AND VOCATIONAL EDUCATION IN ASIA AND THE PACIFIC

UNESCO

INDIA

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The Development of Technical and Vocational Education in India— A Case Study in Quality Improvement

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UNEVOC is the International Project on Technical and Vocational Education which was launched by UNESCO in August 1992. In the field of technical and vocational education, UNEVOC aims to foster the international exchange of ideas, experience and studies on policy issues; strengthen national research and development capabilities; facilitiate access to data bases and documentation; promote innovations in staff development; and support international cooperative actions.

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KEY FACTS

Area	3 287 263 sq km
Population	844.32 million as at March 1, 1991 Growth rate - 2.35 per cent
Official title of the country	India
Climate and geography	Tropical monsoon type.

There are four regions in the country namely:

- the great mountain zone, i.e. the Himalayas, with some of the highest peaks of the world
- the plains of the Ganga and the Indus are formed by the basis of three distinct rivers, the Indus, the Ganga and the Brahmaputra.
- the desert region is located in the north–west of the country.
- the peninsular plateau is separated from the plains of Ganga and the Indus my a mass of mountain and hill ranges. The peninsula is flanked on the eastern side by the Bay of Bengal and the western side by the Arabian Sea. The India Ocean is in the south.

Official Languages
Hindi is the official national language and English is the official link language. In all, there are 14 Indian languages.

Ruling political party	Indian National Congress
Head of the Government	President, Dr Shankar Dayal Sharma
Currency used	Indian Rupee
Political system	A multi-party system on adult franchise with a parliamentary system of Government

Education
The education structure is referred to as 10 + 2 + 3 pattern, with 10 years of general and two years of higher secondary education. The general tertiary education is of the duration of three years. Professional courses of engineering and technology and medicine have longer durations.

Social Welfare
A welfare state, aims to secure and protect a social order in which justice, social, economic and political, is inbuilt. The state gives special care to the educational and economic interests of the weaker sections.

Economy
Predominantly agrarian economy. Agricultural sector provides livelihood to about 70 per cent of the labour force and contributes nearly 32 per cent of the Net National Product. Industrialisation was launched as a deliberate policy in the early 50s and the process is continued. There is a renewed thrust through the policies of economic reform to conform to market economy. A mixed economy with public and private sectors both playing critical roles.

EXECUTIVE SUMMARY

Education has a place of high priority on India's national development agenda. The educational system is of monumental size, yet the country's overall educational and training achievements leave much to be desired. The formal schooling is referred to as 10 + 2 + 3 pattern with ten years of general, two years of diversified and three years of first degree education.

Work education, in one form or another, is an integral element of school curriculum and competency based vocational programs are offered at the higher secondary stage. Vocational courses at the tertiary stages of general education have recently been introduced. Work education is inherent in the educational philosophy of India.

The TVE system in India is multi-sectorial with each ministry responsible for manpower development in that sector. The TVE programs in the formal education system are either state delivered or state financed.

The higher secondary vocational education program is the emerging mode for skill training for informal and unorganised sector and aims to the educational requirements for self employment.

This program is collaborative in nature and its dependence for instruction on the employment sector/ industry is greater than the other sectors of formal TVE. Its national curriculum underscores communication and entrepreneurial skills along with the technical skills of theory and the practice of the concerned vocation.

The technician education is primarily the responsibility of the polytechnic, and the craftsman as well as apprenticeship training is looked after by the Ministry of Labour.

Educational policy formulation is a complex exercise, carried out at many levels by all the concerned agencies, such as National Development Council, Planning Commission, Ministry of Human Resource Development, many national and state level institutions, mass media and many others. There are fewer legislation in the field of education in India than in many countries.

The Union Government has suggested an elaborate management set up for VE which is gradually coming into existence in all the states while that for TE is well in position for a long time.

A number of steps are being taken to improve TVE in India. For technician education, there is a major World Bank financed scheme which addresses the present weaknesses in this system. Vocational education being an emerging system, is continuously evaluated and reviewed to bring in new features to improve its output and performance. The problems are identified by public men/women, voluntary organisations, mass media and education from various angles. This leads to development of a holistic and balanced viewpoint. Some of the future directions of improvement are: introduction of first degree level vocational courses, internal resource generation through the vocational program outreach studies in schools, creating and expanding the open learning system for greater flexibility in delivery for wider outreach and effective linkage with industry and the world of work. These steps also address the issue of enhancing the status of TVE, more particularly, vocational education in India.

1. ANALYSIS OF PRESENT SITUATION

1.1 ECONOMY

India has a predominantly agrarian economy. About 70 per cent of the country's population still derives its sustenance from agriculture and related activities. It has also developed a sound industrial base.

1.1.1 HISTORY

The process of economic planning began in 1952 through the First Five Year Plan which was initiated two years after the country adopted its own constitution. India was defined as a socialist, secular democracy, and "mixed economy", with coexisting public and private sectors accepted as the model for economic development. The objectives and social premises of planning in India are derived from the constitutional directive principles. Public and private sectors are viewed as being complementary. Although economic planning envisaged a massive public sector in the past, the emphasis on public sector is less pronounced now and privatisation is the prevailing concept. Since 1952, agriculture and industry have received shifting priorities in successive Plans. Currently under progress is the Eighth Five Year Plan.

The First Five Year Plan accorded the highest priority to agriculture. The Second Plan aimed at achieving a "Socialistic Pattern of Society" with the accent on equality and a considerable reduction in the concentration of income, wealth and economic power. It was a Plan oriented to rapid industrialisation. The Green Revolution initiated in the mid-sixties has substantially changed the cardinals of the agrarian economy which has taken a great leap forward from the traditional to scientific cultivation. In spite of the alarming mass of population growth, the country is able to adequately feed its masses with no net import of any major food grain. It has also caused a general enhancement in the living conditions of the rural masses coupled with substantial change in their outlook towards cultivation as an economically rewarding enterprise. At the same time, the country has developed a sound infrastructure for industrial development with self-sufficiency in the production of most industrial goods. It is also an exporter of several industrial products to countries all over the world.

The Third Plan aimed, amongst other things at achieving self-sufficiency in food grains production and increasing agricultural production in general. It also aimed at expanding basic industries like steel, chemicals, fuel and power and to develop machine building capacity.

The Fourth Plan aimed at reducing fluctuations in agricultural production. It was oriented to social justice, equality and reduction in the concentration of wealth.

The Fifth Plan had severe inflationary pressure as its backdrop. Accordingly, economic stability was the major aim.

The Sixth Plan derived its priorities from the past three decades of the planning process. Removal of poverty was the main objective. The strategy was to move simultaneously towards improving infrastructure for both industry and agriculture.

The Seventh Plan highlighted rapid growth in food grains production, employment generation within the overall tenets of growth, modernisation, self-reliance and social justice. Due recognition had also been accorded to the role of small scale and food processing industries and to increasing the international competitiveness of the Indian economy.

Formulated against the backdrop of phenomenal changes in the politico-economic global scenario as well as the economic crisis within, the Eighth Plan seeks to give new orientation to planning in India. It is built on long term strategic vision of the future from the standpoint of highly competitive international standards.

1.1.2 ACHIEVEMENTS OF SUCCESSIVE FIVE YEAR PLANS

During the First Five Year Plan 1951–1956, the National Income increased by 3.6 per cent per annum as against the target growth rate of 2.1 per cent. In the second five year plan 1956–61, however, the growth rate actually achieved was 4.0 per cent per annum against the target of 4.5 per cent. In the third five year plan, 1961–1966, there was a sharp decline of the growth rate at 3.5 per cent per annum which fell short of the target of 5.6 per cent. In the fourth five year plan 1969–1974, the growth rate target was fixed at 5.7 per cent per annum, but the actual growth rate achieved was only 3.3 per cent. In the fifth five year plan 1974–1979, the growth rate target was 4.4 per cent per annum and was overachieved at 4.8 per cent. The economy bounced back on track during the sixth plan 1980–1985 when the target of 5.2 per cent per annum was surpassed to 5.6 per cent. The growth rate achieved during the seventh five year plan 1985–1990, was 5.8 per cent per annum which was higher than the target of 5.0 per cent. The favourable impact of the new economic policies is expected to be felt in the eighth five year plan 1992–1997, the target of growth rate has been kept at 7 per cent per annum.

1.1.3 REFORMS

The current Plan also marks the beginning of major economic reforms under the new economic policy that has been pursued since 1991. Mounting fiscal deficits, an ever increasing non-plan expenditure, a loss making public sector and an ailing economy provide the backdrop for the economic reforms measures. The four successive national budgets have defined the directions for globalisation of the Indian economy. The major thrust is visible in:

1. Reducing subsidies in several sectors (fuel, fertilizers, etc.
2. Relicensing of major imports and establishment of enterprises, promoting bureaucratic decontrol.
3. Attracting foreign investments and providing a conducive climate for multinationals.
4. Reducing state share in public sector units and increasing the role of private sector in their management.
5. Reducing custom duty on the import of various industrial raw materials.
6. Stabilising the currency in the international market and making it fully convertible.
7. Streamlining human resource development efforts to conform to the transition to market economy and high-tech production practices.

The success of these reforms manifests itself in:

1. Substantial influx of foreign investment in industry.
2. Increase in GDP in several sectors including manufacturing.
3. Rate of inflation brought down to 7-8 per cent .
4. Stable value of rupee against US $.
5. Increasing forex reserve and improved balance of payment situation.

1.1.4 FUTURE

The Government of India is resolute enough to carry forward the process of economic reforms to a point that the country is fully competitive in the international market. An important element of the requisite infrastructure for this is advanced communication technology and rapid flow of information across the world. India is one of the few countries in the world which has its own communication satellite. A satellite based multichannel TV and computer network link up with the rest of the world is widely in operation. These changes will soon bring in major breakthroughs in the field of mass as well as technical and vocational education for providing the much needed human resources for rapid technological advancement.

An area of relative uncertainty is the skill profile of the future workforce for such a technology intensive industrialisation. In developed countries, technological progress has led to a reduction in blue collar jobs and an increase in skilled ones. In the industrial sector, production is not coupled or correlated with employment in quantitative terms. Large plants in the manufacturing industry are so automated and robotised that they hardly employ any manpower for manual work. Technicians are employed to operate the automated operations. Use of information technology, while creating some jobs for skilled personnel, has eliminated several jobs. In effect, use of higher levels of technology implies investment in the use of higher knowledge and skills. Upgrading of technical skills, therefore, becomes as critical for technological advancement as the importation of sophisticated machines.

There is a need for a serious dialogue with the new industries being set up so as to obtain the manpower requirement in terms of skill competence and to secure their active participation in raising such a human resource base. As the first step, universalisation of elementary education in the formal sector with its characteristic of high social returns; and improving the science and technology components in general secondary education; and technical and vocational education after the 10 year cycle of general education are receiving high priority. However, the content of each of these components has to be suitably revamped to suit the needs of the coming century.

1.2 EDUCATION

Education has been accorded a high priority in India's developmental process. The number of literates has increased fourfold since 1947 and the number of schools has more than doubled. There are ten times more universities than at the time of independence. While there is still a great scope for quantitative expansion, the focus has lately switched to qualitative improvement at all levels.

1.2.1 HUMAN RESOURCE DEVELOPMENT

The Educational and Training Enterprise in India which operates at all conceivable levels from pre-school to post-doctoral is of a monumental size. In the formal education system, the pre-school years range from 1 to 3 followed by 10 years of high school and 2 years of higher secondary. Tertiary education is mostly for 3 to 4 years for undergraduate studies followed by Masters, M.Phil and Ph.D degrees. There are many universities and institutions for post-doctoral research and training. On the informal side the age group 9 to 40 is addressed under two separate programs for school age children and adults, respectively. The Open Learning System has also started functioning in the country with the establishment of the National Open School and National Open University to provide leadership and direction. At present there are five Open Universities and four Open Schools in India.

There are more than 740,000 formal schools. More than 3.6 million teachers are working on a full time basis. There are more than 175 universities offering undergraduate and postgraduate courses and about 7100 colleges affiliated to these universities.

The educational structure in India is generally referred to as the Ten + Two + Three (10+2+3) pattern. The first ten years provide undifferentiated general education for all students. The +2 stage, also known as the higher secondary or senior secondary, provides for differentiation into academic and vocational streams and marks the end of school education. In some states, the plus two stage is located in intermediate, junior or degree colleges but is not regarded as a part of the tertiary stage of education. Figure 1 shows the educational structure in India extending through the doctoral level of education. It also shows the degree and post-degree programs in general and professional areas. Besides, the technician education program has been shown to exist after the ten year of general education. The location of one year or two year programs of the Industrial Training Institutes have been shown at VIII+ and X+ levels followed by the apprenticeship training. The non-formal systems operating at elementary stage, secondary stage (open school) and tertiary stage (open university) have been shown as shaded portions.

1.2.2 CONCEPT AND STRUCTURE OF WORK BASED EDUCATION IN SCHOOL

It is important to emphasise that higher secondary is not the first stage where vocational elements are introduced into the school curriculum. As a matter of fact, work education in one form or another, is an integral element of school curriculum in all the states. It is known through different names in different states. The extent of time devoted to it at different stages also varies from state to state. Work experience, work education, socially useful productive work, craft, life oriented education, vocationalisation and pre-vocational education are some of the names commonly given to it. According to the various policy documents it is recommended to be the universal component of the school education. It is beyond the scope of this study to go into the analysis of objectives and other philosophical/conceptual aspects of these programs since the concern here is pre-employment vocational preparation. Regardless of different definitions given to it from time to time work based education aims to involve children in a variety of production or service oriented activities to the extent of a maximum twenty per cent of the total school time. The activities are graded keeping in view the interests and abilities of children. As expected outcomes, the development of work related attitudes and values are highlighted by some educationists, while the vocational proficiency and remunerative aspects of work is emphasised by others.

At the primary stage the children are supposed to participate in a large number of production or service oriented activities within the school premises and outside. The activities relate to their basic need areas such as food, clothing, shelter, health, hygiene and such others. The choice of skills gradually narrows down at the middle school stage and in a given area the intensity of work practice increases.

Under the generic program of the work based education, the pre-vocational character of work experience assumes greater significance at the lower secondary stage. Under this program, in many states, more intensive skill training is imparted to the students as a part of their compulsory general studies. One or two areas of specialisations are taken up by a group of students who may spend nearly two hundred hours in learning the theory and practice of the chosen trade. The skill training imparted is not of the level that can be called vocational yet it gives the student sufficient insight to explore the particular area of the world of work, should he/she drop out of the school or make proper choices of vocational courses at the higher secondary stage. The pre-vocational program of this nature is now being centrally supported in about 1000 schools in the Eighth Five Year Plan.

It is also important to mention that work based education is supposed to extend to the higher secondary stage in its pre-vocational form for the academic stream students, thereby providing compulsory vocationalisation for all students. However, the implementation of this idea has not found favour in many states. In one or two instances (Haryana, Central Board of Secondary Education) work experience has been extended to the plus two stage but the pre-vocational orientation is found to be lacking.

1.2.3 VARIOUS SYSTEMS AND APPROACHES OF VOCATIONAL EDUCATION

The Technical/Vocational Education and Training is multi-sectoral in nature. Each ministry/ department in the Central as well as State Government is responsible for manpower development in that sector. While some offer regular formal or non formal courses, others draw from the general pool of educated and trained manpower.

The extent of post-secondary TVE program is not precisely quantified in India. A rough estimate would put the number as being close to a million in all programs of one to three years duration. This number is more an indicator of the scale of operation rather than a statistical compilation. To be more specific, the higher secondary programs in 1991–92 enrolled nearly 330,267. This is about 4.5 per cent of the total enrolment at the higher secondary stage. About 25 to 30 per cent of the age cohort going to various types of education and training institutions may be estimated to be under TVET. This however, does not include various formal or informal apprentice modes of learning or enterprise based training. This number would be fairly large but beyond a reasonable estimate.

The formal programs of TVET are by and large, directly or indirectly, state delivered. Even when private institutions are involved they are mostly state financed. The entire enterprise, traditionally and by design, is highly subsidised, the students paying only a fraction of the public cost in the form of tuition fees. The private cost is borne largely by the learners but on grounds of equity, certain sections get stipend and scholarships. The employers contribute hardly anything by way of cost though they are the most direct beneficiaries. The social pressure and equity considerations gravitate against the argument of desubsidisation as a vast majority of TVET learners come from relatively weaker sections of the society.

It is important to take up some of the major sectors and discuss their characteristics. For this purpose, the industrial, health, and some of the agricultural, educational and commercial sector courses are used as examples.

1.2.4 HIGHER SECONDARY VOCATIONAL EDUCATION

The higher secondary vocationalisaiton program aims to develop skilled manpower through diversified courses to meet the requirements of mainly the unorganised sector and to prepare people for the world of work in general through a large number of self-employment oriented courses, not precluding the wage employment orientation of many others. Through diversification into production and service oriented courses, it is desired to reduce the aimless pursuit of higher education and thereby reduce pressure from the tertiary education. There are more than 150 courses in different states which are grouped under the major areas of agriculture, business and commerce, engineering and technology, health and paramedical medical, home science and humanities. The design consists of theory and practice relating to the vocational field, related subjects, language and general foundation studies which includes entrepreneurship. In 1991–1992 a total of 330,267 students were enrolled in the two year program. There are more than 5000 full-time teachers teaching these courses.

1.2.4.1 Structure of Vocational Education in Different States

The evolution of the vocationalisation program over the last sixteen years has yielded a great deal of variability in terms of administrative structure, curricular structure, location in school or junior colleges and collaborative arrangements for imparting instructions. While much of the variability still persists, the efforts since the National Policy on Education '86 (NPE'86) are leading to the emergence of a general uniformity and a broad national pattern of vocational education in the plus two level institutions. It is necessary to have some understanding of the major patterns in respect of the abo features for a better appreciation of the issues involved.

Administrative Domain

In the majority of states, vocational education is handled by the departments of education which either use all the personnel of the general education system of the directorate or in the field (for example: Andhra Pradesh, Bihar, Delhi, Gujarat, Goa, Madhya Pradesh, Punjab, Tamilnadu, Uttar Pradesh and West Bengal) or by creating a separate set up for vocational education within the department (for example: Himachal Pradesh, Orissa, and Rajasthan). However, in some states, the responsibility of administration has been assigned to a department other than the general education (examples: Haryana, Karnataka, Kerala and Maharashtra). These arrangements have their own historical and administrative justifications in different states and may remain so for an indefinite period of time. However, due to the guidelines of the Central Government, most of the states in the first two categories are likely to develop separate wings within the directorates of secondary education with independent responsibility for vocational education.

Location of Vocational Courses

In the majority of states the vocational courses have been instituted in the higher secondary schools or their counterpart institutions. For example, Assam, Chandigarh, Delhi, Gujarat, Himachal Pradesh, Madhya Pradesh, Pondicherry, Punjab, Rajasthan, Tamil Nadu and a few others have a twelve year school system. In all these states and union territories the vocational courses are offered as a distinct stream at the plus two stage. However, in Uttar Pradesh the plus two stage is located in the intermediate colleges which provide both the academic and vocational streams. On the other hand, in states like Andhra Pradesh, Karnataka and Maharashtra, the plus two stage is part of the college education and, accordingly, the vocational courses have been instituted in junior/degree colleges. Yet, in certain other states, the plus two stage is part of the college education with the vocational courses generally not offered in colleges but in the high schools that have been upgraded to the plus two stage in respect of the vocational stream only. This group includes Bihar, Kerala and Orissa. Haryana stands in a class by itself where the vocational courses are taught in separate Vocational Education Institutes created for this purpose. The Institutes do not have grades below the eleventh and do not offer academic stream courses. The diversity of location, however, does not pose any problem of equivalence within the education sector since all the plus two level institutions in any particular state are accredited to the same Board/Council in respect of both academic and vocational stream examinations.

Curricular Patterns

Prior to the NPE '86 there were extreme variations in the curricular design from state to state and even within the same state — from course to course. But all the states which have received Central assistance after 1987 have broadly conformed to a common curricular framework with only minor variations. This includes the study of one or two language(s), a vocational course with seventy per cent of the total time and some foundation course. Within this framework, variations may occur with regard to the languages taught, the existence or otherwise of the general foundation course and related subjects. It is important to mention that many of the older variants of curricular scheme still exist on large scales. This includes the Tamil Nadu pattern (vocational course - 40 per cent of the total), the Maharashtra pattern (vocational course - 33 per cent of the total) and the Uttar Pradesh and Assam pattern (undefined and variable mix of electives). There have been some visible efforts on the part of these states to phase out the earlier patterns and to have desirable flexibility within a broad national pattern.

Collaborative Arrangements for Teaching-Learning

Although industrial collaboration is a vital element of teaching-learning of vocational courses, its extent and modalities vary from state to state and from vocational area to area. For example, the health area courses are all invariably taught through collaboration with hospitals but business and commerce based courses are taught mostly through arrangements within the school. Many agriculture, home science and technology based courses are taught through collaboration but in many instances the collaborating institutions are polytechnics, ITIs and universities. In many instances

true industrial linkages have been forged. Within any given state one may see a wide diversity in the extent and nature of such collaborative arrangements.

Here again what seems to have gradually emerged is a national system of vocational education with industrial linkages and on-the-job training strongly emphasised.

1.2.4.2 The Prevailing National Model

The programs of TVET offered by different channels have different course structure and modalities for the development of materials. The ITI (Industrial Training Institutes, Ministry of Labour) courses are largely practice oriented with the component of general education being minimal, say, to the extent of 5 to 10 per cent. Those under the technician education are mostly theory oriented, the practice component being of the order of 30 to 40 per cent. The higher secondary vocational courses follow a design which is as follows:

- Language(s) 10 to 15 per cent
- General foundation course (Environmental Education, Rural Development and Entrepreneurship Development) 10 to 15 per cent
- Vocational theory and practice 70 per cent.

The practice component of a vocational course varies from 50 to 70 per cent.

The curricula and instructional materials are also developed by the R & D institutions concerned with each sector. For the higher secondary courses, the NCERT prepares exemplar instructional materials and the states also prepare their own instructional packages. The courses developed by NCERT are based on an analysis of job requirements, and have been grouped under a common title of "Competency Based Curriculum". Both curricula and instructional materials are developed in workshops in which the employment sector personnel, curriculum experts, subject experts and classroom teachers participate. So far, these materials have been prepared on the basis of annual papers rather than modules or units suited for instruction in a semester system. The semester system, though accepted in principle for implementation is yet to become a reality in the school sector. However, the NCERT has initiated course organisation in the form of flexible modules so as to suit the semester system, and to help would lead to the development of multi skill competencies to meet employment requirements in the rural areas. All instructional materials, both print and non print, though owned by NCERT are freely available for duplication and dissemination by the states. Copyright permission is invariably granted for this purpose.

The higher secondary programs by design are collaborative in nature, the features of which are discussed elsewhere in the study. Under central financing a sound management system as presented in figure 2 (for details please refer to section 1.2.9) is fast emerging and it is hoped that during the current plan period there will be a great deal of improvement in the quality of training and consolidation of the entire venture.

The students are evaluated at the end of two years by the Boards of Secondary/Higher Secondary Education in different states while internal assessment is conducted by the teaching faculty of the concerned school at periodic intervals. The internal evaluation is only for diagnostic purposes and the student's performance is judged by his scores in the final examination conducted by the Board. Vocational courses are offered only in those institutions which are accredited by the authorised board in the given state.

Teacher Education

Preparation of VE teachers has been an extremely weak area in the Indian system. So far no pre-service teacher education courses have been initiated by any institution and

in spite of its accepted desirability, the cost and other complications including a long gestation period have been the major constraints.

However, the modality for in-service training of teachers during vacations has been developed by the NCERT and followed by a number of states under the financing by the central government. These programs which are generally of four weeks duration are conducted in collaboration with expert teaching or research institutions in respective fields where besides the theory and practice of education, pedagogical skills are also taken into account. So far, the organisation aspect of such courses has been in the State sector, but from the next academic session, the Central Institute of Vocational Education is going to coordinate all such training programs, A new scheme for this purpose has been formulated. The target to train 1000 teachers each year commencing 1995–1996 has been set by the Institute.

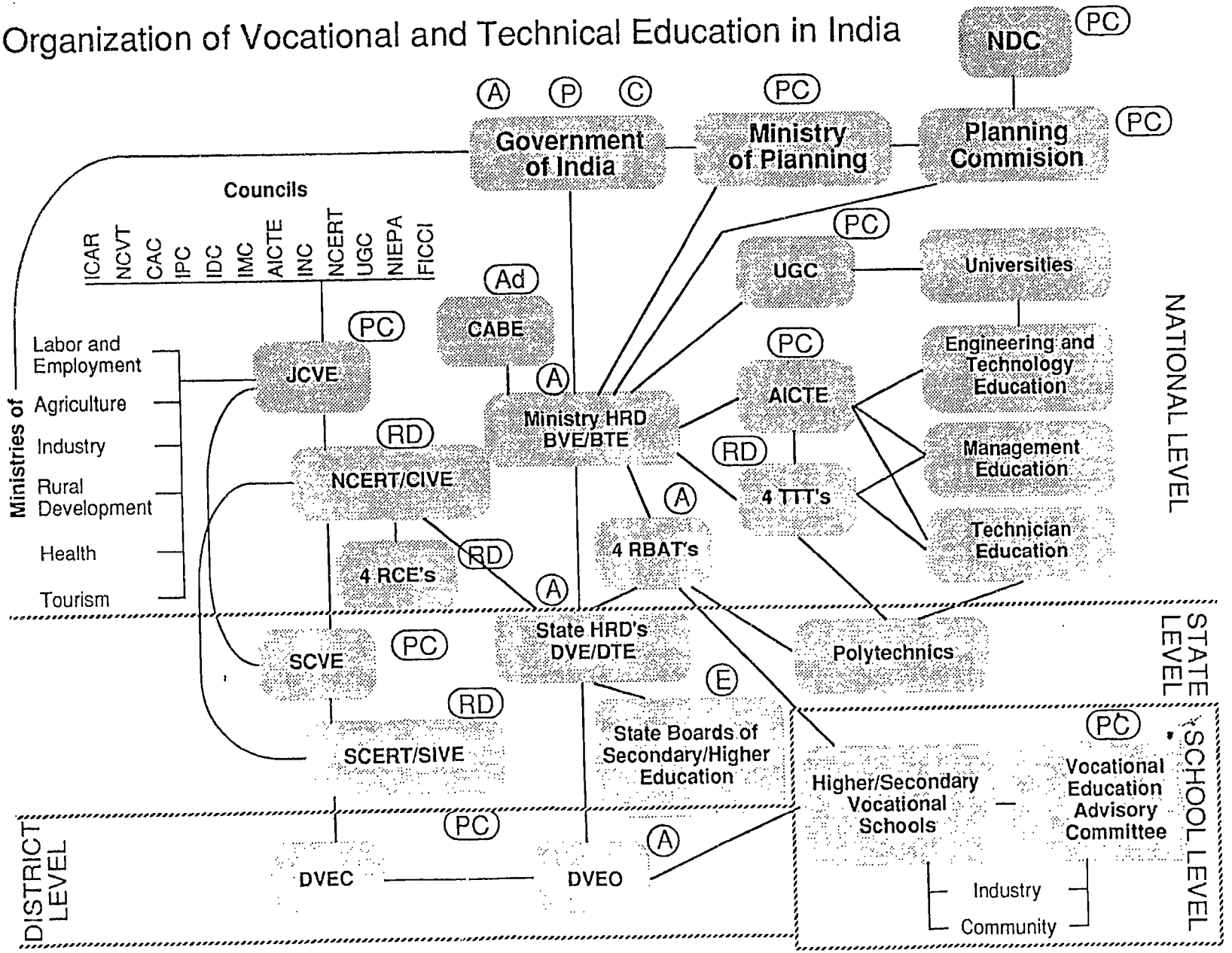
In contrast to the teacher education, the training of key functionaries in vocational education is a reasonably strong feature of the program. In the past, efforts were made to provide orientation to all the concerned principals and supervisory personnel through short term orientation course. With the establishment of Central Institute of Vocational Education a renewed thrust is being given so as to provide orientation to more than 1,000 key functionaries every year.

1.2.5 TECHNICIAN EDUCATION

This sub system consists of a well knit chain of polytechnics which provide broad based education in engineering as well as some non-engineering areas. The minimum qualification for entry into a polytechnic is the grade X certificate. In practice most of the students enrol after Year XII. The courses are generally of three year duration but a few range between two and four years. There are nearly 560 Government polytechnics with the annual admission capacity of 125,000. In addition, there are about 390 private polytechnics. The training is mostly institutional (with some industrial experience), the curricula are predominantly theory oriented and the location mostly urban. They aim to meet the manpower needs of the organised sector.

Technician Education is backed by a vast network of support institutions which include the All India Council of Technical Education (created by an Act of Parliament), four regional Technical Teacher Training Institutes with a faculty size of nearly 60 in each, a Bureau of Technical Education in the central HRD Ministry and Directorates of Technical Education in each state. Yet, the system has serious weaknesses discussed elsewhere in this study.

Organization of Vocational and Technical Education in India



LEGEND

A	Advisory
Ad	Administrative
P	Policy
C	Coordination
E	Examination/Evaluation
RD	Research and Development
NDC	National Development Council
ICAR	Indian Council of Agricultural Research
NCVT	National Council for Vocational Training
CAC	Central Apprenticeship Council
IDC	Indian Dental Council
IPC	Indian Pharmacy Council
IMC	Indian Medical Council
AICTE	All India Council for Technical Education
INC	Indian Nursing Council
NCERT	National Council of Educational Research and Training
UGC	University Grants Commission
NIEPA	National Institute of Educational Planning and Administration
FICCI	Federation of Indian Chambers of Commerce and Industry
JCVE	Joint Council of Vocational Education
CIVE	Central Institute of Vocational Education
RCEs	Regional Colleges of Education
SCVE	State Council of Vocational Education
SCERT	State Council of Educational Research and Training
SIVE	State Institute of Vocational Education
DVEC	District Vocational Education Committee
CABE	Central Advisory Board of Education
HRD	Human Resource Development
BVE	Bureau of Vocational Education
BTE	Bureau of Technical Education
RBATS	Regional Boards of Apprenticeship Training
DVE	Department of Vocational Education
DTE	Department of Technical Education
TTTIs	Technical Teachers Training Institutes
DVEO	District Vocational Education Officer

1.2.6 LABOR

There are two notable training programs under the auspices of the Labor Ministry primarily for skilled workers for the organised industrial sector.

Craftsmen Training Scheme

Craftsman training is offered in nearly two thousand government run or privately managed Industrial Training Institutes. The intake capacity of these institutes was to about 327,000 in 1987-88. There are, in all, 64 trades of which 38 belong to the engineering group. The graduates of these courses find placement in organised public and private sector industrial and business establishments. Some of them go for self employment also. The ITIs offer both X + and VIII + level courses in nearly equal numbers. Most of the courses range in duration from one to two years. The National Council of Vocational Training is the supreme coordinating and policy making body which awards certificates to students on completion of courses. The curriculum is highly practice oriented and the elements of general education are kept at minimum. An ITI graduate is not eligible for university education.

Apprenticeship Training Scheme

The scheme aims to regulate the program of training of apprentices in the industry so as to conform to the prescribed syllabi of the Central Apprenticeship Council and to utilise fully the facilities available in the industry for practical training with a view to meeting the requirement of skilled workers in industries. There are four categories of apprentice program: Graduate Apprenticeship for engineering graduates, Technical Apprenticeship for diploma holders from polytechnics, Trade Apprenticeship for the graduates of ITIs, and Technician (Vocational) Apprenticeship for the graduates of higher secondary vocational courses. There are 71 subjects and 12,000 technician apprentices training at a time. Technician (vocational) apprenticeship is a recent inclusion with sixty designed areas so far, and expansion of the trade list is expected in the near future. The trade apprenticeship program has an intake capacity of over 190,000 of which about 132,000 are actually utilised. There are 140 apprenticed trades which run for durations of one to four years. An appropriate rebate is allowed for the graduates of the craftsman training scheme. The Central Apprenticeship Council awards certificates to the graduates on successful completion of the training.

In addition to the two major training programs presented above, the Ministry of Labor also runs advanced Vocational Training System and vocational training programs, particularly for women, in separate institutes.

1.2.7 OTHERS

Health and Paramedical

There are three councils at the national level to regulate the training programs in their respective areas, namely the Indian Nursing Council, the Indian Pharmacy Council and Indian Dental Council. In other health and paramedical areas, the health departments of the state governments conduct their own training programs to meet their health manpower requirements. These courses, under the control of a variety of authorities, are marked by an absence of standardised course content and proficiency level. It is difficult to make an estimate of the output of the health manpower training and production system. Hospital based training, as an internal supply system, is also a prevalent mode. The curricula have little theoretical content in many situations and almost always these courses lead to a dead end in terms of opportunities for higher education.

Agriculture

The Indian Council of Educational Research is concerned with graduate and postgraduate agricultural education and research. There are a few informal training programs for rural youth through the Agricultural Science Centres and Agricultural universities. There is hardly a system for the production of middle level skilled manpower for the agricultural sector. In some states there are government run agricultural schools but they often provide post induction training to village level workers and other personnel. A manpower production system aiming at vocational development for self employment hardly exists in India in the domain of agriculture.

Business and Commerce

The training system in the field of business and commerce is highly diverse. There are a large number of institutes and teaching shops throughout the country teaching many of the office trades and other vocations in salesmanship, marketing etc. There is no available estimate of the size of the supply system and the quality of its products.

Miscellaneous

There are a variety of other structured programs in forestry, handicraft and cottage industry, music, commercial arts etc. which are nonquantified and lack qualitative uniformity.

TVET in India is centrally directed but locally administered. The vertical linkages of TVET are shown in Figure 2.

1.2.8 SOURCES OF POLICY CONCEPTS

Policy formulation is a complex exercise which involves many departments, institutions and organisations. The sources of policy concepts which have accumulated over a period of time are numerous. In India there is hardly any legal framework for vocational education policies compared to many other countries. The Indian Constitution does not provide specific thoughts or directives on vocational education. There are no national laws to regulate the efforts in this area. The states also have not resorted to legislation on vocational education. Indian Education in general is non-legislative in nature.

As a mechanism prevailing for over a hundred years, the commissions and committees were appointed from time to time. These were not statutory bodies in the sense that their recommendations could be binding on the union or state governments. They are accepted partly or wholly depending on the desire of the government in power. Scanty financial resources often proved to be the major constraint in implementation of many recommendations repeating decade after decade without being implemented or questioned. Slow and cyclic movement is what one encounters if one scans through the pages of history in this critical sector of education.

Mechanism for Policy Formulation

According to the national Constitution, education was a state concern till 1976. Through an amendment of the constitution it now occupies a place on the concurrent list. The Union Government coordinates the entire efforts in this area by laying down policies, intervening through the national planning process and using persuasion to bring about desired changes. The National Policy on Education '86 is a comprehensive document adopted by the parliament. It has been the instrument guiding the educational development throughout the country and it has recently been comprehensively reviewed by a national committee constituted for this purpose.

The universities in the states have been established through Acts passed by the state legislatures and they function autonomously to regulate the tertiary stage of education. Similarly, the university Grants Commission and several central universities have been established through an Act of Parliament. Some of the Board/Councils which regulate secondary stage education have similar statutory status. There are also many national level statutory bodies that are empowered to regulate education and training in their own respective areas. These include the All India Council of Technical Education, the Central Apprenticeship Council, the Indian Pharmacy Council, the Indian Council of Agricultural Research and others. Their respective jurisdictions have been defined in the Acts through which they have been established. It may thus be clear that vocational education which overlaps with nearly all the others has to take into account their existence and make progress through a joint coordination mechanism. This is now being operated through the Joint Council of Vocational Education at the national level, which has been functional since August 1990.

Educational Policy formulation is under the overall charge of the ministry of Human Resource Development. The Ministry is guided by the Central Advisory Board of Education (CABE) which is the national level advisory body which has, amongst others, the education ministers of all the

states as members. However, in the area of overall planning for the country of which the educational planning is a part, the National Development Council (NDC) with the Prime Minister as the Chairman is the apex level body. The Planning Commission, with the Prime Minister as the Chairman, is the Central executive agency for the planning process.

The formulation of policies and strategies is an extensive exercise involving consultations between various expert institutions, non-governmental agencies industries, teacher unions, students and the community at large including the mass media.

The modalities include seminars, conferences, informal discussions, research studies and public debate through mass media. From time to time a committee may be constituted out of a cross section of educationists with or without political affiliations and may exclude the entire official machinery. The governmental mechanism includes frequent meetings of officials from states and conferences of education ministers and secretaries of education convened by the Union Ministry of Human Resource Development. The state governments also maintain grassroots level contacts through their functionaries at various levels and through political and nonpolitical organisations of various kinds.

The statutory bodies/agencies and departments have their own modalities for involving various sections of society and other concerned institutions/organisations. In the field of general and vocational education, the National Council of Educational Research and Training (NCERT) and the National Institute of Educational Planning and Administration (NIEPA) are two such apex institutions. The State Councils of Educational Research and Training (SCERT) are the principal R and D institution in all the states. The NCERT and many of the SCERTs have a wing or a cell of vocational education for R and D functions feeding into the process of policy formulation. These institutions function as coordinators or facilitators of wider involvement and interaction.

1.2.9 MANAGEMENT SYSTEM AND PERSONNEL

The role of a proper management system manned by personnel with proper backgrounds and experiences is well accepted but its emergence has been rather slow and often erratic. Essentially, the management system consists of four distinct categories of functions for which structures are visualised to operate at four different levels. The functions are: a. policy and coordination, b. administration (including supervision and financing), c. research and development, and d. examination and accreditation. The four levels at which these operate are: a. national, b. state, c. district, and d. school. Figure 2 also includes technician education in view of its obvious overlap with the vocational education and certain shared functions between the two.

Policy and Coordination

The Joint Council of Vocational Education (JCVE) is responsible for the overall coordination of all other bodies and departments concerned with vocational education. The All India Council of Technical Education (AICTE) is a statutory body which regulates engineering, technology, management and technician education throughout the country at the national level. The State Council of Vocational Education (SCVE) is a body with similar functions as JCVE at the state level. The District Vocational Education Committees perform the function of local coordination.

Administration

The division of Vocational Education under the Bureau of school education and the Bureau of Technical Education in the union Ministry of Human Resource Development provide finances and monitor the programs of vocational education and technical education, respectively. The Regional Boards of apprenticeship Training administer the Apprenticeship Act in respect of both technician and technician (vocational) apprentices. Directorates of Education of state governments are responsible for general administration and finances in their respective areas. The district vocational education offices or the district education offices provide local administration and supervision in respect of the vocationalisation program. The principal/vice-principal is the administrator concerned at the school level.

Research and Development

The Central Institute of Vocational Education, NCERT, provides overall academic direction, maintains standards, conducts research and evaluation and coordinates curriculum development and teacher training. The Regional Colleges of Education (RCE) of the NCERT function as the regional units of the NCERT. The Techn cal Teachers Training Institutes (TTTI) provide resource support to states in their respective region in respect of technician education. The State Institute of Vocational Education (SIVE)/State Council of Educational Research and Training perform R & D functions at the state level.

2. EXPECTED IMPROVEMENTS IN TVE WITH FUTURE IN VIEW

There is a vision of the future in view of which the TVE in India is being planned and improved. While the later sub-sections of this section will deal with the specifics in respect of Technical and Vocational Education, its general elements are discussed here. In this context, it is important to note that some recent policy pronouncements have indicated that the allocation of finances to education sector in general would be brought to 6 per cent of the GNP from the present 3 per cent in the next three years. it can rightly be hoped that TVE would get its due share. Another promising feature must also be borne in mind — the Indian economy, as result of present restructuring is poised for a major leap forward in GDP within a couple of years.

Future improvements will also keep in view the result of the universalisation of elementary education which would exert enormous pressure on secondary education which in turn will undergo substantial expansion. In order to contain undue expansion in tertiary education which may result in further loss in quality and the present highly subsidised tertiary education becomes impossible to maintain or manage financially, it is necessary to provide skill training for a large section of students by the time they exit from the secondary institutions. It is necessary in order to provide skilled and semi-skilled manpower for the fast emerging industrial sector and the agricultural sector which would become more and more oriented to the use of modern technology. The dual effect of universalisation and industrialisation bring TVE into sharper focus for educational content and process.

While the vocational education system aims at the development of manpower for the unorganised sector in relatively 'low-tech' areas, technical education is being geared up to meet the 'high tech' manpower for the organised sector of employment. Some overlap between the two systems, however, is inevitable for a variety of reasons associated with the vastness of and diversity within the country.

2.1 TECHNICIAN EDUCATION

Out of a total of nearly one thousand polytechnics in the country, about 70 per cent are concentrated in only 4 out of the 32 states and union territories. Many of them still offer only conventional diploma courses in a few disciplines which are outdated. Many institutions have inadequate instructional facilities and the instructional process also remains outdated; there is little or no use of modern educational technologies, virtually no linkage with industry, and poor instructional facilities in the institution itself. The skill component of the courses is generally felt to be weak in spite of the well recognised fact that technicians should be sufficiently skilled. This has resulted into large scale unemployment or under employment amongst the graduates, the actual number is of the order of 100,000. Another weakness of the system is the limited outreach to: rural population, handicapped and women. The enrolment of women is only about 17 per cent of the total while there are 70 polytechnics exclusively for women.

The weaknesses and problems enumerated above were perceived during the formulation of the National Policy on Education 1986, and a Ten-Year Technician Education Investment Program for upgrading the technician education and training system was proposed. It included the introduction of new programs to reflect emerging technologies; expansion of outreach to women, rural population and the handicapped; introduction of continuing education programs to upgrade the existing technicians and an overall improvement in quality by strengthening teacher training, curriculum development, examination and certification, modernisation of workshops and laboratories and enhancing linkage with the industry. Improvements in the overall management system were also a component of the Plan.

There is a massive World Bank project for technician education which essentially supports the Ten-Year Program. The primary objective of the project is to enhance the quality of technician (polytechnic) education in terms of its processes and products. This would be achieved by:

Capacity Expansion

- Introduction of new programs in new and emerging technologies at existing polytechnics.
- Develop a limited number of new polytechnics.
- Establish programs of continuing education.
- Expand programs aimed at women, students in rural and informal sectors and physically handicapped students.
- Initiate Continuing Education programs at selected polytechnics, and
- Construction of student hostels and staff residences etc.

Quality Improvement

- Strengthening teacher education and training programs
- Establishing state level Staff Development Centers, Curriculum Development Centers and Learning Resource Development and User Centers
- Modernising laboratories and workshops
- Promoting Industry — Institute interaction and improving internal revenue generation, and
- Establishing computer centers in every polytechnic etc.

Efficiency Improvement

- Establishing Project Implementation Units at National, State and polytechnic levels
- Strengthening the administration and management of the Bureau of Technical Education, State Directorates and Boards of Technical Education
- Granting autonomy to selected polytechnics, and
- Establishing maintenance centers at state level and at Polytechnics.

The Project is being implemented in Two Phases with the following salient features:

Phase I

- Date of commencement : 5 December 1990
- States included: (Eight) BIHAR, GUJARAT, KARNATAKA, KERALA, MADHYA PRADESH, ORISSA, RAJASTHAN and UTTAR PRADESH.
- Central Sector Institutions included: Four TTTIs at BHOPAL, CALCUTTA, CHANDIGARH & MADRAS and National Project Implementation Unit at New Delhi.
- Total Investment: Rs.8500 million approximately
- Bank Reimbursement: US $260 million at 70 per cent average rate of reimbursement. (Loan: US $25 million and credits: US $235 million).

Phase II

- Date of commencement: Agreement signed at Washington on 16 December 1991 and has since been declared from 29 January 1992.
- States Included: (Eight) ANDHRA PRADESH, ASSAM, HARYANA, HIMACHAL PRADESH, MAHARASHTRA, PUNJAB, TAMILNADU and WEST BENGAL.
- Central Sector: Union Territory of Delhi
- Total Rs.800 crores approximately.
- Bank Reimbursement: US $307.1 million at 83 per cent average rate of reimbursement (entire amount provided as credit).

Flexibility

The project has been designed with ample flexibility and scope for including more states in Phase I and more Union Territories in Phase II.

2.2 VOCATIONAL EDUCATION

A national vocational education system within the framework of secondary education is still in its infancy. Future planning much depends on the analysis of the existing strengths and weaknesses as well as certain assumptions which are enumerated below:

1. Work education and vocational education will occupy a more prominent place in the educational system and will be articulated with employment opportunities (self and wage).

2. Investment in vocational education for human resource development will face competition from other sectors of education. This will necessitate demonstration of greater efficiency of investment.

3. Education about work through the lower secondary stage will find a place in the school curriculum for proper personality development, basic skill development, occupational awareness and for better scholastic attainments in other subject areas. It will help students develop a better vocational decision making process.

4. Upper secondary and out-of-school vocational programs will aim at the development of vocational competencies.

5. Participation in vocational education of widely diverse groups will increase, and it will be a significant, if not the major, channel of education at the upper secondary level.

6. Vocational education will not be divorced from the major objectives of education per se in terms of its role in cultural and social development.

7. The vocational curricula and programs in many areas will be more and more locale specific and the curriculum development will be a more participating process involving industry and community along with the vocational education teachers.

8. Curriculum transaction will require greater linkages with industry and the employment sector.

9. The teaching–learning will be more individualised for the attainment of competencies in a more flexible time frame. The curriculum organisation would offer a common core of general area specific competencies which in turn would have variable vocation specific competencies. This would be to meet the retraining needs arising out of changes in occupational profile and also to make teaching–learning as cost effective as possible.

10. There will be greater use of video and computer software as learning materials in addition to the textbooks and other print materials.

11. The teachers will have regular interaction with the personnel in the elaborate system of management of vocational education and also will have a regular channel of promotion in the cadre of vocational educational administrators, supervisors, planners or teacher educators.

12. The deployment of part-time teachers will remain an integral component of vocational teaching–learning strategy for the sake of greater relevance to industry and to maintain quality standards but there will be a training system for part-time teachers in pedagogical areas.

13. The process of obsolescence will be faster in the future in respect of both equipment and course content and will have to be faced with greater imagination.

14. The scope of vocational education program will be extended to the first degree level to enhance the employability of graduates.

15. A national system of certification and accreditation may become a necessity in order to bring in greater professionalism in various vocations.

3. STRATEGIES FOR FUTURE

3.1 IDENTIFYING PROBLEMS

Educational problems in general, of which TVE is a part, are identified by various categories of people who have their own perceptions and perspectives. The first category comprises the public men and politicians who are in direct contact with the realities on the ground. They would like to feel the impact of any program on an immediate basis. Their concerns are mostly local and their thought processes micro-specific. The second category consists of NGOs and voluntary organisations whose sphere of work is again localised. They view the macro policy intervention in relation to and in comparison with their own programs and activities. Since they speak from their own unquestionably live experiences, the policy decisions often rest with them in the final analysis However, their experiences are subjected to close examination and evaluation from the point of view of replicability and wider application before acceptance. The third category is that of the officials and academics who are guided by macrolevel consideration of planning and execution. They also relate their analysis of problems to international developments in the field of TVE. They show greater concern for national standards, quality, comparability, available resources and economic changes and such others. Yet another category of people are students and the community at large, who are again concerned, almost wholly at their own levels and do not relate their own needs to the overall needs of manpower for various sectors of economy. Nevertheless, their perspective of the problems provides greater insight into the problems of status of TVE, the acceptability of TVE in various sections of the society, and their aspirations which cannot be ignored in an overall analysis of problems and their solutions. The media is also an important source of problem identification in its own right besides serving as the channel for articulation of problem identification by various categories of people. The media perspective is often biased since the main consideration for the media is the commercial value of the news and it is the negative news that sells most.

It is worth examining how the various perspectives of problem identification are finally articulated and emerge in a homogenised and synthesised forms. The most important of the channels is the nation's parliament which is accountable to the people. Its debates are often very penetrating and, being recorded, must be taken into account. Its Consultative Committees on Education often hold exclusive sessions on TVE to highlight the various problems that are being encountered. As another modality the Ministry of Human Resource Development holds periodic national and regional meetings of State Secretaries and Ministers to discuss various problems in implementation. The Central Advisory Board of Education is the highest level advisory body along with the All India Council of Technical Education (a statutory body), Joint Council of Vocational Education, General Body of the National Council of Educational Research and Training and such others. At still another level, the Central Institute of Vocational Education holds several evaluative seminars and on-the-spot study visits to bring out the problems and to suggest future courses of action. Problem identification, thus, is an elaborate democratic and technocratic process which finally results in thorough analysis of problems for informed decision making.

3.2 FUTURE DIRECTIONS

Based on the analysis of problems, the future directions for technician education have been presented in section 2.2 which assesses the major World Bank's financial intervention that is underway. This section, therefore, excludes technician education from its purview.

3.2.1 DEGREE LEVEL VOCATIONAL COURSES

The participation rate in higher education in India is very low compared to many developed countries, being of the order of 5 – 6 per cent. The universities still produce a very large number of graduates, often not of a quality level and always more than the manpower requirement for general degree holders.

The first degree level of education in general subject fields has traditionally been devoid of any orientation to skilled jobs. The universities have seen their roles as providers of liberal learning and its graduates finding places in the employment world as low level general administrators, clerks and a variety of other positions in offices, business and industry. They have also been getting into higher teaching and research positions after postgraduate studies or entering law or other managerial professions after acquiring additional qualifications. The love and rush for degrees, primarily has been because the degree has been an essential qualification for entry into governmental jobs.

However, over the years the situation has changed. The jobs for generalists have been shrinking while the multiple increase in the number of colleges, universities and enrolments therein has not only lowered the standards but also resulted into an over supply of generally unskilled and unemployable graduates of the university system. It's worth noting that the number of universities in the country has increased from 131 in 1981–82 to 176 in 1991-92 and the number of colleges from 4886 to 7121 in the same span of time. The increase in enrolment, according to discipline, between 1981-82 and 1991-92 is given in table 3.2.1 and is of the order of about 56 per cent on an average.

Speciality	Enrolment in Lakhs*		per cent
	1981-82	1991-92	Increase
Arts	11.90	18.66	57.0
Science	5.79	9.04	56.1
Commerce	6.28	10.10	60.8
Agriculture	0.39	0.49	5.6
Vet. Science	0.08	0.12	50.0
Law	1.74	2.45	40.8
Education	0.71	1.06	49.3
Eng. & Tech	1.30	2.25	73.1
Medicine	1.13	1.56	38.1
Others	0.18	0.38	111.1
Total	**29.50**	**46.11**	**56.3**

* 1 lakh = 100,000

As opposed to the increase in enrolment unemployment of university graduates has been rapidly increasing. Although accurate data on unemployment is not available, it is often believed to be the highest amongst all other levels of education and all other groups at the first degree level. In fact, the rapid expansion of highly subsidised higher education and extremely poor articulation with the world of work in organised, unorganised and self-employment sectors, is a major planning concern in the country.

It is with this background and in response to the problem of employability that the university Grants Commission is launching a program of Vocational Education in the year 1994-95 in nearly 100 colleges/universities. For this purpose, 35 vocational programs have been set up to be offered through Science, Arts/Humanities, Commerce and Engineering and Technology faculties. In the first instance one of each 3 electives will be vocational in a 3 year program with about 270 class hours available in each year.

The approach to instruction is based on the higher secondary vocational education program. It is collaborative — the cooperation from employing agencies being imperative. An appropriate enterprise in the vicinity of the selected college would enter into a formal agreement to support the vocational education program to: provide part-time faculty, to allow the use of its facilities, and to give preference to or assist in placement of the graduates.

It is also stipulated that the vocational programs and the colleges offering them should aim at sufficient resource generation through production or services offered to the community. This is

with a view to minimising dependence on external funding for all time in future as well as to provide training in knowledge, skills and marketability at the same time. Details of this concept are dealt with in 3.2.2. This concept is relevant to all sectors of TVE but is now being increasingly emphasised for higher secondary and the first degree stage of vocationalisation.

3.2.2 INTERNAL RESOURCE GENERATION

Internal resource generation by vocational education institutions seems to be a major policy direction to be pursued in the remaining years of this century. As a matter of policy and practice in the past, innovative programs of educational intervention have been financed mainly by Central Government. Many items of expenditure have been highly subsidised. This lead to their initial acceptance of the scheme by some states/universities. The continuation of the scheme after the end of a given five year plan, when central assistance ceases, causes problems such as unenthusiastic acceptance, insufficient financial support from their own resources and the lack of politico-administrative commitment. On the other hand, in the absence of substantial financial support from the Centre, a new program remains virtually a non-starter.

Vocational education programs in those trades and institutions where a strong infrastructure base is provided by central financing would have to take upon themselves the role of resource generation since a model based on massive monetary input from outside suffers from the intrinsic fault of being short-lived. Massive funding would, without any doubt, never be enough to meet the requirements of large scale intervention. For these programs to sustain themselves for long, it is imperative that they recognise the following principles of financing.

Central funds should be provided initially for infrastructure and other purposes needed to start the activity.

Direct beneficiaries — students and employment establishments — should share a major burden of providing running expenses. In the present period of severe financial constraint for higher education, there may be no other option. This is true for any program which is implemented on a fairly large scale in order to have meaningful impact. It also conforms to the new measures of economic reforms and market orientation of the economy. A differential fee structure, coupled with loan facilities and generally higher fees than those charged for general education courses, will not only add prestige to vocational options but would also ensure their effective implementation.

The facilities, faculty and students of the institution should be deployed to meet some economic needs of the community on a commercial or partly commercial basis. This would help students to earn while they learn, help teachers to receive incentive money, and help an institution to improve its programs and facilities. As an added benefit, this will help students to receive entrepreneurial and on the job training. In fact, this may be the only modality to provide the practical experience of running an enterprise on commercial lines in rural and remote areas.

It is often felt that the idea of resource generation of this nature is not workable in India for a variety of techno-managerial reasons. However, there are several successful experiments both by NGOs and Government sector institutions that are currently being studied and compiled for the guidance of others.

3.2.3 OPEN LEARNING

The contact mode and closed system delivery is still by far, the most prevalent modality although a significant beginning has been made through the national open learning institutions. The programs generated by the NCERT which are taught in more than 5000 higher secondary schools as well as those in polytechnics and industrial training institutes, all use the contact delivery mode. The technical support institutions for all the above categories of institutions have, however, accepted the significance of the multi media approach in general and distance learning mode in

particular for imparting technical/vocational education and training. With particular reference to the higher secondary courses, the NCERT has developed some teaching–learning video films in electronics, automobile repairs and indigenous handicraft such as tie and dye, Ikat weaving etc. Sufficient stocks of such materials are being built before schools are encouraged to use them for self-paced and individualised learning.

3.2.4 SCHOOL INDUSTRY LINKAGE

As has been presented at many places in this study the entire vocational education program, both in high schools and colleges presupposes close linkage with industry in various sectors. The linkage is also seen as being vital for technician education where the prevailing mode is institutional. Amongst other things, it offers relevance of training to the present needs of the employment sectors, provides exposure of students to the actual world of work thereby facilitating some other transition between education and the working life, and above all, reduces the cost of expensive facilities within educational institutions. In return for the contribution made by industry, it acquires skilled and partly skilled manpower for its production purposes, offers a group of trainees sufficient training in specific jobs which may be a proper human resource base for recruitment, and above all provides the industry with an opportunity to influence education and training in matters of planning and curriculum. These benefits are more than enough to reverse the present process of drawing manpower from a general pool of indifferently educated and trained personnel.

The subject matter has been dealt with in sufficient detail in section 4.1.

4. ISSUES FOR IMPROVING STATUS OF TVE

Status in any context is a relative concept. What is of higher status to some may be of low status to others. In the context of TVE also, some courses may not pose any status problem while the same courses for others may have a much lower status. Technician education in India has a higher status compared to general first degree education even though it is inferior in terms of level from the point of view of years taken to complete the degree, yet it has lower status than professional engineering, technology and medical courses which are offered at the same level as the general degree level program. Vocational courses, however, have lower status amongst urban pupils in general but are often of higher status than the Arts stream in rural areas.

The problem of status thus requires a much greater resolution in the backdrop of each country. In a situation of extremely high competition for entry of young people into higher/professional education, one may find a whole hierarchy in status. Their career choices in such situations the students are guided more by prevailing compulsions than on the basis of desire, aspirations and affordability. Yet, it would be a gross simplification to say that in view of a large rural-agriculturally based population, vocational courses may occupy a high status for students from such backgrounds. Often, these courses have low perceived demands and poor enrolment as a result of the perceptible craze that exists for a general or technical degree. Although a country of cultivators, agricultural and other blue collar workers, India shows considerable bias in its educational approach, against manual or productive work in schools which are viewed as places primarily for scholastic pursuit. It is therefore important to keep in mind some of the issues being addressed in India to raise the status of vocational education.

The example of the union territory of Chandigarh deserves special mention from the point of view of status. Here the state run schools have greater respectability than those in the rest of the country. Vocational studies in many diverse fields such as Textile Design, Hotel Management, Food Preservation, Computer Application, Office Management, etc. are also taught in the schools, though as separate vocational streams. It is quite heartening to see that these courses attract students with better academic, economic and social backgrounds than in most other states. There is no apparent stigma attached to these courses in this tiny union territory which offers some of the best living conditions and economic status to its residents.

Another instance of high status can be seen in those states of India where vocational courses are taught in privately managed schools which already have a higher rating in the society. Also, in many of the Government managed schools, which have low social rating, the vocational courses, sometimes, offer higher status to vocational courses than that of the school itself. It is worth noting that the provision of these courses within the general framework of higher secondary education, offers higher status to vocational education to certain segments of students.

4.1 CLOSE LINKAGE BETWEEN TVE AND INDUSTRY

With enhancement of employability of the graduates from vocational programs of studies being the major objective of the existing vocationalisation of general education in India, the linkages are supposed to operate at the following stages:

- at the planning stage, for selection of courses
- at the development stage of competency-based course curricula
- at the development stage of instructional resources
- at the stage of teaching–learning of theory and practice in school classroom, and for practical work and on-the-job training.

While the above is the well accepted modality, some shortfalls in actual implementation may often occur.

The collaborative model, not only helps to keep the courses relevant to the requirements of the world of work, it also provides an aura of respectability to students, reduces the overall cost of instruction, arouses students' interest by providing more varied experiences compared to the traditional courses, facilitates postgraduate employment which in turn adds to the status of vocational education in society. On the contrary, where schools seeks to retain their own institutional base for education and training, the program suffers from the point of view of status. While each school can offer a case study for closer analysis as evident from several study visits to schools in various parts of the country, a few documented cases are reproduced below:

Sericulture

One of the major agro-based industries in the State of Karnataka is Sericulture. This is quite evident from the number of institutions in which the vocational course on Sericulture is introduced by the state of Karnataka at the +2 stage in vocational stream. Out of 160 colleges offering vocational courses there are 45 junior colleges, both aided and Government, providing sericulture course.

The required infrastructure facilities for the course are available to these colleges of Karnataka. The agencies involved are grainages, cocoon markets, silk filatures and the silk farms. The linkages of colleges with these agencies are necessary at various stages of silk production, i.e. mulberry cultivation, rearing of silk worm, production of silk worm eggs (grainage), cocoon reeling etc.

The Rural College Kanakapura made an attempt to promote coordination and cooperation with the local community so as to popularise the vocational course of Sericulture in the area by the transfer of technology, knowledge and expertise available with the college faculty to the community. Practical experience in various sericultural processes gained by the community was shared by the staff engaged in the improvement of silk production.

Important activities carried on through the linkages of the institutions with industry and community are as follows:

- Students of vocational stream at +2 stage are regularly taken for practical training and exposure to farms, grainages, filatures, and cocoon markets.

- Students are given orientation and training in all the above areas with the help of community and industry.

- Students visit nearby villages once a month and identify rearing houses, identifying diseases of silk worm, if any, and remedies are suggested by them on the spot. Such activities are beneficial to both community and vocational students.

In the initial stages, the college had difficulty with mulberry cultivation which was not done on a large enough scale to impart practical training to the students.

Because of the linkages developed with the local community the institution acquired the skill of mulberry cultivation on a comparatively large scale and an understanding of other allied aspects of sericulture.

In turn, the community benefited by improving on certain traditional methods of mulberry cultivation through adoption of scientific methods of mulberry cultivation and the new technology of rearing silk worms, suggested by the college faculty.

Because of the scientific knowledge gained by the community in sericulture, the silk production in the area has been raised many fold and there is an increase in productivity resulting in better economic conditions for the people.

The college was able to generate mutual trust and confidence with the community in regard to all aspects of sericulture. It is mutually beneficial. The community learns something new and useful and the college achieves easy access to infrastructure facilities available with the community which can be used for the practical training of vocational students. This is the secret that is helping the college run sericulture vocational course so successfully.

During the local festivals and other occasions the college in collaboration with the Department of Sericulture of Karnataka and other local agencies organises exhibitions, film shows and other visual media so as to apprise the local community about advantages of this vocational course vis-a-vis self- employment as compared to wage employment.

Clock and Watch Repair

A Clock and Watch Repairing course is offered by the Mahantswamy Arts, Science, Commerce College, Hansabhani, Dharwar, Karnataka. The vocational students from Hansabhani Junior College are sent to the Watch Factory, H.M.T., Bangalore, every year for intensive training in watch assembly and repairs. They are provided free-lodging and lunch facility is provided in the factory.

Training is given for three months from January to March with elementary training for about three weeks. One supervisor and three group leaders are posted to train the students. Posted along with them is an instructor from the college is . After three weeks they are given on-the-job training in watch assembly for the remaining period. They are asked to maintain a work diary. The Head of the Department assesses the performance of the students. This course is helpful to students for both wage and self-employment. There is a good linkage between the school and industry. Formerly the students were sent to the factory for training during October. Now this has been changed to January, February and March to adjust with the production program. The user industry is fully utilising the students for their production and the students in return receive intensive practical training.

Automobile Engineering Technician

Automobile Engineering Technician is one of the 21 vocational courses offered in Government Degree/ Private Junior Colleges in Andhra Pradesh. This course is offered at three Government/ Private Junior Colleges. It has been well organised through the establishment of good rapport with nearby local automobile repairs/maintenance workshops. This is providing good hands-on experience to the students during the course of training, besides establishing a good rapport with the community. Further, the community workshops also help the institution in donating certain components for training purposes. After successful completion of the course the students can:

- Establish modest two wheeler repair shops in the rural and semi-urban areas;
- Go in for further education in the polytechnics in the Automobile Engineering discipline;
- Get wage-employment in the private and public sector transport undertakings.

A small per percentage of the products have taken up modest self-employment schemes supported by the State Government and other financing agencies.

Multipurpose Basic Health Worker (Male)

Multipurpose Basic Health Worker (Male) has been running successfully for the past one decade in the Municipal Junior Composite College of Gadag in Karnataka. The effective implementation of the vocational course can be attributed, to a great extent, to the linkages which have been established between the institution and collaborating agencies and also the community. The main objectives of the course are to equip the pupils with skills to bring about improvement in the health conditions in rural areas through control of communicable diseases, family planning, maternal and child health care, nutrition and health education, environmental sanitation and other related tasks/activities.

Collaborative arrangements have been made with the following institutions:

1. Local Ayurvedic Medicine College for practical work in physiology and anatomy:
2. General hospitals for receiving training in first aid and two-week training in the treatment of minor ailments;
3. Local maternity hospital and its maternal and child health clinic;
4. Municipality for extending cooperation for all sanitation practical;
5. Primary Health Center.

The institution has also established a good rapport with following agencies/officers:

1. District Health Officer;
2. Assistant District Health Officer;
3. Senior Medical Officer of the General Hospital;
4. Medical Officer In-charge of Maternity Hospital;
5. Commissioner of Municipality;
6. Medical Officer In-charge of Primary Health Center.

The Institution has adopted the villages which are covered by the Primary Health Center. Field visits are regularly organised for carrying out various practicals in the field.

4.2 ENTREPRENEURIAL ORIENTATION TO TVE

Technical education through the polytechnic network primarily aims to meet the requirements of technicians in the organised sector. Since employment for their graduates has so far not posed a major problem, self-employment has not been highlighted for these graduates till recently. However, there is an increasing realisation of the fact that technologically oriented people may prove to be assets to the society if they are oriented towards entrepreneurship and self-employment. This has resulted in the incorporation of entrepreneurship development modules as supplements to the regular program of study in polytechnics.

The vocational education program, which primarily aims at its graduates being self-employed in several sectors of the economy, incorporates an entrepreneurship module as an integral component of the vocational curriculum. As much as 10 per cent of the total school time is devoted to the study of entrepreneurship for all students pursuing vocational courses. The curriculum has been centrally developed by the National Council of Educational Research and Training, New Delhi in collaboration with the National Institute of Entrepreneurship and Small Business Development, New Delhi by involving experts in education as well as entrepreneurship development throughout the country. The course stretching over 150-200 hours, includes inculcation of entrepreneurial spirit and attitudes, motivation to be an entrepreneur and requisite competencies for launching and managing an enterprise. Textual support materials highlight innovative

methods of teaching. There are a number of national and state level entrepreneurship development institutes in the country. Besides, about 100 Technical Consultancy Organisations, other NGOs and a District Industries Center in each of nearly 500 districts of India are being used as the support institutions for the training of teachers for this emerging field.

Viewed from the status angle for VE, the entrepreneurship movement brought down to the level of schools offers much promise. If it enhances the self employability of vocational graduates, as expected, the status of vocational education would be greatly enhanced. The place for degree as a status symbol would transform itself into the rush for vocational education, which would offer high returns commencing earlier than college graduation.

4.3 ARTICULATION BETWEEN TVE AND GENERAL EDUCATION

As suggested earlier, the system of Technician Education does not suffer much from the status problem in view of ready employment of the graduates in industry. Besides, these graduates do have a career mobility from supervisory and technician position to professional level job and academic status through a Diploma course which has equivalence with a Bachelor's degree. But with regard to vocational education, one cannot ignore the clear signal received from the vocal segment of the society for facilitating greater mobility of VE graduates into higher general courses. While the educational policy is to siphon-off a large section of student population away from general degree level education through vocationalisation, it has been noted that any effort to make the vocational courses 'terminal' would lower the status and reduce their acceptability. It is, therefore, felt that the educational system should provide academic pathways which could be pursued by those students who would like to have a lateral mobility, vertical mobility in their own areas of specialisation or career change in a rapidly changing technological scenario. It may be worthwhile to mention that vocational curricula are basically not "training" but "educational" curricula which includes to the extent of 30 per cent, the language courses and a general Foundation course (inclusive of entrepreneurship). In addition, theoretical knowledge basic to vocational practice constitutes half of the remaining 70 per cent. On the strength of these, the entry of the vocational graduates is not forbidden in arts and commerce areas in any university. The science and professional studies require bridge courses. The articulation is sought to be achieved through the following:

(i) Providing Bridge Courses to make up for academic deficiencies in the higher secondary stage education. Such deficiencies may have occurred since the student opted for a vocational program based on full professional competency. Through bridge courses the students would become eligible for admission into general degree level courses or write competitive examinations for entry into professional programs of engineering, technology, medicine, etc. Though accepted in principle, it has not been possible to formulate and implement bridge courses either by the Boards of Secondary Education or by the universities. Each sector feels that it is the responsibility of the other and the matter is to be resolved through dialogue and discussion. Definition of the bridge course content, instructional and evaluation modalities are some of the issues which remain to be resolved.

(ii) Entry into Polytechnics in areas related students specialisation is another pathway for articulation with higher education. This is effected in different states along different lines.

These may be in the form of :

- giving credit to vocational graduates by evaluating the courses taken earlier.
- giving a year's rebate out of the 3 year diploma program
- by reserving certain percentage of seats in polytechnics for vocational stream graduates.

Yet, some states have not made any such provision so far.

(iii) Degree Level Vocational Courses have been formulated with the dual objective of : a) providing a vocational opportunity along with academic pursuit to satisfy both the craze for a degree and requisite competencies for self or wage employment, and, b) providing opportunity for the vocational stream graduates from the higher secondary schools to follow a relevant and meaningful degree level

program for better career prospects and higher social status. The subject has been dealt with in greater detail in section 3.2.1. In the first phase these courses are to be launched in about 100 colleges/ universities in the country from the academic year 94-95. This pilot phase is expected to be successful and on the basis of experiences gained, wider implementation would be launched during the later part of the present decade. It may be mentioned that a total of 35 courses identified for pilot phase would be offered through the general education faculties in science, humanities, commerce, etc. by optimally deploying the existing faculty after some retraining, by securing the services of professionals and experts from industry on part time basis and by entering into an agreement with an industry in the neighbourhood for practical and on-the-job training of the students. It is a vocational education program fully integrated with the general education since each vocational elective will be coupled with two other subjects from academic electives. For example a student opting for bio-technology would concurrently have two other fields of study such as botany and chemistry.

(iv) The open learning system, the incorporation of which is a much recent phenomenon into the Indian educatioual enterprise is gradually unfolding its potentialities amongst the users and educational workers alike. The concept has not yet sunk into the thinking of people to the extent that, if properly designed and delivered, the courses of open schools and open universities would render other modalities of further education almost without any demand. The flexibility offered by it is so great that very large numbers available in India in its vast countryside would be able to pursue a variety of education and training programs with their own autonomy as learners.

The National Open School located at New Delhi offers foundation courses which enables the young school leavers to make up their deficiencies and helps them to pursue secondary and higher secondary program of studies in both academic and vocational areas. It accredits training institutions and offers academic courses to workers/trainees so as to offer them a second chance to benefit from the formal system of higher learning. The learning, however, is organised at various centers located in all parts of the country and the prevalent medium is still the print. The books and workbooks are written in modular form and in such a style that self learning at a distance is possible.

The Indira Gandhi National Open university is also located at Delhi. Besides a large number of demand driven academic as well as vocational/professional courses, it also offers pre graduate degree courses. Through presently offered in relation to the existing degree and diploma level programs, the scope of these may be extended to cover all or many traditional disciplines such as physics, chemistry, biology, mathematics etc. which may serve as "bridge course" for vocational graduates who might have missed them out while pursuing vocational programs.