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PROBLEMS OF TERTIARY ENGINEERING EDUCATION OF BANGLADESH AND SOME SUGGESTIONS FOR POSSIBLE IMPROVEMENTS

Dr. Shyamal Kanti Biswas¹,

¹Professor, Mechanical & Production Engineering,
Ahsanullah University of Science & Technology, Dhaka, Bangladesh.

ABSTRACT

We think, tertiary Engineering Education in Bangladesh at present is having some problems. This can be known from the occasional various remarks of related educationists, related officials of the country or organizations through media or seminars or from various newspaper articles or news. To discuss this many seminars/conferences have been arranged by many organizations in recent days. The causes of the present scenario might be many and also opinions and suggestions for improvement might vary too. Remaining attached with engineering higher education of the country for more than 4 decades in local public institutions of higher studies, the author got a chance to have a close look on the problems. This paper tried to outline the problems related to accreditation or decline in quality and also some suggestions for possible improvements of tertiary engineering education. In this paper the author wanted to put forward his personal views about the problem and also some personal suggestions for possible improvement.

Key words: Quality Assurance in Education, Washington Accord / ABET / ISO / International Mobility Forum, BAETE, etc., criteria for accreditation.

A. Introduction

In this paper some personal opinions are mentioned aiming at not to hurt anybody. We feel tertiary Engineering education in developing countries is needed to be given relatively more attention especially as, we believe, the growth and development of any country is dependent on qualified human resources in the Technological fields. We appreciate the initiative of the UGC & Govt. of Bangladesh in entering into a contract with World Bank for improving the present state of tertiary education in Bangladesh by establishing HEQEP (Higher Education Quality Enhancement Program) and under that program various activities have already been started. Besides, many seminars to discuss the issue are being arranged by many organizations including professional bodies.^{[10][11]}

We all know that many years back Japan took a especial plan to improve the education system in Japan by establishing 8-9 imperial universities and other appropriate measures and neighboring Sri-Lanka also took a plan to improve the educational level in that country. Japan and Sri-Lanka started getting the benefits from the programs they initiated earlier. Also Indian leaders conceived during '40s - '50s that India's future development might be dependent on improvements in tertiary Engineering / Technical education, development of highly

knowledgeable human resources, development of heavy industries, acquiring latest technology in all sectors etc. Thus India initiated, along with other measures, establishing IITs under direct control of central Government and giving full autonomy in their developments and within a link program with benchmarked famous Technical Universities of USA / Europe / Asia. At present IITs are now ranked among best universities and their graduates are being attracted in global markets too. In the last few decades our national Governments formed multiple education commissions to solve problems in this sector. But sometimes before the full implementation of the recommendations of one commission another new such commission was formed. Such commissions sorted out many problems and also suggested solutions and many such suggestions have been implemented. It is desirable that a separate education commission aiming to sort out and solve problems only related to Engineering / Technical education and profession should be formed by the Government immediately, as we all know that any country needs qualified and technically skilled human resources to solve problems related to infrastructure development of the country and also we believe that future development of any country is quite dependent on advancement of Technology.

*Corresponding author, Tel.: +88-01817-746070, +88-01813-261758

E-mail address: skbaust@yahoo.com, skbiswas.mpe@aust.edu, skbcuet@yahoo.com

A) Quality Assurance in Higher Education^[9]

Universities offering tertiary engineering degrees of which all are not internationally accredited yet. Supplying quality graduates to job market from any educational Institution is essential like that of industrial goods. For goods ISO standards / Regional standards / standards of respective countries etc. are usually followed. For Education various National standards / respective Professional Organizational standards / Regional standards etc. have been designed and can be followed. For Engineering or Technical education, ABET / ISO / Washington Accord / International Mobility Forum / National Professional society like Engineer's Institutions' standard/ National accreditation board like BAETE of Bangladesh standards / other regional standards, etc., can be followed. In many cases the procedure is either difficult or much attention is not always given for follow-up by appropriate authorities, and also interest in implementation is not enough as there is no compulsion to follow. Internationally accredited programs are now frequently desired to remain in / enter into the competitive global market and for that getting accreditation is the cry of the day now.

Accreditation record in Bangladesh is not at all good. Among widely followed various types of world / regional rankings even our best universities like Dhaka University, BUET, etc., are not ranked high, rather conditions are worsening rapidly^[3]. Therefore, it is high time to look back to our old heritage and march forward keeping in pace with world thinking in these days of high competition and globalization as it will not be wise to remain satisfied believing that we are good now or were good earlier. Otherwise our graduates will suffer in world market and at the same time we might fall back in our development efforts.

Black box representation of an University:

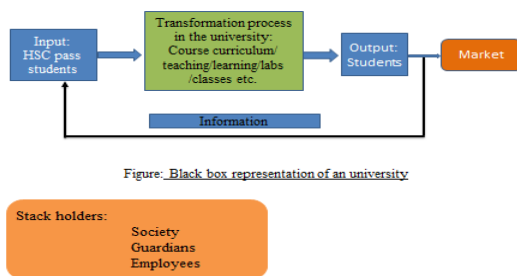


Figure: Black box representation of an university

Like Industrial goods some factors which can be controlled by respective educational institutions / universities like providing proper teaching-learning methodologies and facilities e.g., teaching by following standard updated latest curriculum / Syllabus, recruiting qualified and knowledgeable teachers / staffs, following standard class routine /

program, providing proper classroom size and class room facilities, using proper audio-visual aids & maintaining other proper teaching-learning environment; following standard grading system and other types of merit evaluation systems for students'; maintaining proper teacher-student ratio; providing proper laboratory, library facilities and other related infrastructural facilities; providing proper guidance / consultation to students; maintaining off-time recreational / refreshment arrangements inside campus; etc., should be strictly monitored and maintained.

In addition other controllable factors like maintaining proper teachers' / staffs' evaluation process; motivational policies to attract highly qualified teachers / brilliant students to remain and to join in teaching profession; maintaining university-industry or organizational relationship; regularly getting feedback from employers through Tracer Study program; developing other related programs to allow students to develop his / her own physical / mental capabilities, etc. must be maintained for the interest of the graduates / employers / owners of private companies / universities.

In my personal opinion accredited degrees must be made a requirement for job offer. We also know that it is the time for moving forward, market economy and globalization and also is the age of rapid technology change and environmental change. So, no compromise about the quality of education should be made for the development of the country and also for producing qualified human resource.

Many educationists tried to put forward their opinions about improvement / accreditation: Prof M H Khan^[1] emphasized on the following for the improvement of quality in education: (i) teaching programs require external (peer review) and internal academic auditing (ii) Academic autonomy of teachers should be ensured within the guidelines of ethics, (iii) properly designed grading systems should strictly be implemented to indicate the merit of students, (iv) Curriculum and syllabus should be developed to meet the academic challenges (v) Accountability of the weaker students should be shared by them as well as by their guardians. Some other authors stressed on Out-come Based Education^{[5],[6]}. Biswas et al.^{[4],[7]and[8]} discussed the importance of quality control and importance of accreditation of education and in a key note paper Biswas^[10] discussed the present scenario of tertiary education of Bangladesh. Both Prof M H Khan^[1] & Prof. Iqbal Mahmud^[2] stressed on peer review and academic auditing. Prof Iqbal Mahmud^[2] discussed his ideas on accreditation and quality which has been summarized in Figure 1 in the following:

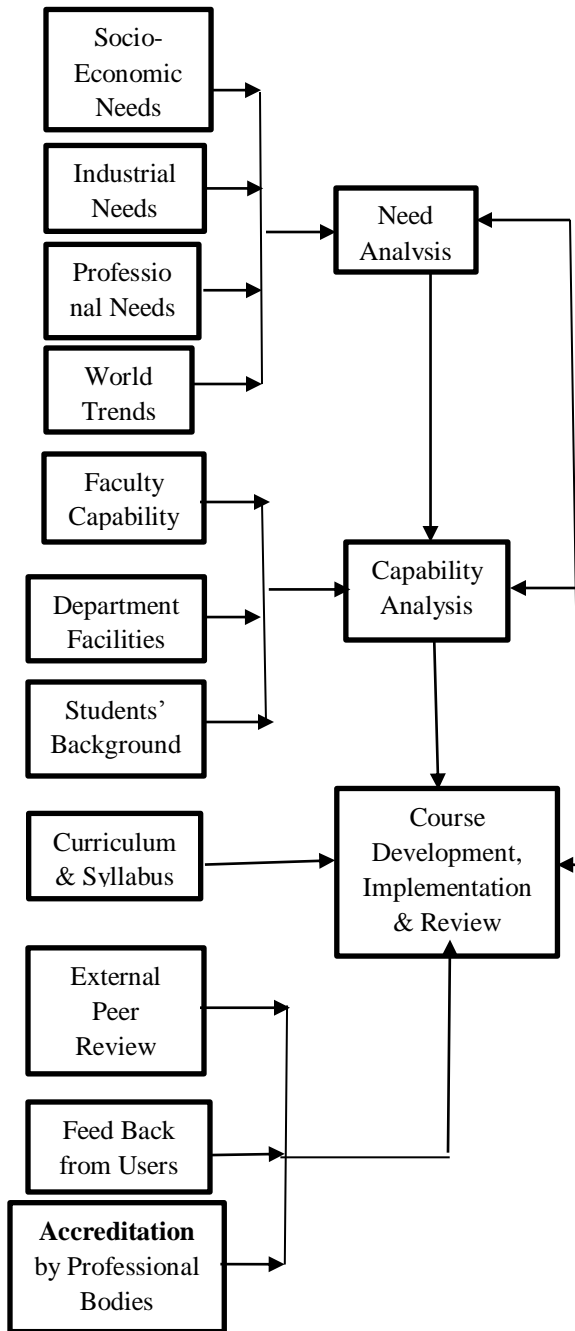


Figure: 1

B) State of tertiary education in some developing countries like India, Pakistan, Malaysia, Saudi Arabia, Bangladesh^[9].

At Present some university programs in Saudi Arabia / Malaysia / India are internationally accredited. In Pakistan and in Bangladesh too accreditation of university programs are given emphasis now. We think, the scenario of tertiary Engineering education in Bangladesh can be improved by giving relatively

more attention by the UGC (university Grants Commission, Bangladesh) like (i) Ensuring relatively more autonomy to the universities at least regarding quality of education, (ii) Regular monitoring to see whether the universities are following approved rules, (iii) A binding to follow uniform recruitment rules for teachers / staffs / officers of the universities, (iv) A binding to follow uniform and similar service rules and other benefits in all universities, (v) A binding to follow strictly the approved student intake rules, (v) Controlling almost all approved controllable and uncontrollable factors, For this Strengthening the authorities of the UGC and allowing it to function as higher education commission is essential. Also Decision giving time must be shortened if possible.

C) Problems of tertiary Education in Bangladesh^[11]

I think, the following are the major problems related to tertiary engineering education in Bangladesh:

(i) Absence of proper accreditation requirement or ignorance / avoidance of accreditation requirements:

Proper Quality assurance / accreditation program must be followed at least to satisfy the requirements of the present employers. Preferences in job placement, in promotion, and in salary determination, may be given to the graduates of highly accredited degree programs. *Programs of Universities failing to get accreditation repeatedly must not be allowed to continue.*

(ii) Absence of strict and uniform guidelines for recruitment / promotion in universities:

(a) Teachers' recruitment and promotion:

Strict and uniform qualification test for the recruitment of all university teachers must be followed. The following points may be considered: (i) Under no circumstances, no teacher having same higher degree should be given theoretical class / practical classes of students' studying to get the same degree as that of teacher. Hence no teacher should be appointed as Lecturer in Engineering without having at least a M.S. or M. Phil or equivalent degree in relevant field. (ii) No teacher in Technical / Engineering universities should be promoted / appointed as Assistant Professor / Associate Professor / Professor without having a Ph.D. degree and other required academic qualifications and experiences, (iii) The entry requirement in teaching posts may be made as at least M.S / M.Phil. degree in the relevant field and if such qualified teachers are not available, conditional appointments of very brilliant persons having only B.Sc. Engineering degree or equivalent as Lecturers may be made in the next 5-10 years in local universities to teach only at practical/sessional / tutorial classes and if needed post

of Tutor / Junior Lecturer may be created for such teachers in the presently followed hierarchy of teaching posts. (iv) ***Research / publication requirement should be made mandatory for recruitment as Assistant Professor / Associate Professor / Professor and preference should only be given to candidates having strong research background and publication records*** (v) Industrial / Outside Organizational practical experience for a limited period may be made mandatory for recruitment as teacher at tertiary level of engineering / technical education, (vi) No graduates of one university should be recruited as teacher in that university at least in the first few years after graduation. Such practice is sometimes followed in some foreign universities. (vii) ***No promotion to higher teaching posts should be made without having a PhD degree but only considering present qualifications and experiences like long service record, having excellent contributions in administrative / departmental works, long teaching record, etc.,*** (viii) Any teacher of any university if he/she marries any colleague / student of that university, he/she should not be allowed to continue in teaching post in that university.

Besides the above points the following may also be followed (i) Non-academic jobs should not be given to academic staffs in general, (ii) Part time teachers should not be employed if possible, etc. (iii) Teachers preferring to enter into administrative post must be identified and be allowed to remain in administration as far as possible and teachers in academic line should not be taken to non-academic posts as far as possible. Except Head's and Dean's post all other higher administrative posts of any university may be filled up by qualified persons / Professors of other universities.

Examples of foreign universities may be followed for those points as discussed above for recruitment.

(b) Staff recruitment:

Transparency in staff requirement must be established strictly. All university staffs should be recruited strictly by following approved qualification test.

(iii) Absence of required basic knowledge in Science and English for Technical Education in new students' intake:

(a) Students' intake:

Fresh students must be admitted strictly by following approved admission criteria. All types of 'quota' if any should be abolished and if possible one central admission test should be held for all applicants on any particular date. Strict control during new intake is to be maintained with respect to basic knowledge in

Science, Mathematics and English as any higher Technical education without a solid background on these subjects becomes a burden later. *It is now considered that level of English language in local higher secondary passed students is poor and thus is not sufficient for technical education.*

(b) Residential facilities:

If possible proper residential facilities, having strict rules to reside, should be developed, to free students from annoyance of searching accommodation and food. For this, rules followed in other foreign countries may be followed.

(c) Facilities for co-curricular & extra-curricular activities:

Facilities for all types of approved co-curricular or extra-curricular activities should be provided by the respective university to develop like a perfect human being.

(iv) Problems of privatization and lean control:

Although officially many private universities have been permitted to operate locally but there is a rumor that some are not strictly following the conditions set by the authorities. So, universities failing to follow approved set rules must be forced to discontinue operation. **Universities should not be thought as profit making business enterprise at all. There should not be any system to purchase a degree or completing a set program with minimum effort.** Besides, strict control to check the performance of the private and public universities by the UGC should be enforced at least for quality and also to monitor the implementation of other set conditions / rules.

(v) Politicization of education & outside interference in running day to day affairs and policy making:

Education should be made totally free from all political influence. University laws / regulations must be made so that there remain no scope for political appointment or to interfere in any type of decision making. Everybody should remember that ***if education is lost everything is lost forever.***

(vi) Absence of non-uniform rules & regulations in many universities:

Rules like those (i) for recruitments; (ii) service rules like leave rules, rules for higher studies etc.; (iii) for payments of all types of financial benefits, etc., should be made uniform in various universities failing in that might cause serious dissatisfaction in all employed teachers & other staffs of universities. It should not be advisable to forget that people usually compares what he/she is getting with others.

(vii) Absence of strict demand of job providers:

Job Providers too should follow strict rules for all recruitments. Organizations / Industries should maintain close relationship with universities. Industry- university forum should be established in all universities at least for course-curriculum review, research funding / tracer study / Study tour and internship/job placement, etc. Each organization / industry should have one R & D department to solve its own problems as well as for future development of any new product. **No recruitment should be made for non-accredited degrees and under influence. Minimum level of quality must be ensured in all jobs.** All engineers serving in any practical job must have local professional society membership.

(viii) Professional accountability of teachers / staffs /officers of universities and Service length:

Strict accountability procedure must be defined and must be communicated at the time of recruitment. **No service be made permanent and all services should be made on contract basis for a limited period. No extension / promotion should be given to teachers if he/she fails in defined accountability, having adverse evaluation report by authorities / students and failing to fulfill set publication and research criteria and having bad service records, etc. Evaluation by the Students' as well as by the authority should be made mandatory for promotion and continuation in teaching service. The doctrine "Publish or Perish" may be followed if required.** For staffs too similar criteria may be developed.

(ix) Absence of tracer study / job placement / Alumni Association and counseling programs:

Each university should have tracer study program to know how its graduates are performing. Also each university should have strong job-placement program and Alumni association. Alumni association can help universities in many social / institutional development activities and tracer study can help universities in updating curriculum and syllabus. **Universities should review / update curriculum and syllabus on a regular basis** to cope with the requirements of job-providers, change in Technology developments, etc.

(x) Strategic policy relating to education:

Long term strategic plan for the development of higher education especially the engineering education must be defined / launched for the development of the country. The author thinks that there must be clearly defined national policy about the relationship among the tertiary engineering education, industrial development, establishment of heavy industries and general development of the country.

(xi) Other related matters relating to tertiary Education:

(a) Granting special pay scale and especial service length to attract brilliant persons to teaching profession.

Special Salary scale for teaching profession is needed to be provided to relieve teachers of economic hardship at all level should be made so that teachers can remain mentally free from economic problems, only then university teachers will be able to concentrate on quality and research. **Teachers' service length should be extended up to a approved limit** to get the benefit of their experiences and knowledge in the field. Examples of other famous foreign universities may be followed in this respect. **Posts of supernumery, Professor emeritus or by other names may be created to attract really deserving Professors to remain in teaching**

(b) Diverting relatively more national budget to Education sector.

More emphasis on the development of education should be given through allotting more national budget on education sector.

(c) Establishing development / link program with bench-marked universities of developed countries to develop local universities.

It was done for BUET, Agriculture University at Mymensingh, and for IITs of India at birth. For the sake of future development and also to get share / guidance of bench-marked universities link programs between local universities with famous foreign universities should be made for the greater interest of the educational quality and also for the development of tertiary Engineering education.

D) Suggestions for possible improvement in Tertiary engineering education in Bangladesh.

1. Strict accreditation requirement in all educational institutions of higher education must be made.
2. Syllabus / curriculum must be updated in every 2-3 years considering local industrial requirements / Technology change / Globalization effect, etc.
3. Strict approved academic guidelines for accountability in teaching job should be enforced giving emphasis on ethics.
4. Strict approved guidelines for recruitment of teachers / administrators / officers / staffs in all universities must be followed.
5. Uniform admission policy for new students must be enforced and if possible one central admission test for all universities may be taken.
6. Establishment of exchange / link programs with Bench marked universities may be established.
7. Strict Government policy so that education cannot be considered as business is to be made and universities selling certificates or not fulfilling quality requirements must be closed down.

8. Minimizing of outside interference in university affairs should be made effective and universities should be given full autonomy at least for academic development and quality management.
9. No political appointment at any level should be made. Politics should be banned in universities.
10. Retirement age of teachers in general should be made higher and creation of special salary structure for teachers should be made and other motivational policy like creation of especial teaching posts like Supernumery Professor, Professor Emeritus etc. for really deserving professors may be implemented.
11. Initiation of government interference to remove the opinion differences among Engineers / technologists / diploma holders should be started soon. For this, practices in developed countries can be followed.
12. Continuing education / on-job training / apprenticeship, etc. programs for graduates and Study tour / Internship / industrial attachment, etc. programs for students may be implemented soon and may be encouraged. Job-fair / product exhibition / seminars / workshops should be held regularly to demonstrate creativity in students.
13. All universities should start offering post graduate degrees immediately to enhance research activities. Teachers must be provided with sufficient funds to do research. Industries should start R & D program soon and university-industry forum must be established soon to solve related problems. Tracer Study program, formation of Alumni Association / Job Placement cell, etc., may be created may be done / created soon.
14. Strict follow-up program for students' / teachers' performance evaluation be made effective.
15. Private university zones like export processing zones with many common facilities, without highlighting failures of private universities only, may be created by the Government. Regular and strict follow up program should be followed for all public & private universities by the appropriate authorities.

E) Conclusion

Some of the present problems in tertiary Engineering / Technical education have been discussed in author's own view. Also some suggestions have been given for possible improvements. In fact the total education should be made influence free from all sectors. A separate education commission to improve tertiary engineering education should be formed soon by the Govt. consisting of thinkers in this line. Students should be brought under the control of

teachers and strict quality control on all sectors of education and accountability at all sectors should be strictly established. Role of UGC should be made relatively more-broad based. UGC should act like ombudsman. Accreditation of University degrees should be made compulsory for any job or entry to higher education and also for continuation as university teacher. Peer review of univ programs may be implemented.

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