TECHNICAL TEACHERS TRAINING INSTITUTE, BHOPAL

PROF. S. K. SONI

PREAMBLE -

Govt. of India established four Technical Teachers' Training Institutes in the country in 1965. For Western region the institute was located at Bhopal. It initially started functioning in the premises of S. V. Polytechnic Bhopal. In 1977 it had its own campus. Fig 1.1 shows jurisdiction of this regional institute and details of each state.

Fig 1.2 depicts organizational structure. Through the years of working with the state system TTTI Bhopal has believed in project approach. Interdisciplinary task group structure is evolved for effective functioning. Project approach ensures visible outcome and impact on the system. Recognizing the need and importance of highly qualified resource persons in the educational field TTTI Bhopal designed and started Masters Programme in Technical Education [M.Tech. (Ed.)] in 1986 which is approved by Govt. of India and AICTE. This is the unique programme in the country. Many states (even outside the region) are taking advantage of the M.Tech. (Ed.) programme.

In 1991, Govt. of India launched World Bank Assisted Project for the development of Technician Education System in the country. The institute was actively involved in preparation of the project at national level. For smooth functioning matrix structure was introduced to account for project components and departmental structure. Fig. 1.3 shows Matrix Structure.

We received a questionnaire from the editor and responses have been provided in detail. These responses would reveal our contributions and our future perspective.

---

1. TO WHAT EXTENT, STATES IN YOUR REGION PERCEIVE AND PLAN THEIR TRAINING NEEDS ?

In all the States in our region i.e. Gujarat, Goa, Madhya Pradesh and Maharashtra, the World Bank Assisted Project for Strengthening Technician Education has been implemented. Un-

Incharge Principal, TTTI, Bhopal.

der the project, in each polytechnic a Staff Development (SD) Cell under Polytechnic *Project* Implementation Unit (PPIU) has been established. One of the functions of SD Cell has been to perceive and plan the training needs of the faculty of the polytechnics. These training needs are being considered at two levels:

(i) individual training needs; and

(ii) institutional training needs.

Institutional training needs have been primarily focussed on various components of the World Bank Project, whereas individual training needs have been concerned with those areas in which individual teachers needed inputs to improve their teaching performance. These polytechnic training needs usually are being sent to State Project Implementation Units (SPIUs) where total State needs are perceived and total annual plan is being made.

Interaction occurs between TTTI faculty and SPIU coordinator and coordinators of various important World Bank Assisted Project sub-components in the States in the months of November /December. During this interaction meeting, TTTI Calendar for a year is planned to cater for the perceived needs.

Any special and immediate needs perceived by the State Directorates, Boards and SPIUs during the year are also negotiated with TTTI and programmes are planned to cater to these needs.

Thus, at present, a fairly scientific system exists in the States to perceive the needs and plan for catering to the needs.

2. WHAT MECHANISM ARE EXISTS IN THE STATES TO ENSURE THAT THE TRAINING IMPARTED IS USED EFFECTIVELY IN POLYTECHNICS ?

At present a number of mechanisms are existing in the States and Polytechnics to ensure that the training imparted is put to effective use. These mechanisms are as follows :

1. Whenever faculty members are trained for any specific work like curriculum development, continuing education, distance education, industry institute interaction, rural development, instructional material development etc., they are usually used as resource persons for these activities by TTTI, Directorate, Board, Curriculum Development Centre (CDC), Continuing Education Centre (CEC), Learning Resource Development Centre (LRDC), Learning Resource Users Centre (LRUC), Industry- Institute-Interaction Cell, Industry and Polytechnic depending upon the requirement.
2. In certain sub-components of the project, the States send monitoring teams to the polytechnics. One of the purposes of these monitoring teams is to see whether persons trained for that project are making use of the training effectively.
3. In some polytechnics, internal monitoring teams have been formed for monitoring some of components of the project including staff development.
4. PPIU in each polytechnic maintains

records of staff development. Some PPIUs also try to ensure the utilization of training.

3. WHAT IS THE QUALITATIVE IMPACT OF WORLD BANK ASSISTED PROJECT ON THE STATES IN YOUR REGION ? WHAT MORE NEEDS TO BE DONE ?

Some indicators for the qualitative impact of World Bank Assisted Project on the States in the region are as follows:

1. In all the States in the region Curriculum Development Centres (CDCs) have been established. Most of the curricula have been revised and new curricula developed considering the industry needs and involving industry in the process of curriculum development.

   Curriculum Development in Gujarat has started using still (intellectual as well and motor) model. A large number of industries have contributed in identifying the skills required for a technician.

   Autonomous polytechnics of Maharashtra have undertaken curriculum development activity on their own. St. Xavier's Polytechnic, Mumbai, has undertaken curriculum development in hitech. areas on competency based model. All the autonomous polytechnics are now able to introduce quick changes in curriculum depending upon the needs of industries.

2. All the State in the region have started using Multipoint Entry and Credit System (MPECS) approach. All curricula in Gujrat use MPECS approach. There are a number of institutions in Gujarat where students are able to complete the diploma programme in 2 or 2 and half years instead of 3 years because they are able to get credit for higher entry level and / or registration for more courses because of better performance. Flexibility has been brought in most of the programmes in the States in the region so that students have choice to choose subjects they desire. Autonomous polytechnics of Maharashtra have introduced Multipoint Entry and Credit System (MPECS). In Madhya Pradesh, initially MPECS was introduced in selected programmes in a few polytechnics. It has now been extended to more polytechnics.

3. In Maharashtra the concept of Lead Centres has been adopted. A number of polytechnics have been identified as Lead Centres and they coordinate and undertake many activities including staff development for surrounding polytechnics.

4. A large number of new teachers in the regional States have undergone Induction Training. Classroom competence of these teachers has increased as a consequence of Induction Training and there is some evidence that classroom instruction has improved in the polytechnics.

5. Most of the new teachers, some old teachers and some laboratory / workshop instructors have also un-

dergone industrial training. There is some evidence that due to this, teachers have started using industry experiences in their classroom and laboratory teaching. Also industry - institute interaction has improved.

6. Industry - Institute Interaction Cells have been established in all polytechnics. In general, industry - institute interaction has improved in the polytechnics and States. Industry has become a real stake holder in polytechnic education. Curriculum development and continuing education activities are being undertaken in the States with fairly close interaction with the industry. Industry is also using the polytechnic services for continuing education, testing, collaboration of equipment and some consultancy. Industry is also supporting polytechnic education by supporting faculty training, supporting staff training, students training, students industry visits, campus interviews, participation as guest lecturers etc. Concept of "Care Taker Industry" has come in some Autonomous Polytechnics of Maharashtra. Care Taker Industry takes care of all industry related needs of that polytechnic.

7. Continuing Education Centre (CEC) and Continuing Education Departments (CEDs) have been established centrally and / or in some polytechnics in the region. Continuing education for industry personnel and others has been undertaken by many polytechnics in the region. This has increased their outreach and also resulted in internal revenue generation and closer interaction with industry.

8. In Gujarat, Continuing Education Centre (CEC) has launched diploma programmes in civil, electrical and mechanical engineering in distance mode. A large number of persons working in industry have been able to get benefit out of this programme. High quality course material have been developed for about 120 courses. Course materials developed are being used by regular students also as they find these very useful. All the polytechnics are functioning as study centres for these students. Thus polytechnics have increased their outreach.

9. New hi-tech laboratories have been developed in many polytechnics. Also modern equipment have been acquired in most of the polytechnics. Students are thus getting benefit of using modern and hi-tech equipment.

10. Computer Centres have been established or strengthened in most of the polytechnics. Most of the students in the polytechnics are now getting some exposure to computer. In many polytechnics, courses related to computers have also been launched. Many office activities have been computerised in the polytechnics. Also computerised MIS have been introduced.

11. In many polytechnics new labora-

tory experiments have been planned and laboratory sheets have been prepared based on new equipment. Laboratory manuals have been developed for many laboratories in various programmes in all the States and are being used by students for their laboratory work.

12. Learning Resource Developments Centres (LRDCs) have been established in all the States of the region. These LRDCs have developed a variety of media for many courses and programmes. Media include OHP Transparency sets, models, course materials in print, laboratory manuals etc. These materials are being used by teachers as well as students.
13. Learning Resources Utilization Centres (LRUCs) have been established in many polytechnics in the region. In LRUCs facilities for self learning have been created. It is reproted that students have started making use of self learning facilities to some extent. LRUCs also look after media hardware in the polytechnics and also make arrangements to acquire required software. A number of relevant video programmes have been acquired by LRUCs and these are being used by students and teachers. Efforts are also being made to acquire computer assisted learning material by the polytechnics.
14. In Maharashtra, 12 government polytechnics have become autonomous. Autonomy has provided faster pace of growth in these polytechnics in all dimensions of their working, including developing their own curricula, interacting with industries and conducting their own examinations and certification.
15. Most polytechnics have computerized MIS which is being made use for managing various activities of the polytechnics.
16. Women participation in the diploma programme has increased considerably in all regional States. Women-wings in existing polytechnics have been opened.
17. Hostel facilities for women students have been especially created in some of the polytechnics.

Though the project has resulted in quality improvement in many facets of polytechnic working, a lot of ground is still to be covered. Some of the directions in which work is to continue are as follows :

1. Sustenance of the gains of the project has to be strengthened.
2. More and more polytechnics have to become autonomous so that they can take their own decisions. Existing autonomous polytechnics have to enhance their capability of using autonomy. Decentralisation of decisions and enhancing polytechnic scope for independent and responsive action can only occur through greater spread of autonomy.
3. Curriculum review has to be an on going process for existing curricula.

Industry participation in curriculum development activity has to continue and increase. Most of the new curricula have to start using competency based or skill based model. Skill and competency identification has to occur in areas in which it has not been done. Examination systems has to change to take care of introduction of competency based or skill based approach. Philosophy of multipoint *entry and credit system (MPECS)* has to percolate further and it has to be used in right spirit. Curricula developed have to provided much more flexibility than what is existing.

4. Though industry - institute interaction has improved, all polytechnics have to work towards it. All polytechnics have to undertake continuing education activity so as to increase their outreach.
5. Quality of training of students has to further improve by integrating self learning, introducing newer methods of teaching and learning, and use of a variety of media and group oriented methods.
6. Industry has to participate much more closely with the education and training of students by providing them training facilities and creating models for industry to work as laboratory, and for relevant student project work.
7. New equipment which have been received in institutions have to be used by designing new and innovative laboratory experiences using these equipment.
8. Development of variety of learning resources has to be undertaken by various LRDCs and their usage has to increase in the polytechnics.
9. All students have to get exposure on the usage of computers.
10. Continuing support from State level infrastructures for the benefit of polytechnics and students is required.
11. Employment of polytechnic passouts and their placement needs more focussed approach.
12. System capability to undertake further changes has been created. But the policies and initiatives to ensure these developments have to be considered urgently to take full advantage.

4. WHAT ARE YOUR FUTURE PLANS TO ENHANCE THE QUALITY OF POLYTECHNIC EDUCATION SYSTEM ?

Future plans of TTTI Bhopal to enhance the quality of polytechnic education system include continuing to undertake projects for improvement of the quality and organise programmes and workshops in various areas in which it is already working. Some areas in which TTTI Bhopal envisages to undertake projects in future and work on projects in hand are :

- Sustaining gains of the World Bank Project.
- Supporting state infrastructures

(Directorate, Board, SPIU, CDC, LRDC, CEC, IIIC etc.)

- Supporting polytechnics infrastructures (PPIU, SD Cell, Lead Centre, LRUC IIIC, CED etc.)
- Development of Centres of Excellence in the States.
- Grant of autonomy to as many polytechnics as possible.
- Introduction of competency based model of technician education in as many polytechnics as possible.
- Increasing further industry - institution interaction.
- Extension of 'caretaker industry' concept to many more polytechnics.
- Trying of networking strategies for staff development in polytechnics.
- Diffusion of experimentations in flexibility in curriculum, laboratory innovations, student assessment, employment of passouts, resources mobilization, continuing education, distance education.
- Enhancing image / status of the polytechnics by bringing in concept of technician degree in the polytechnics.
- Training of polytechnic faculty so that they can increase their internal revenue generation by consultancy and other means.
- Student employability enhancement.
- Working towards development of computer assisted learning packages.
- On line learning by offering courses on internet and by other distance mode like video conferencing.
- Participating in policy formulations at Govt. of India, AICTE and State Government levels.

5. WHAT ARE MAJOR PROBLEMS FACED BY TTTI IN IMPLEMENTATION OF THEIR SCHEMES ?

1. Need of staff development is still questioned by many teachers and even administrators. This is because there is no clear cut staff development policy. Due to this many persons who need training do not come for training, but those who don't need training are sent for training.
2. Though mechanisms for training needs identification have been established in the polytechnic in States, these require fine tuning.
3. Due to busy schedule and engagement of faculty in the polytechnics, many a time faculty members who are identified for attending a programme are not able to attend the programme and the programme gets cancelled.
4. Faculty shortage in polytechnics, delays in filling up vacancies, adhoc teacher appointments for very brief periods render staff development endeavours difficult to plan and implement.
5. Excessive centralisation of decision making in States result in delays in sanctions and approval.

6. As a large number of polytechnics are to be served, TTTI at times is unable to deal with individual polytechnics problems.
7. TTTI has been catering to the requirement of government and aided polytechnics of the region, which were also covered under WBAP. However, during the last couple of years many more polytechnics have come up under private sector. These polytechnics are also producing diploma holders. A process to cater to the requirement of these polytechnics need to be established so that they also give quality education.
8. There is inadequate realisation about data-based management and research based development in the States.

6. WHAT WOULD BE THE CONCLUSION / REMARKS, IF AN ACADEMIC AND SOCIAL AUDIT IS CARRIED OUT ON THE ACTIVITIES OF YOUR TTTI, SAY OVER A PERIOD OF LAST 5 YEARS ?

Our perceived conclusions / remarks if an academic and social audit is carried out on the activities of TTTI Bhopal will be as follows :

1. It has brought in policy support for technician education in the country by influencing Government of India, AICTE, State Governments, Industry and other Stake holders of the system.
2. It has propagated new ideas, models and innovations in the technician education system in India. These ideas, models and innovation relate to curriculum development, industry - institute interaction, laboratory innovations, examination reforms, instructional resource development, continuing education, distance education, institutional autonomy etc. Many of these have been adopted by different states.
3. By its Master of Technical Education Programme and resource persons development programmes, it has provided a cadre of resources persons to the states who are undertaking responsibilities which are much different than the normal responsibilities of teachers. These resource persons are also functioning as agents of change in the states. Many staff development activities which were being done by TTTI Bhopal are being done by States with the help of these resource persons.
4. By establishing linkages with industry, it has increased its own outreach and has brought to limelight capabilities of polytechnics. It has also developed successfully models of industry - institution interaction which can be adopted or adapted by polytechnics.
5. By supporting Community Polytechnics thrust in the polytechnics, it has increased social outreach of the polytechnics. Also by involving polytechnics in Rajiv Gandhi Drinking Water Mission Project, it

has further enhanced the capability and outreach of polytechnics.

6. By bringing in the component of monitoring and research in many of the projects and programmes and involving polytechnic faculty in the monitoring and collection of data, it has brought in a culture of action research in the polytechnics.
7. By providing exposure to the polytechnic faculty in various methods and media and involving them in development of different types of media, it has brought out lot of improvements in the process of curriculum implementation.
8. By projecting feasibility of distance education for technician education system, it has established a successful model of distance education in technician education and also provided a viable alternative to establishing new polytechnics which is an expensive proposition.

7. WHAT ARE THE SPECIALITIES OF YOUR TTTI OVER THE OTHER TTTIs IN THE COUNTRY ?

Some of the special features of TTTI Bhopal are as follows :

1. It follows project method of working. Inter disciplinary teams are normally formed for these projects. Team work of the institute is specially remarkable. Usually staff development programme are those programmes which become part of a particular project. In a project, necessary guideline documents are prepared in the beginning, resource persons and other faculty are trained as per need of the project, and project is implemented in the polytechnics or the state. Project is continuously monitored and necessary changes are made.
2. TTTI Bhopal has taken lead in bringing in Multipoint Entry and Credit System and flexibility in curriculum concepts and also bringing in concepts of skill based and competency based curricula.
3. TTTI Bhopal has given models of autonomy which have been further refined by states and implemented.
4. TTTI Bhopal has given models of induction training, industrial training of teachers, continuing education, industry-institute interaction and distance education which are being successfully implemented in the States.
5. TTTI Bhopal works in close collaboration with client States, their infrastructures and polytechnics.
6. TTTI Bhopal has very close collaboration with industries, including industry organizations. It also does a number of projects for industry.
7. TTTI Bhopal is developing video programmes for the system. It has also undertaken the work of developing Computer Based training (CBT) packages.
8. TTTI Bhopal has close linkages with Barkatullah University, Bhopal. University has created a Faculty of Technical education solely for TTTI Bhopal. TTTI

Bhopal has been running Master of Technical Education (M.Tech.Ed.) Programme under the Faculty since 1985.

9. TTTI Bhopal has started Ph.D. programmes in the field of Technical Education. Already a number of students have registered for Ph.D.

8. DO YOU FEEL THAT RESEARCH IN ENGINEERING EDUCATION IS NEGLECTED / CASUALLY TAKEN / PROPERLY ATTENDED BY YOUR TTTI ? KINDLY ELABORATE.

Research in technical education is properly attended to by TTTI Bhopal. In all the programmes and projects, components of action and summative researches are normally in built. Over the years, our M.Tech. Ed. students have also conducted a number of researches in technical education.

TTTI Bhopal has begun offering Ph.D.. programmes under the Faculty of Technical Education.

9. NUMBER OF PROGRAMMES CONDUCTED BY YOU LEADING TO DIPLOMA, DEGREE IN ENGINEERING EDUCATION AND HOW MANY STUDENTS HAVE PASSED THESE FROM YOUR TTTI ?

Master of Technical Education (M.Tech.Ed.)

Number of Students Passed : 119

TTTI Bhopal at present, conducts induction programme for new teachers. Information about participation in these programme is as follows :

Year	No. of Programmes	No. of Participants	Participant Weeks
1994-95	12	295	1261 includes trainees of diploma prog. also
1995-96	12	314	1184
1996-97	13	260	951
1997-98	4	183	732

Short Courses / Workshops / Staff Development Programmes

A large number of such programmes are conducted every year. Information about participation for such programmes from polytechnic system is as follows :

Year	No. of Programmes	No. of Participants	Participant Weeks
1994-95	165	2732	355
1995-96	295	8323	8075
1996-97	256	5717	6535
1997-98	347	6802	7355

INFORMATION SHEET

1. Name of TTTI : Technical Teachers' Training Institute, Western Region, Shamla Hills, Bhopal.

2. Year of Establishment : 1956-66

3. No. of Extension Centres with their Address :
   1. TTTI Extension Centre, Govt. Polytechnic Campus, Ahmedabad 380 015. Gujarat.
   2. TTTI Extension Centre, Govt. Polytechnic For Distance Learning Building, Shivajinagar, Pune - 411 005.

4.(a) Name of the States being served :
   1. Goa
   2. Gujarat
   3. Madhya Pradesh
   4. Maharashtra

(b) No. of Polytechnics being served in region :

Govt.	Aided	Unaided
115	22	–

In addition, for M.Tech.Ed. and all Indian programme, all the polytechnics are served.

5. (a) Names of the Departments in the Institute and Number of Faculty members at present :

No.	Name of Deptt./Centre	Prof.	Asstt. Prof.	Lect.	Others	Total
1.	Civil Engg. Department	1	1	1	–	3
2.	Mechanical Engg. Deptt.	1	1	1	2	5
3.	Elect. Engg. Deptt.	1	1	1	–	3
4.	Computer Science Engg.	1	1	2	3	7
5.	Deptt. of Science	1	–	–	–	1
6.	Deptt. of Education	1	1	1	–	3
7.	Curriculum Development Centre	1	3	–	–	4
8.	Centre for Continuing Education and Distance Learning	–	2	–	–	2
9.	Centre for Measurement and Evaluation	2	2	–	–	4
10.	Centre for Educational Research	1	1	–	1	3
11.	Centre for Educational Management	1	2	–	–	3
12.	Industrial Liaison Centre	1	2	–	–	3
13.	Media Research and Development Centre	2	3	–	3	8
14.	Rural Development Centre	1	1	–	–	2
15.	MIS	–	–	–	1	1
16.	Extension Centre	1	1	–	–	2
		15	21	6	10	52

(b) How many of these are ladies ?

Professors	Asstt. Prof.	Lect.	Others	Total
1	5	2	1	9

6. Physical facilities :

i) Campus area	:	14.55 Hectares
ii) Built up area of Institute	:	4573 m^2
iii) Hostel Capacity	:	Gents : 112
		Ladies : 30

7. Library facilities :

i) Area	:	308 m^2
ii) Number of books	:	27753
iii) No. of Journals subscribed	:	55

8. Number of laboratories with their names :
   1. Mechanical Engineering Laboratory (General)
   2. CNC Laboratory
   3. Electrical Engineering Laboratory
   4. Electronics Engineering Laboratory
   5. Microprocessor Laboratory
   6. Civil Engineering Laboratory
   7. Energy Laboratory
   8. Computer Laboratory
   9. Education Laboratory
   10. Education Technology Laboratory
   11. Microteaching Laboratory
   12. Video Production Centre
   13. Interactive Media Centre
   14. Work Centre
   15. Model Room.
9. Number of research students on roll (1998-99 : 7 already registered for Ph.D. + 8 (due for registration soon).
10. Title of topics of research on Engineering Education in the current year 1998-99 :

Institute Researches :

1. Role of Technicians in new technologies.
2. Training needs of polytechnics teachers and technicians in using modern equipment.
3. Enhancing participation of women in technical education.
4. Development of a system for polytechnic passout employment.
5. A study of student assignments and tutor comments on assignments for distance learning polytechnics in Gujarat.
6. A snap study on the effectiveness of induction programmes.
7. Alternative funding patterns in autonomous polytechnics.
8. A national study on enhancing employability of women passouts from polytechnics.
9. Use of learning resources in polytechnics.
10. Patterns of interaction with industry in selected polytechnics.
11. Study of assessment and examina-

tion related skills and competencies.

12. A study of staff development plans designed and implemented and their effect on the performance of polytechnic teachers.
13. A snap study of impact of World Bank Assisted Project on employability of passouts.
14. Tracer study on employment status of polytechnics.
15. Impact Studies of World Bank Assisted Project in the areas of -

    (a) Internal Revenue Generation.

    (b) Employment status of polytechnic passouts.

    (c) New equipment purchased, utilization and impact on students.

    (d) Utilization of computers centres.

    (e) Utilization of Learning Resource Users' Centres (LRUCs).

    (f) Continuing Education Centres / Continuing Education Departments / Continuing Education Activity in Polytechnics.

    (g) Staff development (short term programmes).

    (h) Industrial training experiences of polytechnic teachers.

    (i) Curriculum development.

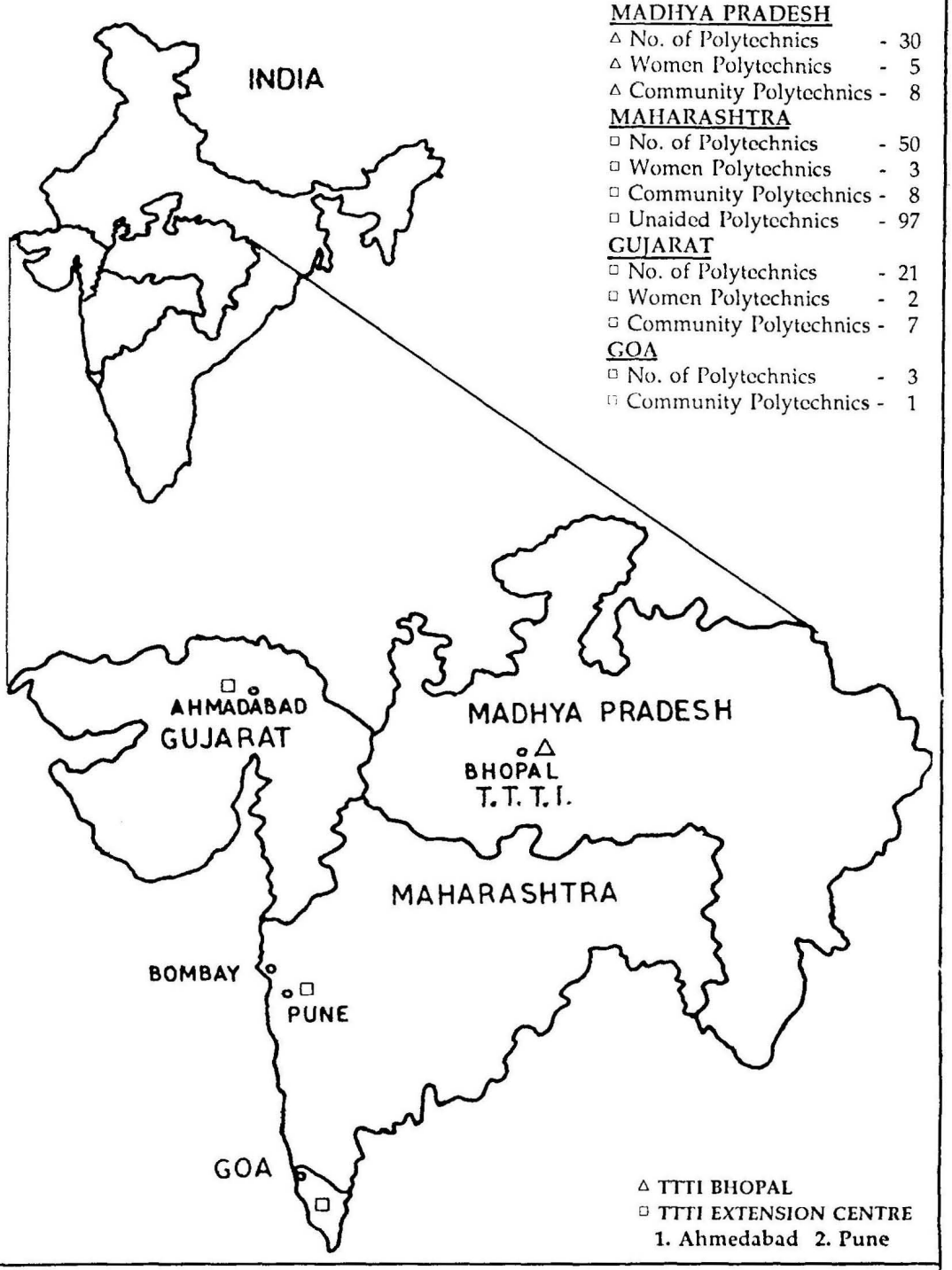
    (j) Distance Learning Programmes.

Ph.D. Researchers :

1. A critical study of quality management factors in use of autonomous polytechnic in Maharashtra.
2. Developing appropriate strategies for effective implementation of competency based curriculum.
3. Reengineering technician education programmes for labour market orientation through competency based curriculum development in polytechnics.
4. Evolving industry institute interaction strategies for evaluating quality of polytechnic passouts.
5. A critical study of initiatives for continuing education and training in industries.
6. Evolving models of participatory governance and internal management of polytechnics.
7. Design of strategies for effective implementation of curriculum in autonomous polytechnics.
8. A critical study of optimum utilisation and sharing of resources in multi-level financing technical institutions of Maharashtra.

★

FIG. 1.1 : T.T.T.I. BHOPAL & WESTERN REGIONAL STATES



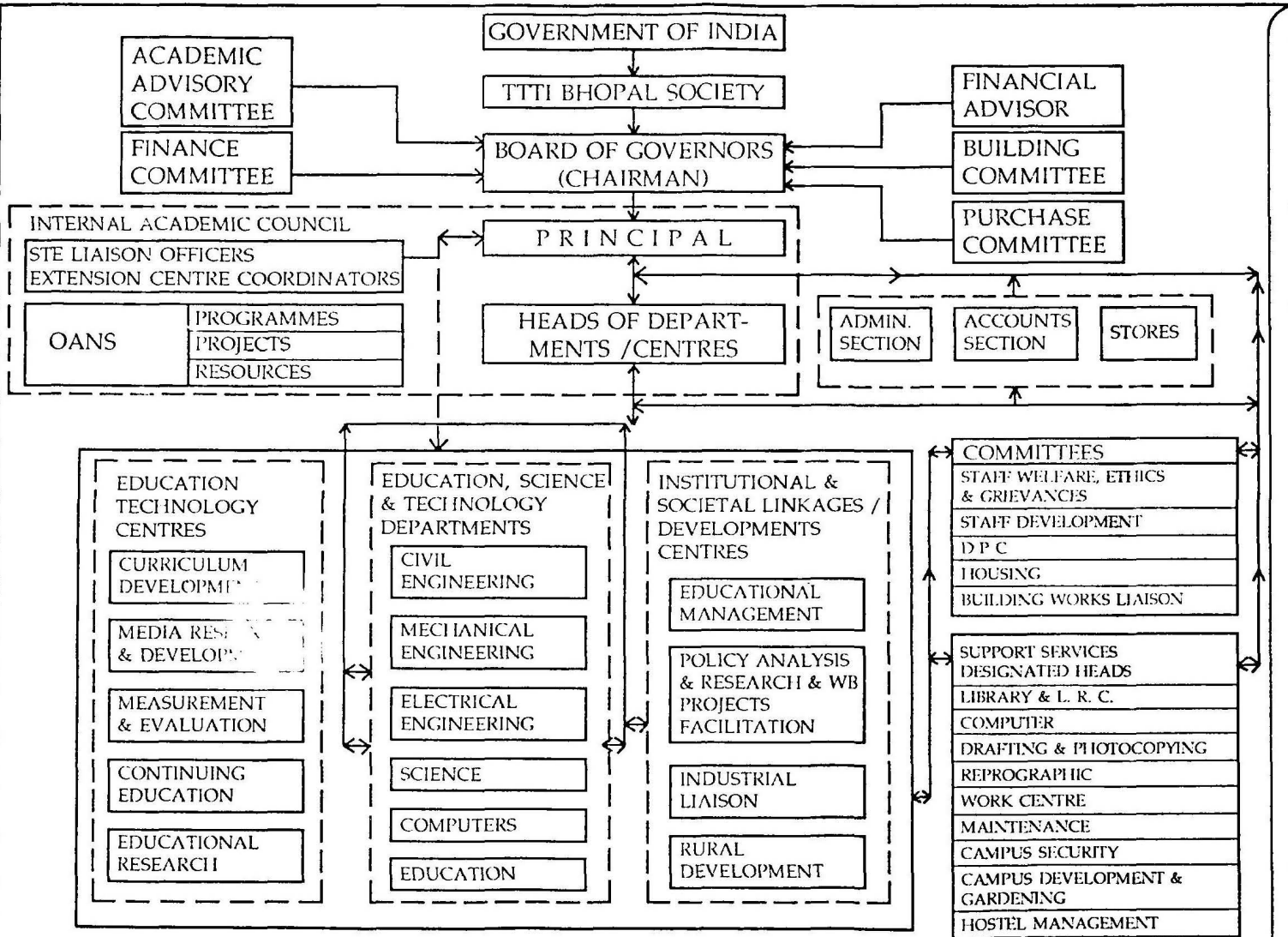


FIGURE 1.2 ORGANIZATIONAL STRUCTURE OF TTTI, BHOPAL.

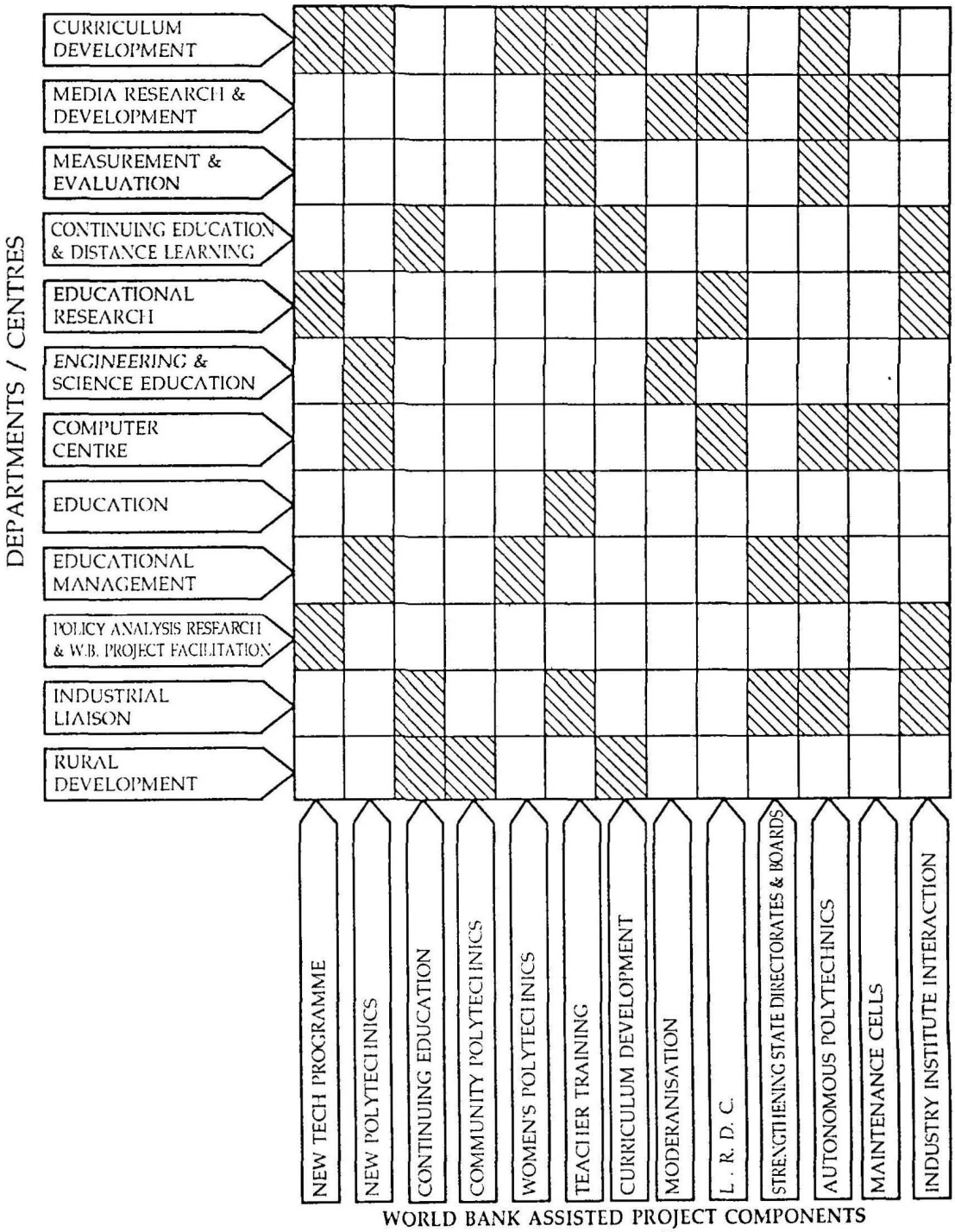


FIG. 1.3 : MATRIX OF DEPARTMENTS & WORLD BANK ASSISTED PROJECT COMPONENTS