Impact Evaluation of "Modernization of Existing 20 Polytechnic Institutes & Establishment of 18 new Polytechnic Institutes (Revised)'

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Impact Evaluation of the Project 'Modernization of Existing 20 Polytechnic Institutes & Establishment of 18 new Polytechnic Institutes (Revised)'

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Executive Summary

1. Background:

Central purpose of this study is to assess the impact of the project 'Modernization of Existing 20 Polytechnic Institutes & Establishment of 18 new Polytechnic Institutes (Revised in June 2006)' of the Directorate of Technical Education of the Ministry of Education, Government of People's Republic of Bangladesh. The project was approved in 1998 at an estimated cost of tk. 38827.83 lakh with no foreign exchange component. It took long 10 years to implement the project (1998-2008). The broad objectives of the project are to modernize 20 old and establish 18 new polytechnic institutes.

2.0 Objectives of the Study:

i. To review the current implementation status of major components of existing and new Polytechnic Institutes.
ii. To review the rationale of the project in respect to concept and design.
iii. To assess the direct and indirect impacts of project activities on major expected outputs- with respect to human resource development, self-employment, IG opportunities, women employment & women participation in development, socio-economic development and overall poverty reduction of the youth force of the country.
iv. To examine the internal strengths and weaknesses and opportunities and threats towards project through SWOT analysis.
v. To recommend measures for improved performance of institutes, sustainability and more replication of polytechnic Institutes all over the country.

3. Methodology:

3.1 **Selection of the Respondents:** In order to meaningfully address the objectives of the study, we have identified four types of respondents who are directly connected with the project. In fact, these respondents are our units of analyses of this study. They are: i) principals of the institutes, ii) teachers, iii) students and iv) passed-out graduates /diploma holders. Selection of the respondents was done separately by following appropriate methodology. In case of the institutes, all principals were selected for interview. In case of teachers, students and passed-out graduates, we have used systematic sampling technique to select our respondents by utilizing their records/registers (where their particulars are maintained in orderly fashion) from our randomly selected sample of 10 institutes. For details, one may see our discussion in the chapter-2 on methodology in page# 5 of this report.

3.2 The questionnaire administered to the principals helped the study team to gather all aspects of the Project to assess implementation status and project impact. The respondents for this study were all the Principals- old and new Polytechnic Institutes of the Project. The questionnaire was mailed to them. For teachers and students, the study team visited 25% of the 38 Institutes i.e. about 10 Institutes selected randomly including one Mahila Polytechnic Institute in Dhaka. We are left with no choice except selecting it as it was the only Mahila Polytechnic Institute established under the project. These 10 institutes of which six were from the old including the Mahila Polytechnic Institute and four were from the new polytechnic institutes. The selection of the institutes was made by following the systematic sampling procedure. The research team headed by the Principal Investigator (consultant) visited the sampled institutes and conducted interview with Teachers and students. Again, selection of

Teachers and students was based on systematic sampling using Teachers' register and Students' register respectively.

4. Findings of the Study

In this study, as we have mentioned earlier, we have four sets of respondents, namely, principals, teachers, students and passed-out graduates/diploma holders. Data were collected from each set of respondents and thus, they became major source of our knowledge of the institutes. Findings were presented below for each set of respondents accordingly.

4.1 Principals:

Principals of the institutes have provided wide range of information such as physical infrastructural development, teaching staff, technologies, students' enrollment and its growth, continuation and discontinuation rate, workshop/labs, teacher-students ratio, sex ratio, allocation and expenditure pattern, governance and sustainability issues etc. Data thus collected are briefly summarized and discussed below:

i) Physical Space: Mean area of physical space actually acquired and developed in the old polytechnic institutes is quite satisfactory with 21.40 acres. Comparable figure in new polytechnic institutes is unsatisfactory with 2.08 acre of land. This has obvious implications for allocation of physical spaces for administrative buildings, teaching class rooms, laboratory/workshops, hostel facilities in the old institutes etc. Old institutes have considerable edge over the new institutes in all these aspects (see tables 1 & 2).

ii) Students and Technologies: Only 18 technologies are actually reported to be offered in old institutes; whereas in the new institutes only 13 technologies are offered (see table-3). This is quite contrary to what has been envisaged in the project objective to introduce 41 technologies (P.1). Teacher-students ratio is abnormally high in all subjects and unacceptable. There are instances where teachers are recruited, but technologies were not introduced. Another depressing situation is: both teachers and technologies are in place, but without any students (see page 14+15).

iii)Teacher-Students Ratio: There are 38497 students (except Khulna) and 704 teachers; and teacher-students ratio is 1:54.7 in the old polytechnic institutes. Comparable figures in new institutes are 17677 students and 231 teachers with teacher-students ratio of 1:76.5. Students' ideal teacher-students ratio is 1:25 as against current teacher-students ratio of 1:60 implying that there is considerable scope for improvement for the sake of polytechnic education in the country. (See tables 3 & 4).It may be noted that all institutes run in two shifts. Same teacher teaches in both the shifts. If students of both shifts are not taken into consideration, then teacher-students ratio shall be half. It will be still higher than the desired number which is 1:15.

iv) Students Sex-Ratio: Contrary to our expectation, female students' enrollment is too low. In old institutes, there are 10.9 female students for 100 male students. Comparable figure in the new polytechnic institutes is 11.7 female students per 100 male students (see table-5) implying that still there is a long way to go for our females to come at per with males.

v) Problems in Introducing Technologies: Shortage of teachers and resource constraints are cited as reasons for not introducing technologies in both old and new institutes. Almost all principals indicated that they did not get teachers as per sanction. (see table-6). They, however, suggested some new technologies for their institutes. These are: Textile/garments

making, Electrical/electronics, Telecommunication, Refrigeration and air conditioning, Instrumentation and process control, Electro medical , Architecture & interior design, Mechatronics , Food technology, Automobile etc. One may, however, note that some of these have already been introduced in some polytechnic institutes. In view of the demand, Government may consider introducing more of these Technologies to other institutes.

vi) Workshops, Demonstration and Appropriate Technologies: All principals reported to have workshops at the institutes. On average, there are 32600 sq ft and 17200 sq ft floor space available for workshops in both old and new institutes respectively, but unfortunately they all have reported that they do not have reasonable number of teachers for demonstration of technologies at the workshops. Now a teacher handles 45-50 students at the workshop against their ideal number of 24-25 students. They recommended some appropriate technologies for their respective institutes such as: Textile, Electrical ,Electronics, Marine, Food technology, Telecommunication, Architecture and Interior design, Refrigeration and air conditioning, Instrumentation and process control, Mining and mine survey, Environmental technology/engineering, Electro medical , Construction etc. They also gave concrete suggestions for workshops improvement such as: Workshop building 1 vertical extension up to 5th floors, IT related workshop, Computer building extension , CAD lab, RAC technology, Environment lab/ GIS, Micro oven and PLC, Electrical/mechanical workshop, Electronic/Medtronic's lab, Founding shop, Automobile/welding workshop, Testing lab, Internal lab. For details, see tables-6 and 7. Data in table-8 also show that the principals (n=17) recommended 15 demonstrable technologies at their institutes.

vii) Students' Enrollment, Growth and Survival Rate: One out of 4 and one out of 3.5 applicants are usually selected for admission into the old and new institutes respectively. Female students' enrollment in both types of institutes is very small (see table-9). Data in table -10 show that there is considerable increase in enrollment of students in 17 technologies from 2007 to 2011 in both old and new institutes except in medical technology, instrumentation and process control and environment technology. Our data also show that 10-14% diploma holders remain unemployed. According to the principals of the institutes, only 69% and 50% people of the catchment area are being served by the old and new institutes respectively (see table -11). While data in table-12 show that cohort survival rate of the students admitted in 2007 survived upto 2010 only 83% and 85% in the old and new institutes respectively.

viii) Equipment and Furnishing: Equipping and furnishing as per plan in both set of institutes are not quite satisfactory. Their quality is also questionable. What is worrying is the inadequate skills of teachers to use equipment (see table-13)

ix) Teachers' Training, Syllabi and Current Courses: The principals of both old and new institutes strongly feel that teachers' training and retraining in all technologies are necessary and that their courses and syllabi need updating from time to time (see table-14).

x) Institutes' Governance: Almost all the principals of both sets of institutes have reported that they have been enjoying some delegation of power to recruit part-time teachers and spend money up to certain limit and that their admission system is through on-line, but they sometime face political and students' unrest (see table-15).

xi) Project Concept and Design Issues: Some of the principals of both sets of institutes see that there are some design flaws as two projects are put in one basket and those 2 acres of land for the new polytechnic institutes is quite inadequate. Teachers were not trained in the know-how of utilizing machines; and continuation of services of teachers on development budget for a long time in the new institutes has demoralized the teachers. There is no hostel

facilities for female students. For linkage with industries, prior arrangement appears to be inadequate (see table-16).

xii) Project Implementation: The project could not be implemented fully according to majority of the principals of the institutes in respect of equipment, furnishing, land acquisition and development, teachers' recruitment, recruitment of part-time teachers, hostel accommodation and teachers' training. They informed that about 1500+ students can be admitted within the space available, if current problems of teachers' shortage are resolved. Their expenditure abilities appear to be quite satisfactory (see table-17).

xiii) Principals' Suggestions for Improvement:

- Extension of land area for construction of dormitory, playground, auditorium and hostels etc.
- Transferring project manpower to revenue budget for job satisfaction and equal status.
- Enhancing revenue budget for repair and maintenance works, purchase of furniture and stationeries
- Provide sufficient machines and equipment for practical classes.
- Reconstruction of old workshops and quarters
- Vertical extension of administration buildings, hostels and staff quarters.
- Provide need-based professional training for teachers, administrative staff and officers.
- Link relevant industries for proper training, career planning and placement etc.
- Introduction of co-curricular activities and up gradation of syllabus and library facilities.
- Recruit new teachers, staff and part-time teachers especially for 2nd shift and fill up vacant posts etc. (For details, see tables 18-19).

6.2 Teachers' Opinions about Institutes, and Suggestions for Improvement:
Overwhelming majority of teachers of the old polytechnic institutes are male (92%) and married (94%) with large family size (4.8) and more of engineering background compared to those of the new institutes (see table -20). Data in table-22 reveal that old institutes have more teaching subjects than those of the new institutes. Most of the teachers feel that teaching aids are necessary. There is a system of course evaluation, but 'average' and 'below average' grades are few. Teachers candidly informed to have problems like i) students' absenteeism, ii) inattentiveness and dishonesty, iii) Students' pressure for passing them in the exams and iv) Students' politics (see table-21).

Teachers have reported that they are satisfied with their job; enjoyed teaching and got their salary regularly (see table-22). Teachers of the old institutes feel that they have adequate space as opposed to the teachers of new institutes who feel that their institute's space is small. Hostel facilities of the new institutes are virtually little. They identified some problems of their institutes, such as: lack of teachers and students' accommodation, job insecurity of the new institutes, lack of subject-specific training, shortage of teachers and lack of sports facilities. They gave some suggestions for improvement of their institutes, such as: Increasing number of teachers and lab-assistants, Increasing computer and library facilities, Internet access and use of multimedia; and Stipend /scholarship for students (see table-23).

Teachers opined that more learning opportunities should be given through training and retraining. Workshops and lab facilities should be increased; industry based syllabi should be developed and more resources should be provided. (see tables 24-25).

6.3 Students' Aspirations, Perception of the Institutes and Suggestions: Students got themselves admitted through on-line system with some hopes and aspirations. Most of them usually come from middle income group. Their father's annual income is in the range of 1.64 to 1.74 lakh Taka. Students find their institutes insufficiently equipped and furnished. New

polytechnic institutes do not have hostel facilities which are beyond their expectation. Female students face serious accommodation problems. Students who stay in the hostel of old institutes face enormous problems including insufficient fans, bathroom facilities, political problems, students' unrest and outside encroachment. Majority of the students like their institutes, but some students reported that they do not like their institutes for sub-standard teaching ability, lack of accommodation facilities, teachers' inattention, inadequate training, lack of stipend etc. They also observed that workshops facilities are inadequate. Workshop is congested with too many students to be taught by one teacher. Equipment per student at the workshop is also inadequate (see table-27). According to students, some improvements of the institutes are overdue in respect of teachers, workshops, equipment, furnishing, students' accommodation, games and sports (see table-28). The students are thoughtful of their institutes in as much they gave some suggestions for improvement. (See table 30).

6.4 Passed -out Graduates/Diploma Holders: The ultimate impact of the project is measured in terms of diploma holders' employment status. In this section, some information is provided regarding the employment status of the passed-out graduates/diploma holders of last two years (i.e. 2009-2011). The purpose is to see the ultimate impact of the project under study in terms of their employment status. We have tried to know how many of the passed-out graduates since 2009 have been employed, self-employed and unemployed. Data in Table-30 reveal that out of 130 diploma holders, 61.2 percent were male; and 33.8 percent were female. Mean years of employment was 1.8 years. Since completion of their diploma and 93.8% were employed. Only 2.3 percent and 4 percent (n=130) were respectively self-employed and unemployed. Mean years of employment of those employed was 1.1 years. Among those who were employed (n=122), 49.2 percent were engaged in teaching at the polytechnic institutes (part-time basis), followed by technician (14%), civil engineering (10.7%), software programming (9.8%), food processing (4.1%), IT (4.1%), and others. While asked, they mentioned three sources of getting their current job, namely, direct interview 74.6%, personal connection (12.3%) and institutes (13.1%). While further asked, 94.3 percent reported that their training was found to be useful in getting the job. Only 07 out of 122 respondents stated that their training was not helpful in getting the job. They mentioned that their teachers and teaching contents are not suitable and up-to-date.

We have tried to ascertain the job-satisfaction of the employed graduates (n=122). The responses/answers to various questions raised in this respect are briefly presented in table-31. While asked, 91.8 percent replied that they were satisfied with the present job and that 8.2% were not satisfied. Overwhelming majority of the respondents (92.8%) was reported to be satisfied with their employers. On the contrary, the unsatisfied respondents (n=10) mentioned poor salary was the main reason of their dissatisfaction. Besides, coercive management and negligible bonus were also cited as reasons for their dissatisfaction. Average monthly income, they earned was reported to be Tk. 5770/- per month. They also said that this salary was not befitting their technical qualification. Their expected average salary to satisfy them is tk. 12500/- per month. While further asked, majority of them (72.7%) reported that they had no scope for promotion in their current job. For details, see table-31.

The employed diploma holders were so satisfied that they would like to stay in their job. It was observed that in our sample of 130 passed-out graduates, 122 were employed and only 3 were self-employed. We have tried to ascertain whether they were willingly self-employed. Out of 3, only 2 reported to be self-employed willingly; and the activities in which these self-employed people were engaged were: refrigerator mechanic, computer technician and graphic design. They have reported to be earning fairly better than their colleagues employed elsewhere. For details, see table -32.

7. SWOT Analysis

7.1 **Strengths:** Govt's high priority and commitment, significant infrastructural development of the old institutes, high level response for students for enrollment, on-line admission system etc.

7.2 **Weaknesses:** Shortage of teachers, lack of teacher's training, inadequate furnishing and equipment, inadequate lab facilities, lack of hostel facilities of the new institutes, lack of canteen & medical facilities for students, lack of internationally competitive syllabi, inadequate internet facilities etc.

7.3 **Opportunities:** Scope for improvement in enrollments, increase in the number of teachers, further modernization, transferring new polytechnic institute to revenue budget, vertical expansion of buildings.

7.4 **Threats:** Demoralized teachers of new polytechnic institute, external politics, resource constraints, inadequate budget for maintenance and lack of girls' accommodation

8.0 Recommendations and Conclusions:

The findings of the study reveal that the project has mixed success and failures both in terms of implementation and achievement. Based on our findings, the following recommendations are made for the consideration of relevant authorities.

8.1 Recommendations:

i. Technical manpower produced in different technologies are reportedly 24000 per year which appears to be disproportionate to the country's population and its requirements. At least, a target of annual production of 50000 diploma holders should be aimed for which vertical expansion of existing new polytechnic institutes and establishing another 25 more institutes with necessary teaching staff. Furnishing, equipment and lab facilities are extremely essential. In fact, every district should have at least, one institute.

ii. More qualified teachers of appropriate technical and technological background should be deployed to reduce the current teacher-student ratio.

iii. All teachers engaged for different technologies should receive periodic training in their respective field for their own skill development for which customized training should be designed at the technical teachers' training institutes. At present, this is not getting due attention which it deserves. Directorate of Technical Education may also take necessary steps in this connection. It may open a training unit to organize periodic training for its teachers.

iv. With the deployment of appropriate teachers, more and more technologies should be introduced with necessary support facilities. Technologies like leather technology, fine wood works, vegetables preservation and packaging technologies, web-sites development, e-commerce, automobile etc should be introduced in, at least 15-20 polytechnic institutes.

v. Hostel facilities, particularly for female students should be ensured in all polytechnic institutes. This will attract some female students to receive training.

vi. Every institute should have placement center with a view to finding out jobs opportunities for their graduates by establishing contacts with industries and other relevant organizations.

vii. Library facilities need to be enhanced significantly; and students should be encouraged to avail these facilities.

viii. Workshop/lab facilities should be increased. Teacher-student ratio at the workshop should be reduced to 1:20. More equipment for the purpose of demonstration at the workshop should be procured. Teachers should be taught about the know-how of equipment-use before purchasing /importing the relevant equipment.

ix. Wood work department at Kaptai Polytechnic Institute needs to be remodeled and modernized. Their existing products are not worth buying. The instructors should be trained abroad so that they may produce Chinese or Malaysian type of furniture.

x. Quality of training should be international level so that the passed-out graduates can compete in the international market.

xi. In order to ensure job-security, all teachers and staff of 18 new polytechnic institutes should be transferred to revenue budget. At present, their non-pensionable services are bothering them so much so that it affects their job performance.

xii. In order to improve women's participation in polytechnic, hostel facilities and financial supports need to be provided. It is also important to find out more women friendly and market demand-oriented technologies for them.

8.2 Conclusions:

With regard to implementation, suffice is it to say that project took longer time than due. It could not provide teachers to start many technologies as mentioned in its objectives. Those who were already on job required training and retraining to utilize modern equipment. Some of them need to learn the know-how to operate various equipment. Due to teachers' shortage, teacher-students ratio is highly imbalanced. Workshop facilities are inadequate. Consequently quality of training suffered and could not be ensured for which our trained diploma holders could not be of international standard. Number of technologies is far short of the target envisaged in the project document. Library facilities reportedly are inadequate. Notwithstanding these failures, project has modest success in terms of growth in number of enrollment and passed- out graduates, physical infrastructural development etc. All institutes reportedly produce 24000 diploma holders per year. If this trend continues, Bangladesh will take long time to turn its growing population into productive workforce. It is suggested that production target should be raised up to 50000 per year. In order to achieve this target, some more new institutes should be established, more teachers should be put in place and more hostel facilities should be provided. Both ongoing and new institutes should be well furnished. Suggestions offered by the principals, teachers, students and diploma holders should be taken into consideration. Each institute should have placement center to find out job-opportunities for the diploma holders/passed-out graduates.

Chapter 8 : Recommendations and Conclusions:

8.1 Recommendations:

This is a core project of the technical education sub-sector and financed entirely with government own resources that indicates government's priority and importance attached to technical education. There are 38 polytechnic institutes including 18 new institutes established during the project period (1998-2008). Modernization of previously established 20 institutes with modern equipment and proper furnishing and establishing 18 new institutes were, in fact, the key purpose of the project. The purpose of the study is to assess the implementation status and impact of the investment of the project. In the light of the findings discussed in the previous chapters, the following recommendations and conclusions are made.

i. Technical manpower produced in different technologies are reportedly 24000 per year which appears to be disproportionate to the country's population and its requirements. At least, a target of annual production of 50000 diploma holders should be aimed for which vertical expansion of existing new polytechnic institutes and establishing another 25 more institutes with necessary teaching staff, furnishing, equipment and lab facilities are extremely essential. In fact, every district should have, at least, one institute.

ii. More qualified teachers of appropriate technical and technological background should be deployed to reduce the current teacher-student ratio.

iii. All teachers engaged for different technologies should receive periodic training in their respective field for their own skill development for which customized training should be designed at the technical teachers' training institutes. At present, this is not getting due attention which it deserves. Directorate of Technical Education may also take necessary steps in this connection.

iv. With the deployment of appropriate teachers, more and more technologies should be introduced with necessary support facilities. Technologies like leather technology, fine wood works, vegetables preservation and packaging technologies, web-sites development, e-commerce, automobile etc should be introduced in at least 15-20 polytechnic institutes.

v. Hostel facilities, particularly for female students should be ensured in all polytechnic institutes. This will attract some female students to receive training.

vi. Every institute should have placement center with a view to finding out jobs opportunities for their graduates by establishing contacts with industries and other relevant organizations.

vii. Library facilities need to be enhanced significantly; and students should be encouraged to avail these facilities.

viii. Workshop/lab facilities should be increased. Teacher-student ratio at the workshop should be reduced to 1:20. More equipment per student for the purpose of demonstration at the workshop should be procured. Teachers should be taught about the know-how of equipment-use before purchasing /importing the relevant equipment.

ix. Wood work department at Kaptai Polytechnic Institute needs to be remodeled and modernized. Their existing products are not worth buying. The instructors should be trained abroad so that they may produce Chinese or Malaysian type of furniture.

x. Quality of training should be international level so that the passed-out graduates can compete in the international market.

xi. In order to ensure job-security, all teachers and staff of 18 new polytechnic institutes should be transferred to revenue budget. At present, their non-pensionable services are bothering them so much so that it affects their job performance.

xii. In order to improve women's participation in polytechnic, hostel facilities and financial supports need to be provided. It is also important to find out more women friendly and market demand-oriented technologies for them.

8.2 Conclusions:

A project like this is, by no means, sufficient to produce technical man-power through 38 polytechnic institutes of the country. The project has, to some extent, achieved its physical target, but it took longer time than due. Students' enrollment has increased since completion of project. It will keep on growing, if the current trend continues. Hardly 83-85 percent enrolled students survived upto their 4th year. The reasons for high dropout rate are still unknown. Male-female students enrollment is quite low (e.g. 12:1). This can be improved by providing financial support, hostel facilities and introducing female-friendly technology. Due to lack of in-service training facilities, teachers themselves could not update them with technological know-how, though there is a tremendous interest in them. According to

the principals and teachers, they are not getting any benefit or training support from their national technical training center. Teacher-students ratio is highly unsatisfactory (1:55+) depending upon subject/technology). Government failure to provide teachers, as per sanction of the project, has considerably thwarted the project to achieve its stated objectives. In fact, more deployment of teachers, supply of equipment, hostel facilities, regularization of jobs of 18 new polytechnic institutes , providing internet facilities, improvement of carpentry works and periodic training of teachers, establishment of at least another 25-30 polytechnic institutes in country may help significantly to achieve government's vision to transform young population into productive workforce.