TTTI CHANDIGARH

DR. S. K. BHATTACHARYA

(I) IN RETROSPECT

HISTORICAL PERSPECTIVE :

Technical Teachers' Training Institute, Chandigarh is one of the four regional institutes established by the Ministry of Human Resources Development (MHRD), Government of India, in 1967. Large scale industrialisation during the two decades since independence created the need for competent engineers and technicians in a variety of areas of production, manufacturing, construction and services. This necessitated the development and expansion of technical education, for which facilities were very meagre at the time of independence, both in terms of programme areas and number of technical manpower trained in different categories. While the infrastructure did expand to meet the needs, the quality of trained manpower became a matter of concern, particularly with reference to availability of well qualified trained technical teachers. The Government of India, then decided to initiate series of programmes for quality improvement of polytechnic education.

On the recommendation of All India Council for Technical Education (AICTE) four regional Technical Teachers' Training Institutes (TTTIs) were established at Chandigarh, Bhopal, Calcutta and Madras.

Initially the institute had the collaboration of the Royal Netherlands Government, till 1974. The institute looks after the training needs of the teachers of the polytechnics in the northern region comprising the states of Delhi, Haryana, Himachal Pradesh, Jammu and Kashmir, Punjab, Uttar Pradesh and Union Territory of Chandigarh.

The institute started with conduct of training programmes for engineering and applied science teachers of polytechnics awarding a Diploma in Technical Teaching (Dip. TT). The training programmes included upgrading knowledge and skills in technical / applied science subjects, industrial placement and pedagogical concepts and practices.

AREAS	ROLES AND ACTIVITIES

A. Staff Development	• Act as Regional Nodal Resource Centre for all training programmes related to technician education system.
	
	• Organise training of teachers / supporting staff of poly technics through
	
	  – Short-term programmes in areas of Professional Skills Development, Educational Management, Educational Technology, Induction and Content updating.
	
	  – Long-term programmes through Diploma, Post-diploma, Post-graduate and Doctoral courses.
	
	  – Industrial training
	
	• Offer long-term courses in New / Emerging technologies for creating expert teachers in Polytechnics.
	
	• Offer credit based short-term courses linked to long term programmes leading to career development.
	
	• Offer training programmes for teachers from Degree level technical Institutions in the areas of Induction, Educational Management, Educational Technology etc.
	
	• Develop training programmes in Distance-cum-Contact mode
	
	• Become "Institute of Technical Education and Research (ITER)", accepted by MHRD in principle, with power to AWARD DEGREES.

B. Curriculum Development	• Develop curricula in areas of New Emerging Technologies • Assist/Guide states in curriculum implementation • Develop models/approaches for curriculum development in areas of New/Emerging Technologies • Determine technical manpower profiles for New /Emerging Technologies • Create database to maintain technical manpower profile
C. Community Polytechnics and Service to the Unrecognised Sector	• Develop and propagate appropriate technology • Provide service to disadvantaged groups • Provide support to various social schemes for disadvantaged groups, undertaken by Central and State Govt./Agencies, requiring expertise of TTTI.

	• Undertake activities for the promotion of entrepreneurship.
D. Development of Learning Resources and instructional Support Systems	• Develop innovative instructional strategies and related media • Undertake research and develop flexible learning technology and multimedia based instructional software. • Develop teaching and learning resources / variety of media to cater for technical education system/industry training needs.
E. Institute-Industry-Partnership	• Train Industrial Personnel • Design and implement appropriate HRD schemes for industry training needs • Promote partnership between technical institutes and industries • Co-ordinate, facilitate and develop re-training schemes for industrial personnel • Provide consultancy to industries • Organise Continuing Education for working personnel.
F. Research and Development	• Undertake research for the development of technical education system, including determining manpower requirement of industry • Develop innovative methods, processes and practices for introduction of emerging technologies in teaching-learning environment • Undertake research for improving processes and practices in industry.
G. Educational Planning and Management	• Provide Assistance to the state in preparation and implementation of various development projects • Assist States in introduction of modern methods, management processes and practices in the technical education system • Provide guidance in developing Centres of Excellence • Undertake integrated institutional development and institutional evaluation within the country and abroad

– Review of curricula; and

– Design for changing mode of course offerings to Multi point Entry and Credit System (MPECS); distance education etc.

INSTRUCTIONAL MATERIAL DEVELOPMENT :

To support instructions in polytechnics, the institute develops a variety of print and non-print instructional materials such as text books, laboratory manuals, work books etc. and models, charts, slides, OHP transparencies, CAL packages, video films, trainer boards, experimental kits etc.

RESEARCH AND DEVELOPMENT (R & D) :

The institute undertakes a number of Research Studies and Development Projects in engineering education, management and technology areas for generating new knowledge and to develop methods and strategies for solving the problems of the user system.

EXTENSION SERVICES :

To assist the system in implementing quality improvement projects and in undertaking developmental activities, the institute provides assistance to central and state agencies and polytechnics under many extension service projects.

CONSULTANCY SERVICES :

The institute offers consultancy services to international, national and state level organizations in the areas mentioned above such as training, curriculum design, instructional material development and by undertaking R&D activities on specific request from such agencies.

INFRASTRUCTURE :

The Institute is located in the educational complex in Sector 26 on a plot of about 16.5 acres (6.77 hectares) of land. The Institute buildings include : Main Academic Block, Computer Centre, Educational Television Centre, Media Centre Block and Academic / Administrative Block; besides, Main Hostel, Post Graduate Student's Hostel, Student Centre, Institute Guest House; and Residential Campuses in Sectors 26, 29 and 42. The built up area is 17,700 sqm. for academic and administrative buildings, 5210 sqm. for hostels and guest house buildings and 9850 sqm. for residential campuses.

The institute has a well equiped library with a collection of over 30,000 volumes journals and other reading materials.

A vast play ground comprising of an athletic track, fields for football, hockey, courts for lawn tennis, volley ball and badminton are available to provide outdoor sports facilities for the students and residents of the campus.

DEPARTMENTS :

1. Applied Sciences
2. Civil Engineering
3. Computer Science and Engineering
4. Continuing Education and Distance Learning
5. Curriculum Development
6. Education and Educational Management
7. Educational Television Centre

8.   Electrical Engineering

9.   Electronic and Communication engineering

10. Electronics Service Centre

11. Entrepreneurship Development and Industrial Coordination

12. Information Management and Co-ordination

13. Mechanical Engineering

14. Media Centre

15. Rural Development

THE PROGRAMME :

The institute having covered the target population of Diploma holding teachers, trained about 610 teachers through long -term programmes of one and half to two and half years' duration leading to Diploma in Technical Teaching (Dip. TT), during the period 1967 - 1982. These programmes were discontinued in 1982. Presently the institute has a sanction to admit 60 technical teachers and industry professionals, per year, in its four Master's degree industry professionals, per year, in its four Master's degree programmes. 165 teachers have undergone the Master's degree programmes till March 1997.

The Post Graduate Certificate Course in "Information Technology" has also been well received by the general public and about 60 students are admitted every year on the full time and part time modes. The Advanced Certificate Course in Educational Technology and Management areas is offered through distance cum contact mode and attracts a large number of technical teachers and working professionals.

The Institutes conducts, on an average, 120 - 140 short term training programmes of 01.06 weeks duration that account for over 6000 person - weeks of training of technical teachers and working professionals, every year.

Need-based, on-the-job training is also provided to over 600 teachers in about 10% of the polytechnics in the region, identified as Centres of Excellence.

The Institute has, in addition, conducted a number of sub-regional and In-country programmes in collaboration with the Colombo Plan Staff College for Technician Education, Manila Phillippines.

The Institute has conducted a number of training programmes for developing countries such as Iran, Pakistan, Bangladesh, Somalia, Nigeria, Ethiopia and Yemen, both at the Institute and locations abroad. Such programmes are sponsored by international agencies like UNESCO, UNDP and Educational Consultants India Limited (Ed.CIL).

Faculty support of the Institute is provided to other training organization like Punjab University, State Departments of Public Administration, Commonwealth Asia and Pacific Youth Centre etc.

The institute, has designed and periodically reviewed over 90 curricula in the conventional and new and emerging technology areas as per needs expressed by clients.

Many curricula have been re-designed and are now offered on the Multi-point Entry and Credit System pattern as well as through Distance Learning mode, in a number of states in the region.

To improve relevance of the programmes offered in the polytechnics, the Institute established Curriculum Development Centre in 1971. The Centre undertook the responsibility of systematic curriculum development for the states of the northern region. Over a period of time, the Institute has developed a methodology for systematic curriculum design, development, evaluation and review and has been rendering services to the states in the region in the design of new curricula and evaluation and revision of the existing curricula. Effective implementation of the curricula developed or revised required reorientation and retraining of teachers. To accomplish this, the institute started offering from 1971, short term training programmes of duration varying from 1 to 6 weeks in the areas of engineering and technology, pedagogy and educational management. Introduction of new curricula also created the need for relevant instructional materials for which purpose, the institute embarked upon a major programme of developing, using and disseminating a variety of print and non-print instructional materials. For this a media centre was established in 1981. The media centre started training the polytechnic teachers in the preparation and use of print and non print instructional materials. It also started producing these instructional materials in collaboration with polytechnic teachers and other experts. These instructional materials were disseminated widely to polytechnics all over the country.

The National Policy on Education (NPE) 1986, laid special emphasis on providing continuing education facilities for the working professionals. The institute, in 1988, took up the continuing education project sponsored by Indian Society for Technical Education (ISTE) / MHRD. The main objectives were to develop need-based print and non print instructional materials and to plan and organize Continuing Education Programmes to meet the vast retraining requirements of industry personnel and to assist the states and polytechnics in setting up and operationalising continuing education centres and departments respectively.

In 1992, the institute started two Master's degrees programmes in the areas of "Engineering Education" and "Manufacturing Technology". Two more Master's degree programmes on "Construction Technology and Management" and "Computer Science and Engineering" were started in 1994. In 1998, the Institute has started two more ME programmes viz "Electronics and Communication Engineering" and "Instrumentation and Control". These programmes are specially tailored to the needs of polytechnic teachers and professionals from industry and have a perceptible bias towards industrial / field practices.

OBJECTIVES OF THE INSTITUTE :

–   To provide professional training for teaching engineering and technology subjects;

–   To provide for continuous improvement in instruction and research in such branches of engineering and technology as the society may think fit and to provide for the advancement of learning and dissemination of knowledge in the

branches;

- To arrange for practical training in industries on a co-operative education plan.

OPERATIONAL OBJECTIVES :

- To train teachers of diploma institutions through long, modular and short courses;
- To foster and promote research in :
    * Improving classroom and laboratory techniques;
    * Developing understanding of teaching; and
    * All aspects of curriculum development and testing.
- To prepare and supply, wherever necessary teaching aids, instructional material including filmstrips, technical films and other aids to polytechnics.
- To associate the institute with councils and other academic bodies of technical education in the region, regarding curriculum development, admission procedures and examination reforms;
- To collaborate with institutes and / or with institutes and / or organizations in India and abroad that have similar objectives and functions;
- To take initiative in improving polytechnic education; and
- To collaborate with industries in the region in formulating training programmes of mutual interest.

To meet the variety of needs of the polytechnic education system and to initiate and implement quality improvement prospects at the state and polytechnic levels, the institute presently undertakes a number of activities which can be categorised as :

STAFF DEVELOPMENT :

A variety of training programmes are offered for updating and upgrading polytechnic teachers and administrators such as :

Master's degree programmes of 18 months duration in Engineering Education, Manufacturing Technology, Construction Technology and Management and Computer Sciences and Engineering.

Short term training programmes of 1-6 weeks duration in new and emerging technology areas, pedagogical areas, educational management, curriculum development, educational technology, entrepreneurship development, rural development etc.

Induction programmes for newly recruited teachers in the system. In addition, the institute offers (i) 8 months full time and 12 months part time Post Graduate Certificate Course in Information Technology, and (ii) Advanced Level Certificate Courses in (a) Educational Management and (b) Educational Technology through distance - cum - contact mode.

CURRICULUM DEVELOPMENT :

The institute has developed a systematic methodology to design and develop curricula for diploma programmes. The activities undertaken include :
- Design of curricula for engineering and non-engineering courses to be introduced in polytechnics;

A distinct contribution of the institute has been to introduce aspects of computer, education, linking instructional process with the world of work, environmental awareness, entrepreneurship development and independent self study as an inbuilt component of the curriculum.

A number of Memoranda of Understanding have been entered into, with Universities like Rohilkhand and TIET Patiala (Deemed University) and industrial organizations like Computer Maintenance Corporation of India, PHDCCI etc. with an ulterior motive of improving the academic environment by way of mutual faculty support and involvement in promotional activities.

The Institute over the years has developed a number of print materials such as textbooks, laboratory manuals, Teacher manuals, modules, workbooks, data books and other materials which have been widely disseminated to the technical education system and industry. The institute has also developed a number of computer assisted learning packages, video programmes, experimental kits training boards and other multi media learning packages for improving the instructional process in technical institutions.

The Institute has under taken research and development projects for specific needs of technical education system as well as industry. The areas for research and development include technology, Management, Educational Technology, Industrial Process and Practices, Entrepreneurship, Appropriate Technology, Institutional and System Development etc.

The Institute has rendered extension services to technical education system and industry by way of improving the instructional processes, development of infrastructure facilities by taking collaborative projects for development of laboratories and workshops etc. setting up new structures (centres/cells) and by improving efficiency of industrial processes.

The Institutes has played a very significant role in planning and implementation of a major project of the Government of India on "Strengthening Technician Education in India" with the assistance of the World Bank. The Institute has assisted six States of the northern region covered under the project in the preparation of their detailed project reports and implementation, of the new scheme like introduction of new programmes and courses, modernization of laboratories and workshops, setting up computer centres, introduction of flexibility, staff development, strengthening directorates and boards of technical education etc.

The Institute has also rendered assistance to states towards enabling then to develop mechanism for obtaining record of performance of polytechnic pass outs in the employment sector.

The Institute has undertaken a number of consultancy projects for the industry and other organizations through customised, tailor-made programmes for working professionals in the areas of engineering and technology like new engineering material, instrumentation and control, industrial electronics, construction management etc.), management entrepreneurship development.

More specifically training programmes have been offered for upgrading the knowledge and skills of personnel at shop floor and different levels of management, development of managerial skills such as communication, teachership, motivation, conflict management, management of change, and total quality management etc. Programmes have also been offered on awareness of computer application, entrepreneurship development, rural development including manpower development and transfer of technology. Besides, the Institute has offered a number of programmes for training of trainers and for supervisory development.

Over the years, TTTI, Chandigarh has made significant contribution in brining about improvement in the technician education system. The institute has also assisted in policy formulation at the national and state levels for the growth and development of technical education in the country. The Institute is poised for achieving still higher levels of performance in the years to come.

(II) LOOKING AHEAD

THE PERSPECTIVE :

The dawn of nineties witnessed phenomenal changes in the technological, economic, social and political dimensions in the environment. These factors do have a profound impact on the technician education system and consequently on the scope and range of services offered by the institute to the system. One of the important concerns of the institute would focus on how to assist the clientele on the vital aspect of sustaining the gains of infrastructure created for technical education system.

Considering the changes taking place in the environment and the future trend, the institute needs to focus on the following activities to fulfil its mission to promote excellence in the technician education and industry :

• Change in the industrial and fiscal policies of the Government of India and globalisation of Indian economy and promotion of privatisation will call for immense changes for the knowledge and skill profiles of technicians and their attitudes towards their proficiency. In order to make these changes possible, the institute has to envision and implement training programmes in newer areas of technology through new format of programme offering and resort to distance learning mode wherever possible as well as through use of advancement in educational technology like interactive teaching learning, so as to increase the reach and cover a larger number of teachers and professionals from industries.

• The institute proposes to take up Data base and MIS for scientific planning of technician education.

• The institute would offer more induction programmes for technical teachers both at the degree and diploma levels of education.

- The education system in general is facing resource crunch and hence all institutions need to offer a wide range of innovative courses and services to other systems and professional agencies to generate resources of their own. The institute proposes to conduct more number of need-based programme for the industry and also for general public in the areas of interest to them.

- The instructional delivery system in technical institutes and also at the TTTI, needs to undergo considerable change for effective teaching learning. The crucial elements for making such changes possible are the availability of high tech instructional resources like interactive educational video programmes, computer aided learning packages and multi media software. The institute proposes to lay great emphasis in this area and make pioneering efforts to effect these changes in technical education.

- While considerable work has been done in the area of curriculum development including design of curricula in new and emerging areas and revision of existing curricula, there is considerable scope for improving the existing system of examination. In the years to come, the institute proposes to render assistance to the states in revamping the entire system of students' evaluation with emphasis on achievement of competencies.

- The institute during the last 30 years has been able to establish purposeful and beneficial links with industry and confederations of industries both at the regional and national level. The institute has also made considerable efforts to promote industry institute interaction between technical institutions and the industry around. There is yet considerable work to be done in this area and the institute proposes to put in concerted efforts through developing and implementing models through Research and Development, to bring industry and technical institutions closer so that the involvement of industry is that of an equal partner in the management and training process in technical institutions.

- Technical institutions have for a long time remained isolated from the community around while the scheme of community polytechnics started two decades back has been able to achieve limited success in the areas of manpower development, transfer of technology and technical services; much more needs to be done in technical education in this area. The institute proposes to undertake, on a priority basis, promotion of technical services to the community by technical institutions in a more systematic and organised way.

- The institute proposes to intensify its activities in the area of research concerning the various aspects of technical education and technology in collaboration with technical institutions and industry. The institute will also intensify its activities to promote research in technical insti-

tutions by taking up need based collaborative approaches by developing and implementing models through Research and Development for Autonomy to polytechnics, Examination system etc. The institute is endowed with dedicated faculty and staff whose untiring efforts have enabled it to rise to its present stature. The institute looks to the future challenges of striving to achieve even greater heights of excellence with confidence and pragmatism.

Towards the realisation of the future vision especially with reference to technician education, the institute envisages that in time to come, the Technical Teachers Scheme under Quality Improvement Programme (QIP) (which was launched by the Government of India in mid-sixties) for engineering college teachers, would be revived and the institute would be a Centre under QIP for polytechnic teachers. Such a situation would provide the much needed help to motivate the polytechnic teachers for their active involvement in the process of qualitative improvement of technician education.

DEVELOPING POLYTECHNICS AS CENTRES OF EXCELLENCE :

In times to come the institute envisages a radical change in the work culture of the polytechnics through Centres of Excellence, at selected polytechnics in the country. This would be possible only through a concrete effort made to first internalise the developmental activities at the identified Centres of Excellence and thereafter disseminate the gains to all the institutions of the state through a network approach; in addition, the institute would be required to introduce use of high technology in the instructional process e.g. interactive video CAI packages, multi-media etc. and provide on-the-job training at these centres for development and use. Besides the above, the efforts of the institute would be directed towards making these Centres reliant in the matters of self reliant contribution to developing curriculum, learning resources and undertaking research for own problem solving.

APPLICATION OF 'IT' TOOLS :

Computer Science Department of TTTI, Chandigarh is exploiting IT tools quite effectively in its academic activities. With the present infrastructure and facilities, the institute plans to set up its own web server to advertise its presence globally.

CURRICULUM DEVELOPMENT :

The future perspective of Curriculum Development Centre will be to:

- Prepare model curricula in emerging areas of technology.

- Promote the concept of Cooperative Technician Education.

- Promote flexibility in programme offering by way of introducing Multi Point Entry and Credit System (MPECS).

- Promote development of information resources at the state and polytechnic level for effective curriculum processes.

- Undertake research in the field of Curriculum Development includ-

ing evaluation.

- Conduct certificate / diploma programmes in Curriculum for Development for developing countries.

STRENGTHENING INDUSTRY - INSTITUTION INTERACTION (III) AND PROMOTING ENTREPRENEURSHIP :

The future vision for III Entrepreneurship Development can be indicated as :

- Developing network with industry and technical institutions for interaction and transfer of information and data instantaneously.

- Promoting the concept of technical education as a collaborative venture between technical institutions and industry.

- Emphasising skill training and field application.

- Undertaking collaborative research and continuous improvement projects.

- Training and empowering the people.

- Re-orienting technical education to promote entrepreneurship among students; and

- Achieving excellence in Industry Institute Interaction to improve the quality of technical trained manpower.

CONTINUOUS EDUCATION (CE) :

It may be stated that future of Indian Industry and Polytechnics / Engineering Institutions lies in development of world class technical manpower through continuing education, using flexible delivery systems, incorporating latest information technology and education media alongwith conventional effective learning print media. No industry or engineering institution would be able to survive the competitive world market without effective development of technical manpower. CE is the answer to the present and future challenges.

DISTANCE LEARNING :

The cell, at present, is offering the following programmes on flexible and modularized pattern with credit based evaluation :

Advanced Certificate Course in 'Educational Technology'. Advanced Certificate Course in Educational Management, and Certificate Course in 'Education Technology' for instructors of ITIs.

Another programme which is being planned is 'Research in Technical Education'. In the years to come the cell intends to offer courses in a variety of areas including engineering and technology.

RURAL DEVELOPMENT :

A Regional Information Centre is on the anvil and is likely to be established shortly for disseminating the information of various appropriate technologies and creating data base for rural development activities.

MASTER DEGREE PROGRAMMES :

In addition to the four present M.E. programme, the following programmes are likely to be launched in the near fu-

ture :

1. M.E. in Instrumentation and Control (Industry Orienter and Practice based).

2. M.E. in electronics and Communication (Industry Oriented and Practice based).

3. Master of Business Administration.

In the years to come TTTI, Chandigarh will be leader for the integrated development of world class technical education system through teacher education, research and development and consultancy consistent with the needs of industry and community.

★