

## NATIONAL FRAMEWORK FOR ENGINEERING EDUCATION DELIVERY MODELS IN SOUTH ASIA

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### Abstract

There does not exist any national qualification framework (NQF) for higher education in Bangladesh. If a higher education model of Bangladesh can be prepared in harmonizing with models of Europe and USA, Bangladeshi citizens can travel more easily to those countries for employment purposes and to pursue additional studies. Bangladesh being a human resource export country must not miss the opportunity to get an access to the competitive regional and global employment market. As higher education system in Bangladesh and those in Europe and USA as well culture, religion and language are highly diverse, idea of harmonization of national model of Bangladesh with those in Europe and USA may not be feasible at this stage. But the idea of regionalism in higher education in South Asia is very exciting. Bangladesh being a member of South Asian Association for Regional Cooperation (SAARC) and having some similarity in education system, Government of Bangladesh should work with other South Asian countries to create such framework. Bringing NQFs for higher education of different countries in South Asia into one frame work can be seen as an important step towards the regional integration objective. Once the framework works well, then harmonizing the frame work with models in other countries in the world can be done.

**Keywords:** Higher Education, engineering education, national qualification framework, harmonization of models.

### 1. INTRODUCTION

The development of National Qualifications Frameworks (NQFs) has been a major international trend in reforming national education and training systems since the late 1990s (Tuck, 2007, Stephanie, David and Michael, 2008, Michael, 2005). In the intensely competitive global environment, the economic fortunes of every country are determined by the quality of its national education and innovation systems. In this context each country should have developed at least its national framework for higher education to ensure compatibility of qualifications and learning outcomes within and outside of the country. Taken this context into account, the framework for the European Higher Education Area or the 'Bologna Framework' was developed in 1999 (Armstrong, 2009). The Bologna Process is a series of ministerial meetings and agreements between European countries designed to ensure comparability in the standards and quality of higher education qualifications. Main actors in the Bologna Process were: (a) education ministers of countries that signed the Bologna Declaration, (b) representatives of European universities (EUA), (c) professional higher education institutions (EURASHE), students (ESU), (d) quality assurance agencies (ENQA), (e) the United Nations Educational, Scientific and Cultural Organization - European Centre for Higher Education (UNESCO-CEPES), and (f) Education International (EI) and Business Europe. The Process was also supported by the European Commission and the Council of Europe.

Initiatives have been taken in developing national qualifications frameworks in Asia-Pacific Economic Cooperation (APEC) (Armstrong, 2009, Wesley, 2003). At present 110 countries have National QF (Gerald, 2009). However, to date there is no QF across countries that are not in the same geographical proximity. The task of creating a common higher education framework for countries that are not in the same geographical proximity is insurmountable in view of the vast differences in the structure and performance of the various higher education systems. On the other hand, creating a common higher education framework for countries in the same geographical proximity is relatively less difficult. Bangladesh is a member of South Asian Association for Regional Cooperation (SAARC). SAARC, as a regional block comprising of eight countries namely, Bangladesh, India, Pakistan, Afghanistan, Sri Lanka, Nepal, Bhutan and Maldives. The combined economy of SAARC is the 3rd largest in the world in the terms of GDP (PPP) after the United States and China and 8th largest in the terms of nominal GDP. SAARC nations comprise 3% of the world's area and contain 21% (around 1.7 billion) of the world's total population. The SAARC policies aim to promote welfare economics, collective self-reliance among the countries of South Asia, and to accelerate socio-cultural development in the region.

South Asia has been integrating rapidly mainly through trade and investment. This region is also witnessing increasing mobility of people in countries of the region and between regions. This new context places higher education in a pivotal role in developing human resources capable of creating and sustaining globalized and knowledge-based societies. Bringing NQFs for higher education of different countries in South Asia into one frame work can be seen as an important step towards the regional integration objective. Therefore, harmonization of different national qualification models is essential. Harmonization of different higher education models is a process that recognizes the significance of regional education cooperation and the importance of establishing an 'area of knowledge' in which activities and interactions in higher education, mobility, and employment opportunities can be easily facilitated and increased. According to Hettne (Hettne, 2005), harmonization is cyclical, and a policy process (functional cooperation) and policy tools (lesson-drawing, policy externalization, and policy transfer) anchors it.

There are benefits in creating a common higher education space in South Asia. The more obvious ones are greater mobility, widening access and choices, academic and research collaborations, enhanced collaboration on human capital investment, and the promotion of SAARC and/or South Asian within the fast changing global higher education landscape. The immediate advantage of such harmonization in higher education system is presented as easier exchange and mobility for students and academics between nations within South Asia apart from member countries availability to access systems, tools and best practices for quality improvement in higher education.

## **2. DEVELOPING NATIONAL QUALIFICATION FRAMEWORK (NQF)**

NQF is the route through which a country brings education and training together in a single unified system. Work for a qualification framework aims at (a) create a single integrated national framework for learning achievements, (b) accelerate the redressing/ rectification of unfair discrimination in education, training and employment opportunities, (c) assist higher education institutions in designing education programs as well as upgrading existing ones, (d) support quality assurance system and quality enhancement and (e) support lifelong learning. Few decades ago, higher education was largely provided for elites and for the purpose of administration and leadership. But today the scenario has changed. Now higher education provides knowledge and skills training to many as it are necessary to enhance an individual's employment opportunities. There are different types of stakeholders, 'employers', 'parents', 'students', 'education providers', 'Alumni', 'Quality Assurance Agency (QAA)'. NQF should be developed meeting expectations of the stakeholders though they have different needs. Employers expect that higher educational institutions adequately prepare students to achieve professional skills so that they can better serve the increasing needs of society and industry. Students expect that they can easily go abroad for employment purposes or to pursue additional studies with the education they will receive from institutions. Therefore, NQF of a country must be introduced to ensure compatibility of qualifications within and outside that country.

During the last few decades many developed and developing countries have brought a paradigm shift in higher education system. Universities in Europe, North America, Africa, New Zealand, Australia and some counties in Asia have adopted Outcome-Based Education (OBE) to promote educational revitalization. OBE adequately prepares students for life and the work force (Spady, 1994, Don., 1983 ). The traditional education (TE) system has failed to equip students with proper learning and it cannot adequately prepare students for life and work in the twenty first century (Brown, 1988, pp. 125). The basic goal of traditional education is to present the knowledge and skills of the old generation to the new generation of students, and to provide students with an environment in which to learn, with little attention (beyond the classroom teacher) to whether or not any

student ever learns any of the material. The superiority of the alternative education system, OBE at achieving desired both cognitive and affective educational outcomes has been demonstrated in thousands of empirical research studies and is heavily supported by modern cognitive science ( Haile,1997, pp152-57). The OBE process ties together the different stakeholders that define the department's Program Education Objectives (PEOs) along with the Program Outcomes (POs). The POs are further mapped in terms of Course Learning Objectives (CLOs) ( Don., 1983). The process flow of OBE for any discipline is illustrated in Fig. 1. Living in highly competitive globalized world, Bangladesh cannot set itself aside from globally recognized educational system.

#### OUTCOME-BASED EDUCATION

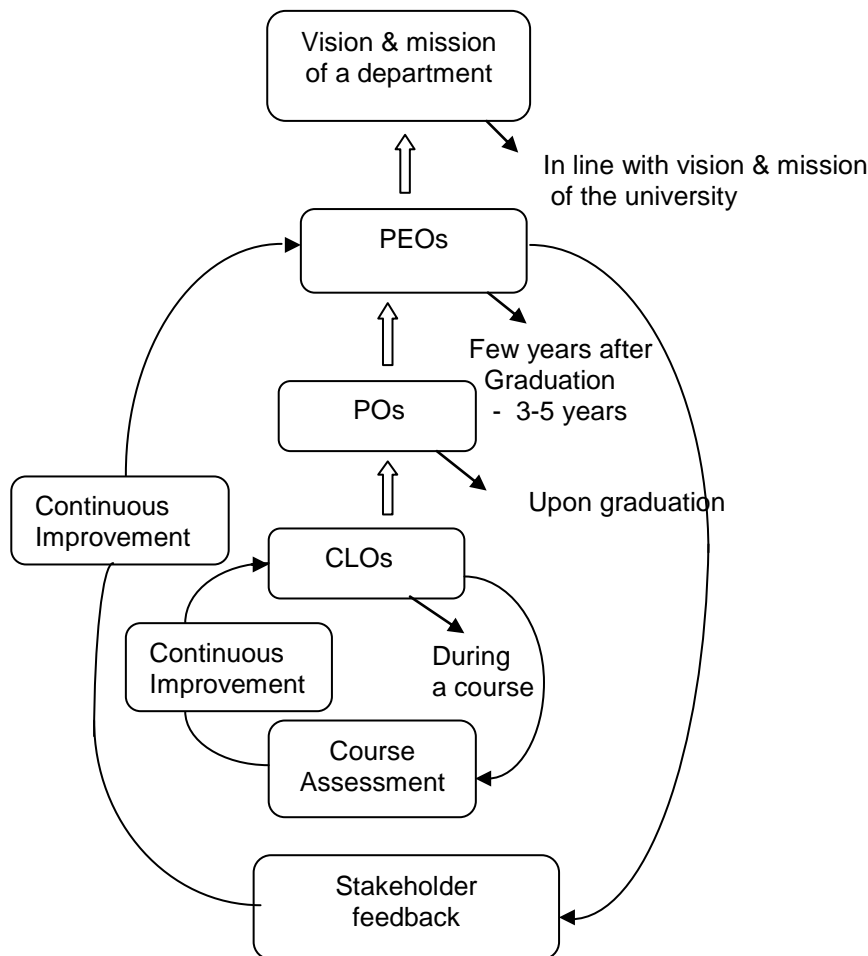


Fig.1. OBE Process Flow.

### 2.1. Developing NQF in Bangladesh

Bangladesh did not have any NQF. NQF development is very complex and is a very dedicated task for policy-makers and qualification agencies. It also requires involvement of all stakeholders. As there is no tradition of involving stakeholders and social partners in education and training policy and legislation in Bangladesh, this will make it more difficult and complicated. Schools and universities in Bangladesh have been practicing traditional education (TE) since emancipation of the then Pakistan in 1947. Even after its emergence as an independent country in 1971, education system in Bangladesh has not overhauled.

The education system in Bangladesh is characterized by co-existence of three separate streams (Shafiqul, Tahman, Mahbubur, 2008., Zaman, 2009). The mainstream is a vernacular based secular education system. This education system is divided into 4 levels-- Primary (from grades 1 to 5), Secondary (from grades 6 to 10), Higher Secondary (from grades 11 to 12) and tertiary (3-5 years). Students enter universities for a first degree (bachelor) and can continue their studies up to master's and doctorate degrees.

OBE possibly will not be successful in schools and colleges in Bangladesh. It will not be easy to merge three separate streams into one. All schools must follow the same curriculum prepared by The National Curricula and Textbook Board (NCTB) (Bureau of Education, 1974). NCTB also has prepared curriculum for colleges. Therefore, schools and colleges will not be able to set its own mission and vision and will prepare program educational objectives, program outcomes and course learning outcomes based on the vision of the institution and degree offering department. PEOs, POs and CLOs are the essential components of OBE. Schools and colleges may not be able to involve stakeholders in preparing curriculum. Schools and colleges will face many challenges in implementing OBE and assessing students' performance as prescribed in OBE. Teachers are at the core of quality improvement in education. Unfortunately due to low wage and less opportunities, teaching at schools and colleges does not consider as an attractive profession in Bangladesh. Qualified graduates do not prefer this profession. Under-qualified graduates are recruited as teachers; many of them have chosen this profession as they did not get any other jobs. The school and college teachers are involved in other businesses in order to maintain their family. Many teachers are always busy in active politics and give limited teaching time. For successful implementation of OBE, teachers will be required to reorganize the curriculum, increase the amount of time allocated to monitoring individual student progress against outcomes, administer appropriate forms of assessment and maintain comprehensive records. Many of them will not show interest in studying the new education system. They will oppose in implementing OBE apprehending they will have to give more time to the students if OBE is implemented. OBE will fail because of limited government funding.

The higher education sector in Bangladesh has expanded significantly during the last two decades or more (Bureau of Education, 1974). At present, there are 115 universities in Bangladesh compared to only seven in mid 1980s. Out of these, 34 universities are in the public sector, while the other 81 are in the private sector. The total number of students in the public and private universities is about 2,50,000. Like schools universities also follow traditional education system. Also, a large number of teachers in non-engineering universities are actively involved in politics and hold various non-academic positions. They have very limited teaching time. Like school and college teachers, many of them will oppose in implementing OBE as they will have to give more time to the students if OBE is implemented. A small portion of teachers in engineering community in Bangladesh are involved in active politics. Technological education has been recognized as a priority sector by all governments. There is a possibility that OBE will succeed in engineering education in Bangladesh. In OBE assessment and evaluation processes are shown in Fig. 2. The major challenge for most of the engineering programs in Bangladesh will be to prove that their graduates are able to achieve the POs. The program is expected to show that a process of measuring, assessing and evaluating the degree of achievement of the students shall be established. Subsequently, the results of this assessment process shall be applied for continual improvement of the programme. Initially a simple technique should be used due to limitation in resources and lack of interest of teachers in spending time in assessment and evaluation. Universities may adopt a rubric based analysis (Nirmal, 2008) of an activity (final exam, homework, report, presentation, term project etc.).

Opportunities of employment of engineering graduates both in Bangladesh and outside countries increase day by day. A decision needs to be taken whether Bangladesh will develop NQFs for all sectors of education and training now. It is important to be clear about priorities, especially where there are significant resource constraints. It may suggest focusing efforts on one sector of education and training rather than a comprehensive NQF which includes all sectors of education and training.

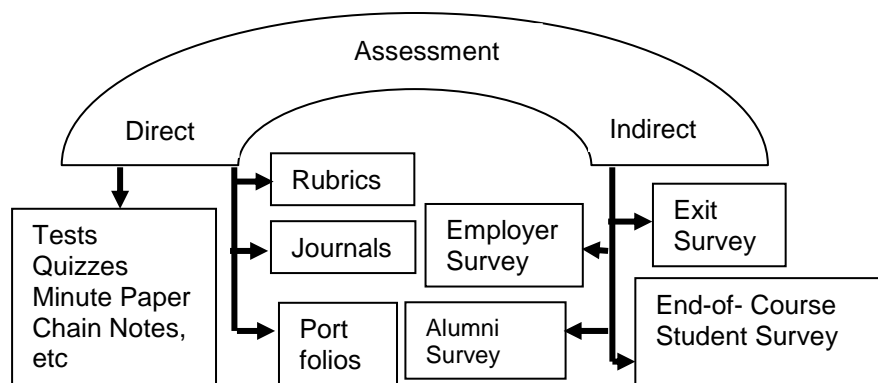


Fig.2. Types of assessment.

In order to cope up with fast changing global engineering education landscape, Bangladesh should prepare a National Frame Work for engineering education model aiming at:

- a) Create a single integrated national framework for learning achievements
- b) Involvement of stakeholders in qualifications systems
- c) Assist engineering education institutions in designing education programs as well as upgrading existing ones
- d) Support quality assurance system and quality enhancement
- e) Support compatibility and comparability at international level and facilitate recognition of qualifications
- f) Support lifelong learning
- g) Harmonizing NQF with NQFs of other countries in South Asia

The NQF process should be started based on a broad involvement of stakeholders at all stages of the process, coordinated by the Ministry of Education and university grants commission (UGC). Other relevant ministries (science and technology, labor market, culture, youth) should have also been involved in the development.

### **3. HARMONIZING ENGINEERING EDUACTION SYSTEM**

The American higher education system has become more influential after the early twentieth century with the stress on research as the main activity of universities. Apart from that, the American system was the first to introduce massification of education which had been adopted by many countries around the world. The engineering education in Bangladesh is in line with USA system and is as follows:

- (a) Bachelors program, 4 years duration (bi-semester or trimester): 130-150 credit hours
- (b) Masters program, minimum one year duration: at least 30 Credit hours including course and thesis/project work
- (c) Doctoral program, minimum three years duration : at least 54 Credit hours including course and thesis work

On the other hand, the higher education system in Europe is different from that of USA. The three cycle system of the 'Bologna Framework' (Armstrong, 2009) is as follows:

- (a) Bachelors program, 6 semesters duration: at least 180 ECTS Credits
- (b) Bachelors program, 8 semesters duration: at least 240 ECTS Credits
- (c) Masters program: at least 120 ECTS Credits
- (d) Doctoral program : at least 120 ECTS Credits

However, universities in Europe and North America have adopted Outcome Based Education (OBE) to promote educational revitalization. Not many countries in South Asia have introduced OBE in engineering education. There are countries in South Asia which offer both four and three years engineering degrees and others offer five years in addition to three and four years bachelor degrees. Educational models in South Asia vary and are not uniform. The task of creating a common engineering education space is insurmountable in view of the vast differences in the structure and performance of the various engineering education systems and institutions in South Asia. Whilst developing and agreeing to minimum standards and ensuring equivalence and comparability of qualifications between and within countries are important elements of this process, a primary focus is to enhance quality across the sector and facilitate processes that lead engineering education systems to be able to inter-operate more effectively to the benefit of development in South Asia. Process flow for harmonization is shown in Fig. 3

South Asia should look towards the Bologna Process as a model to adopt in seeking to harmonize engineering education in the region, thus bringing together such issues as quality assurance, student mobility, and recognition of degrees, diplomas, and certificates. It is important to draw on the lessons learned in Europe while acknowledging the significant cultural and material differences among the continents.

The primary goal of harmonization in engineering education systems of different countries in South Asia is to create general guidelines in areas such as degree comparability through similar degree cycle and

qualifications framework, quality assurance, lifelong learning, or credit transfer system and so on. The Harmonization of different models that is most desired and considered most feasible is that which does not require all higher education systems to conform to a particular model. The consensus should be that a system

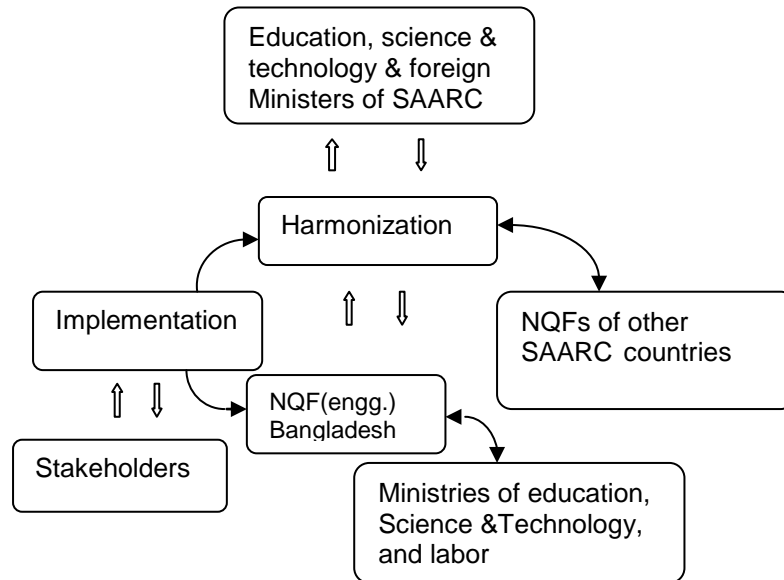


Fig. 3. Process flow for harmonization.

that becomes a reference or one that can be fitted into without jeopardizing cultural diversity and national identity is considered most feasible and desired. The general guidelines will facilitate and smoothen student mobility, lifelong learning, and hassle-free movement of talented workers within the region, which will strengthen regional economy in the long run. In other words, in countries of South Asia with a harmonized system of higher education there will be continuous interactions and mobility for students, faculty members and talents and professionals.

### 3. CONCLUSION

The key to achieving high rates of economic growth in Bangladesh lies in development and utilization of her human resources, the only resource Bangladesh has in abundance. There is widespread agreement that provision of quality education in general, and higher education in particular, is a key factor in national development and for nations to compete successfully in the global knowledge economy. Unless a vigorous overhauling in existing higher education systems is not carried out, NQFs for higher education in different sectors cannot be achieved. First an NQF for engineering education is proposed. If NQF in engineering is successful, then NQFs for other areas can be developed. Harmonization of NQF with those of other countries in South Asia has a significant role to play in encouraging mobility of students, academics and professionals, while it can also become an effective vehicle for ongoing, systematic improvement in the quality of higher education delivery across South Asia. Harmonization of education systems, particularly higher education systems will be important for the integration of South Asia Regional cooperation (SAARC) countries. This system could be developed or constructed on the basis of a common, but not identical, practices and guidelines for cooperation in education.

SAARC countries need to improve the quality of their education systems as many graduates lack the skills needed in today's rapidly changing workplace. All countries should have a common education system. Higher learning institutions should introduce the alternative education system, OBE Education Language is a key towards the development of a global community. SAARC countries are rich in culture, diverse in language and religion but have one common goal, to be united as one. Mostly, the language barrier has always been a constant problem among the people of the member countries. This is a great challenge to the SAARC community to further create programs on how to address this issue. The increase of usage of English language is one of the focal areas to be considered.

For South Asia, directives should come from the political masters. Thus the role of governments of South Asia is very critical to a successful implementation of this idea of harmonization of the higher education systems. Equally important, national prejudices and suspicions need to be put aside if we are to realize regional aspirations and goals.

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