

IMPLEMENTATION COMPLETION AND RESULTS REPORT

Technical Education Quality Improvement Program (TEQIP) - Phase I

IDA Credit No.3781

Government of India

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National Project Implementation Unit

by



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ABBREVIATIONS AND ACRONYMS

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ABBREVIATIONS AND ACRONYMS

| | |
|-------|---------------------------------------------------|
| CIP | Concise Institutional Proposal |
| CREC | Calicut Regional Engineering College |
| DPR | Detailed Project Report |
| DSS | Decision Support System |
| FMR | Financial Management Report |
| FY | Fiscal Year |
| GOI | Government of India |
| IDA | International Development Agency |
| MPR | Monthly Progress Report |
| NIT | National Institute of Technology |
| NITC | National Institute of Technology Calicut |
| PG | Postgraduate Degree Programme |
| PMU | Program Management Unit |
| PPIF | Programme Progress Information Format |
| SoE | Statement of Expenditure |
| TEQIP | Technical Education Quality Improvement Programme |
| UG | Undergraduate Degree Programme |

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IMPLEMENTATION COMPLETION AND RESULTS REPORT

1. Project Concept, Development Objectives and Design

India's objective of promoting economic growth by competing in global markets requires well-trained, technologically competent personnel who can adapt to rapid changes in technology and who can contribute to technological improvements and augment productivity growth¹. On recognizing this and observing the growing demand for Indian professionals particularly in the area of software engineering in all parts of the globe including the highly developed countries, the GOI has decided to give very high priority to human resource development in engineering and technology. Government strategically decided to go in for long standing schemes to strengthen the manpower supply with the help of the external funding agency. Government adopted a three pronged approach for this namely: (1) Enhance the intake and quality of the existing institutions (2) Promote private sector (3) Establish new institutions. Accordingly, in 2001-2002, called upon the Institutions to join the Technical Education Quality Improvement Programme (TEQIP). The objective of the TEQIP Program has been to support the production of high quality engineering professionals through integrated reforms in the engineering education system. At the end of the first phase, that is being reviewed now, it can be categorically stated that the TEQIP has made positive interventions in the educational system in India and enabled a quality conscious educational process in the Degree and Postgraduate level engineering education across India. This is vindicated by the eagerness with which people are looking forward to the phase II of the TEQIP. National Institute of Technology Calicut joined the TEQIP through the competitive selection in the first cycle in 2002-2003.

National Institute of Technology Calicut is a premier institution for technical education and research, situated in a sylvan setting at the foothills of Western Ghats on the south-western side of peninsular India and is fully funded by the Government of India from April 2002 onwards. Institute was initially established as Calicut Regional Engineering College (CREC) in 1961 and began its operations 1961-'62 as an undergraduate (UG) college, having only three branches of engineering namely Civil, Electrical and Mechanical Engineering. Institute received funding from Union Government and the Government of Kerala. This arrangement continued till March 2002 until it became the National Institute of Technology. NITC now enjoys the status of an institute of national importance like the Indian Institute of Technology under the provisions of the NIT Act 2007 of the Union Government of India. At present, that is, in 2008-2009, there are about 2300 UG students, 650 PG students and around 155 Ph.D Scholars on the rolls and they are supported by around 190 teaching faculty and 230 strong non-teaching supporting staff. NITC has grown many-fold in the last 47 years of its existence. There are 9 UG programmes and 24 PG programmes being offered at present in the various disciplines and specializations. PG programme in Management, aimed at the engineering graduates, will be started in 2009-2010. New UG courses in Chemical Engineering and Biotechnology were started respectively in 2006 and 2008, even though it was not proposed in the CIP.

For NITC, the TEQIP has been envisaged as a scheme for enhancing the quality of the academic processes. This was planned to be achieved through modernizing the laboratories, establishing new facilities, improving power backup networks, refurbishing the old and dilapidated buildings, training the faculty and staff, and building the institutional networks,

¹ World Bank, Performance Appraisal Document, TEQIP

organizing community outreach activities etc. The commitment to the community was to be discharged through various community service activities through continuing education programmes and outreach activities. There were five major Engineering Departments covered under the TEQIP, viz. Department of Civil Engineering, Department of Computer Science & Engineering, Department of Electronics & Communications Engineering, Department of Electrical Engineering and Department of Mechanical Engineering. Central facilities were also taken into consideration while preparing the plan. Science and Humanities were given due consideration because of the enriching support they provide for the engineering education and research. Initial TEQIP allocation was Rs.209.4 Million, which was finally enhanced to Rs.211.06 Million in the year 2008-2009. The Institute level Implementation Plan(IIP) was drawn broadly as per the Project Implementation Plan (PIP) and Project Appraisal Document(PAD) of the TEQIP. The Concise Institutional Proposal (CIP) was prepared through extensive discussions and brainstorming sessions conducted at the Institute level and department level meetings, and has been refined many times as advised by the national level committee/NPIU. The activities under the various components envisaged under the heading of "Institutional Development" as per the CIP, namely Academic Excellence, Networking, Service to Community & Economy, System Management Capacity Development were systematically implemented with a steady pace right from the beginning. During the period 2002-2009, Institute has completely utilized the allotted funds and has been carrying on the activities even after 31 March, 2009 to keep up the tempo of the reforms and the fruitfully utilize positive changes that were brought in through TEQIP Phase I.

2. Achievements of Project Development Objectives

NITC was selected as LEAD INSTITUTE under the TEQIP in the first cycle along with five other NITs. Even though, a very pervasive performance could not be accomplished under the "Networking" front, Institute has maintained its leading position in technical education and research. All other objectives have been materialized to a greater extent.

2.1 Institutional Development Activities

Institutional Development works were undertaken through the three sub-components/activities: (a) Promotion of academic excellence, (b) Networking of institutions for quality enhancement and resource sharing, and (c) Enhancing quality and reach of services to community and economy as envisaged in the PIP.

2.1.a Promotion of academic excellence

Significant ones among the multifaceted activities under this sub component are listed here.

(i) **Improvements in institutional governance and, management and administrative practices;**

NITC is autonomous under the NIT Act 2007 and is fully funded by the GOI. Prior to that and after transformation of REC to NIT in 2002, Institute was granted autonomy and was conferred with the *Deemed to be University* status, by which the academic reforms perceived under TEQIP could be implemented. During the period 2002 to 2007 Institute has undertaken various reforms like formation of Senate, Boards of studies etc and completely transformed the academic practices into that being followed by IITs.

(ii) **Improvements in teaching, training and learning facilities**

All existing laboratories, workshops and computer center were modernized them during the TEQIP period. Emphasis was for incorporating state of the art equipments and software. A number of new equipments were added in the various departments so that students could get a better exposure to the practical aspects of the theory they learn in the classrooms. The Internet connectivity was made available across the campus and the speed was increased from 2Mbps to

32 Mbps and the next enhancement will be to 64/100 Mbps. The library facilities were improved by adding more titles and updating the automation system. The NALANDA digital library of NITC was further strengthened. The better and easy access of on-line resources of INDEST, INFLIBNET, and others catalyzed the research activities also. Whole campus wear a new look now.

(iii) **Improvements in curricular practices;**

After becoming autonomous with the Deemed to be University status in 2002, NITC has implemented the Credit based continuous evaluation, largely following the pattern of IIT Madras. The curriculum has been made substantially flexible for enabling the self paced learning and specialization and continuous evaluation. The curriculum has been revised again 2006. Next revision is due to be made in 2010. All eligible courses have been accredited by NBA in 2004. The five courses which were accredited for three years in 2004 were got reaccredited for five years in 2008. The examination system has been automated using the DSS developed by the Institute.

(iv) **Faculty and staff development**

Efforts have been made to train the faculty and non-teaching staff in their functional areas and interpersonal skills. Young faculty was given training on instructional design and delivery, apart from short term training in research methodology. Training sessions were arranged both in house and outside. Almost all staff members have attended at least one programme. Faculty was given support for attending national/international conferences and workshops. Apart from this around fifteen faculty members have visited universities/institutes abroad and spent one week to six weeks there. In order to attract best talents and overcome the faculty shortage, the standing advertisement for faculty recruitment has been released in April 2008 and updated it in January 2009. The recent revision of faculty-staff ratio, drastically cutting it from 1:1.5 to 1:1.1 has caused difficulties in recruiting technical support staff in the laboratories in required numbers as it is required to keep their recruitment in pending to get the ratio of the various categories reduced to the new levels by way of retirement, resignation etc. or alternatively to appoint more faculty in various disciplines. This bottleneck is about to be overcome and more appointments would be happening soon. Nevertheless, TEQIP provided a long waited avenue for training and development, and the enhancement in the quality is gradually becoming visible.

(v) **Enhancement in postgraduate education and research, and consultancy activities;**

There has been significant improvement in the research activities in terms of PG(250 to 500) and Ph.D(2 to 20) scholars per annum. Now, annually 20 scholarships are offered for Ph.D. The mandatory increase based on Government of India(GOI) orders on OSC quotas for OBC has been done now in a phased manner. Increase in research publications is visible from the numbers viz.

(a) Journal publication In 2002-2003-**21**, In 2007-2008-**91**

(b) Conferences: In 2002-2003-**32**, In 2007-2008-**120**

(vi) **Enhanced interaction with industry**

Interaction with industry has been largely for campus placement of the UG and PG students. The placement for UG students has been excellent over these years, which is almost 100% for all the major branches. Recently many organizations and multinational companies have started offering internships also. Industrial sponsorship for research is getting materialized.

(vii) **Increased attention to equity issues.**

Institute scrupulously follows the reservation policy of the GOI. Apart from this, access is ensured through various facilities like dedicated book bank, counseling etc for the SC/ST students. Lady students are provided with 24x7 computer center in the Ladies Hostel, apart from the common facilities in the institute. Institute is committed to providing equal opportunities for all, regardless of caste creed and gender.

2.2 Networking of institutions for quality enhancement and resource sharing

Even though, Institute started the formal TEQIP network activities with two network institutions in 2002-2003, one college(MES College of Engineering) did not continue in TEQIP. The other college, namely LBS College of Engineering maintained an active linkage with NITC through out. Later, faculty has joined hands with the peers in NIT Trichy and NITK Surathkal also for undertaking research. It is heartening to take note of the pan Indian networking of NIT faculty getting evolved because of the various opportunities being provided under TEQIP. NITC has further enhanced the non-formal networking both with national and international organizations/universities.

2.3 Enhancing quality and reach of services to community and economy

Concerted efforts to reach out to the community was made during 2002-2009. Entire schools(around 40) in the Nadapuram Assembly Constituency got benefited because of the constant interaction of the faculty with the teachers and the training provided for preparing course material in Information Technology and computer usage. Similar efforts have been undertaken in the Koduvally Assembly Constituency, and host Chathamangalam Gramma Panchayath as well. Special job oriented training for village craftsmen of Kakkodi Gramma Panchayath was organized with the help of the local chapter of Institution of Engineers. The ongoing Office Automation Training in the campus provided improved living conditions and job opportunities for more than 200 unemployed women and youth in 2002-2009. The Apprentice Training, supported by the Board of Apprentice training, in trade and library science, not only supplement the manpower requirements in the labs, but also enable the dozens of young men and women to get better placements.

3. Achievements by Project Components

The four components under *Institutional Development* are namely Academic, Excellence, Networking, Services to Community and Economy, and the System Management Capacity Development. The achievements have very gratifying and we look forward to continuation of the development activities.

3.1 Academic Excellence

More than 30 laboratories have been modernized by adding new equipments, instruments and software in the various Departments. CAD labs and Simulation Labs are set up in the various areas including VLSI, GIS, CAD/CAM, Dynamic System Studies etc. Each Department was given support to set up one research laboratory in their core areas. Major outcome is the research in emerging areas of nanoscience, nanotechnology, composite materials, photonics, power quality, wireless communication, production engineering and so on. This led to the starting of the new

PG courses in Nanotechnology, VLSI, Information Security, Photonics, Polymer Science, Signal Processing etc and research in many cutting edge areas.

3.2 Networking

At the outset it is to be stated that the “Networking” as a pervasive and proactive activity has not happened at NITC. But it has initiated a positive change in the mindset of the people and has resulted in activities, which would get strengthened in the future. Main bottleneck is the mindset of the people and the administration on either side of the Network link. Second difficulty is the inadequate capacity in terms of faculty and staff to spare time for any network activity. This is because when the academic schedule is very tight and is governed by the calendar, and when we are not able to spare a faculty member even for a short duration of a week or so, both parties would find it difficult to carry on the network activities like joint research, faculty exchange etc. Third difficulty is the geographical distance and the consequent difficulties in travel that limit the travel only for very essential activities. In spite of these difficulties, activities like workshops, training etc have been conducted. Part time research leading to Ph.D has been offered to the faculty of network members. Of late joint research work with faculty has been started, and the faculty members has been nominated to attend the short term courses, and other programmes. The testing facilities available with other institutions like NITK, NITT are being utilized for research purposes. The confidence and the competence built up by way of laboratory facilities and the exposure due to the participation in conferences and seminars have resulted in the formulation of non-formal networking with national R& D organizations like BRNS, ARDB, and some foreign Universities as well and have provided the impetus for the research in the campus. It is hoped that the tempo will continue.

3.3 Services to Community and Economy

It has been observed that there is a quantum leap in the use of ICT in modern life and the younger generation students are required to pursue topics in computer usage/computer programming, but the school teachers are not well equipped to rise to the occasion. So institute joined hands with People’s representatives and local administration in building the required competencies for the school teachers and enabled them to develop teaching materials and the computer laboratories. It has been also observed that the people of village are motivated to take up the tasks of building micro enterprises through the three tier Panchayathraj institutions and the self help groups. But their major handicap is the lack of opportunities for training and need for guidance for securing support in finance and sales management and so on. Institute has made attempts in empowering women through various means like office automation training, training in crafts and interior decoration, entrepreneurship development etc. and the results are gratifying. The activities like Office Automation Training, Apprentice Training were also organized regularly every year.

3.4 System Management Capacity Development.

More than 25 senior faculty members and three officers have been nominated to attend various courses for training in institutional management in human resources, finance, procurement, project management etc. The use of Decision Support System in automating information flow could reduce the drudgery of the manual preparation of documents, data entry of marks, service matters etc to a greater extent and speed up the services. We feel that those involved with the project have acquired new, relevant, skills and experience which would benefit them in their career development.

4. Implementation Mechanisms and Performance

Director of the Institute was the Chief Coordinator and the Executive Officer for TEQIP. The Dean(Planning & Development) was the Chief Implementation Officer for Procurement. Institute level Consultative Committee consisting of all Deans and HoDs

have prepared the plan for implementation and monitoring. The Project Management Unit(PMU) coordinated the data flow and reporting. The PMU was headed by the faculty. The officers in the sections of purchase, finance, and engineering services have been nominated as the nodal officers for procurement, finance, and civil works respectively. One faculty was in charge of the DSS development and implementation. The purchase committees for various Departments were chaired by the HoDs and were comprising of faculty from other departments as well. All procurements were made based on well thought out plan and as per the World Bank/IBRD guidelines and observing the GFR/CVC guidelines. Procurement of Civil Works through shopping and National Competitive Bidding were obtained. Institute has utilized the NCB and NS/IS procurement modes for procuring equipment and computers. Progress has been steady and systematic. The main contribution of the analytical and other work supported by the project has been at two levels. First, at the substantive level, the work has contributed new knowledge on some key academic management issues (as mentioned above). Second, at the level of the process, the work has promoted greater awareness and interest in important issues of staff training, faculty development, coordinating the information for timely reporting and the need for synergistic coordination of the institutional development activities for better output and outcome.

5. Project Sustainability

- i) Build more classrooms and laboratory space and the hostel facilities.
- ii) Recruit best faculty on a regular basis.
- iii) Enter into association/ collaborations with institutions of higher standing/R&D organizations
- iv) Strengthen the industry-institute linkage not only for student placement, but also for attracting consultancy and sponsored projects.
- v) Streamline the usage of the equipment and facilities for effective utilization.
- vi) Strengthen the library and Internet facilities to enable increased use of ICT in students' learning and provide faculty and students with the state of the art facilities.
- vii) Strengthen the continuing education programmes
- viii) Ensure timely support for faculty in conducting/attending conferences.
- ix) Strengthen the management and improve the computerized decision support system
- x) Pursue capacity building exercises in sustaining the improvements brought in by various activities under and along with TEQIP.

6. Bank's Performance

Institute has no direct business with the Bank except the review comments circulated based on the periodical reports. It is noted that Bank does actively support participatory approaches and consults widely on the development of its country and sector strategies. Institutions have been given the task of reporting the progress systematically through the Monthly Progress Report(MPR), Statement of Expenditure(SoE), Financial Management Report(FMR) Programme Progress Information Format (PPIF) of the Joint Review Missions and others. Even though the clerical work is enormous, it enabled the assimilation of the proper information. Further more, it appears that the Bank does not sufficiently promote government ownership. NPIU may give the required appraisal.

7 Borrower's and Implementing Agency's Performance

MHRD and NPIU have been very supportive and proactive in the implementation of the TEQIP at the Institute level. The JRMs conducted on a periodic basis have not only enabled a systematic review but also facilitated cross fertilization of ideas for the different institutions.

8 Key Lessons Learnt

The involvement in the TEQIP as national level project have revealed some pertinent lessons that need to be incorporated into the design of future programmes aimed at building the capacities of the Institute as a implementing agency and a developing institute of national importance. NIT Calicut is honoured to be part of a national movement for strengthening the higher technical education. Even though much is desired to be happening in terms of quality and excellence, the significant changes happening and the trends set by the TEQIP during the past five to six years period are worth the efforts put in by the Ministry of HRD, NPIU, and the Institute. It is heartening to note that the equipment acquired by the Institute have been put into best use for the regular instructional labs and research. Efforts are needed to strengthen the research activities further and the investment needed is much higher than that is affordable under TEQIP. So faculty has to be motivated to build capacities and produce innovative results with the help of other sponsoring agencies and industries. This has been noted and the efforts are being undertaken on an urgent basis. Regular recruitment is being done to remove the faculty shortage. Meanwhile, the nonavailability of sufficient number of support staff and the inadequacy of skill sets to support research activities at advanced level cannot be overcome in a short while because Institute carries the backlog of forty years of existence as a Regional Engineering College. Institute is honoured to share the credit of all the improvements occurred during TEQIP with the honourable Mentors and Auditors who have put in their best efforts in correcting us mid course in the Programme Implementation. It is also noted that the network activities could not be promoted vehemently due to many factors, but this has enabled, of course, a new direction for academic collaborations.

The Institute has been included in the scheme of TEQIP at a critical juncture, when the Institute was undergoing a major transformation from a teaching college affiliated to the local University to an institution of national importance. So the academic reforms envisaged under TEQIP has had happened as a matter of routine. But the financial input needed for strengthening the infrastructure and facilities by the addition of equipments enabled the modernization needed for the institute to some extent. Nevertheless, the mandatory periodical review and the audit have systematically enabled the progress in the implementation of various reforms. GOI could rely on the scheme to fund the Institute in this critical juncture. Also, Institute could utilize the opportunities of training and development for motivating the faculty and staff to build competencies and facilitate very good education for the students who graduate from this Institute. Even though the clerical work needed to fulfill the requirements in respect of the periodical reporting to NPIU has been enormous, this could set a process to run with regard to the collection and assimilation of Institutional information. Interestingly the MHRD also started prescribing more or less the same style in reporting PLAN and Non PLAN expenditure. So this has added advantage for better management of the Institute as a whole. An important development by way of participation in TEQIP is the provisions for institutional networking and Services to Community. Still there exists a kind of hesitation among the academic community and it is observed that the contingent of people, including students, who participated in these service activities, is a small proportion of the total population. It is to be noted that this is a general trend and has nothing to do with TEQIP alone. To reform an established institution with multiple interest groups is a challenging task, and will require continued high level commitment to develop alignment among the various stakeholders. So the process has to continue.