

Capacity Building for Engineering Education in War-Affected Countries

Bahawodin Baha, University of Brighton

Dr Bahawodin Baha is a principal lecturer at University of Brighton in England since 1989, where he has been teaching and conducting research in electronic engineering.

Besides his teaching in the UK, he has been helping Higher Education (HE) in Afghanistan since 2005 and has conducted many projects on improving higher education in Afghanistan.

Recently, he was on sabbatical leave for two years and was technical advisor at the Ministry of Communication and Information Technology (MICT) in Afghanistan. During his work, he worked very closely with the Ministry of Higher Education (MoHE) and Kabul based universities.

He was a visiting scholar at Virginia Polytechnic, Institute and State University in the USA in 1991 – 1992.

————— Dr Judith Watson has been a senior research fellow at the University of Brighton in England since 2001, where she conducts research in education studies, particularly the geography of education and training.

She has conducted numerous projects for governmental and NGO bodies in the UK on educational evaluation and planning. She currently runs the only course in the geography of education currently offered in a UK university at undergraduate level, and is preparing a textbook based on that course. She also has research interests in regional planning and environmental education. She is reviews editor of the international journal Capitalism Nature Socialism.

Dr. Judith Watson

Capacity Building for Engineering Education in War Affected Countries

Abstract

This paper will briefly discuss the progress which has been made in the higher education sector in Afghanistan and will identify the main challenges to enhancing the capacity of engineering institutions. The importance of scientific and higher education for economic development for countries such as Afghanistan is discussed. Recommendations are provided to improve the building of capacity in engineering institutions in Afghanistan.

1. Introduction

It is well known that educational institutions, like other institutions in war-affected countries, will be devastated by long wars. Rebuilding the countries' infrastructure requires resources in terms of finance as well as human resources. Within those human resources, well experienced engineers and technicians are essential for vital sectors such as energy, transportation, telecommunication, agriculture, mining and construction.

Afghanistan is regrettably one of those countries which have been affected by wars for nearly four decades. However, after the creation of the new government with the assistance from the international community in 2001, many public and private engineering institutions were established in the country [1]- [2]. In fact, there is some sort of university in almost every province in the country [3]. Unfortunately, such an expansion was not carefully thought out, as there is no natural progression to focus on strengthening the various levels of the educational institutions in the country.

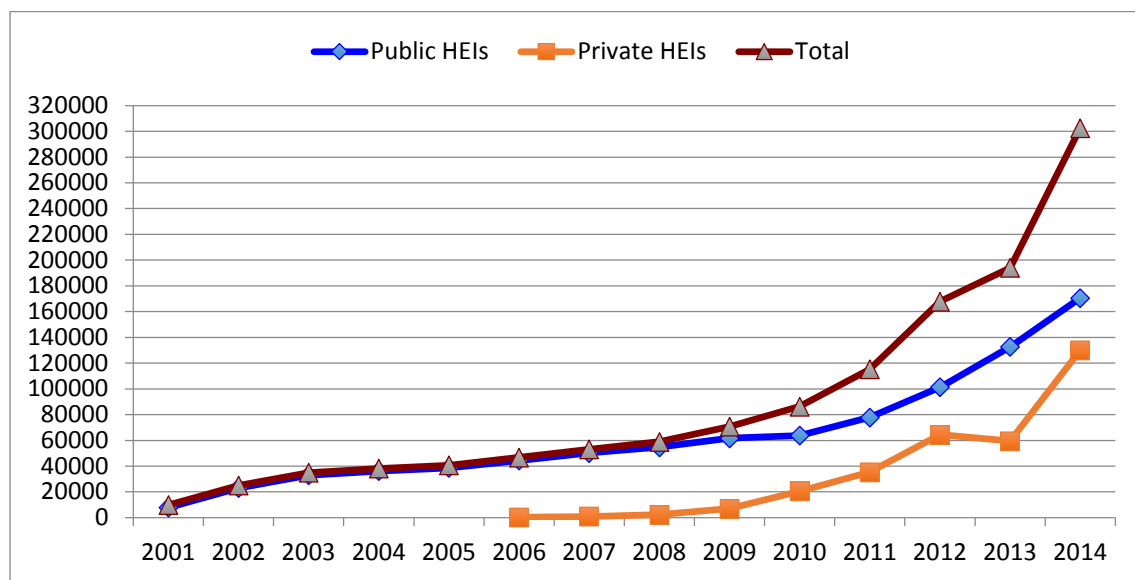
Building the capacity of engineering institutions is a major challenge for the present government to tackle as it is crucial to prioritize planned growth in higher education especially in engineering, science and technology. As like in the developed world, technological development can help to raise the standard of living in Afghanistan.

This paper will briefly review the progress of engineering education in Afghanistan during the last decade and will highlight the main capacity-building challenges that engineering education in Afghanistan is facing at present. On this basis, practical recommendations will be made to address these challenges, which can enhance the quality of engineering education in the country and thus lead the Afghan people towards a better, more self-sufficient future.

2. Overview of the higher education sector

The education sector in Afghanistan has experienced significant progress in terms of student number entering the universities in addition to establishing new colleges and universities throughout the country. According to the Ministry of Higher Education (MoHE) strategic plan from 2014 -2019 [4], there were only six public universities and no private universities or higher education institutions in Afghanistan before 2002 while the number of public and private universities has risen to as many as 126, of which 34 are public and 92 are private.

Similarly, the number of students in the same period has risen from less than twenty thousand students to nearly three hundred thousand students as shown in Table 1.



Source: MoHE data 2001-2014 [4].

Table 1: student number entering higher education, 2001 - 2014

Furthermore, it is anticipated that the number of students will increase by approximately 12% annually for the next four years. As the number of high school graduates in the country is year by year, therefore, the number of students entering higher education will increase even further in the future [4]. Afghanistan has a very young population and the numbers in youth cohorts are certain to increase for the foreseeable future [4].

Despite this increase in the number of students entering higher education, the World Bank report suggests that student enrolment in the country is still the lowest in the region [5].

According to the MoHE figures, approximately 60% of students are studying science and engineering and the remaining 40% are studying social science subject disciplines.

Because of poor economic conditions, the university education is free and students are admitted to public universities on the basis of university entry exam results. Therefore, admission to the universities in the capital and some major cities is very competitive.

As scientific and engineering education which is vital for the economic development, therefore, it will be highly productive to quality of scientific and engineering education. To improve the quality of engineering education, it will be essential to address the main challenges that will be discussed in the next section.

3. The Challenges of the existing system

According to the knowledge and experience of the authors, efforts to enhance the quality of higher education in Afghanistan should be focused in the following areas:

3.1. Educational qualification of the academics

Some lecturers at higher education institutions have been trained abroad during the last thirteen years [4]. However, most of them run businesses or have second or third jobs alongside their main job at the university. Consequently, they may only be working part-time at higher educational institutions. Consequently, it is highly unlikely to predict significant progress in the near future unless the role of the law is properly implemented.

3.2. Enhancing the management practices

The vast majority of the decision makers at the Ministry of Higher Education (MoHE) and major universities in Afghanistan do not have strong exposure to international practices and therefore, do not possess the experience which is highly desirable to manage higher educational institutions. They also lack the experience to properly evaluate the suitability of the existing educational programmes at higher educational institutions in Afghanistan. Furthermore, they do not have the vision to enhance the quality of higher education in the country.

3.3. Weak role of the law

The implementation of nation-wide regulations and standards within the higher education system has not been very successful; unfortunately, politics plays a significant role in issues such as the appointments of senior managers and even teaching staff in most institutions. It is

regrettable that politicians intervene in academic affairs, such that high level politicians often put certain managers at higher education under pressure to make certain decisions.

Influential figures and politicians use universities and higher education institutions to promote their own political agendas, something that could be very damaging. Education should be separated from politics, and the young generation should be encouraged to focus solely on their education in their young age, they can pursue politics later on in their life.

3.4. Lack of regulatory bodies for all subjects

The shortage of well-established regulatory bodies for all subject disciplines and the sudden expansion of the higher education system in the country have had a major effect on the quality of graduates from universities and higher education institutions in Afghanistan. The sudden expansion is due to political pressure in the public sector and short-term gains in the private sector, which has significantly reduced the quality of graduates from higher education. International norms should be used to establish proper regulatory bodies who would evaluate and determine the suitability and quality of all of the courses taught at public and private universities.

3.5. Lack of policies and plan to improve science and technology-based education

Improving education in science, technology and engineering is essential for the future development of Afghanistan. Information Communication Technology (ICT) can contribute significantly to accelerating the development of the education system in the country. It is believed that the integration of ICT into the country's education system could see in introduction of distance learning, enabling the establishment of a knowledge network for students and academics and increasing the availability of quality teaching material.

3.6. Coordination between colleges and universities

At present there is little collaboration and coordination between the universities within Afghanistan. Sustained communication between universities has great potential to significantly improve the quality of education in the country, primary by developing the courses and taught material such that they become more relevant to the local job market. The present job market is not a realistic one, as most of the more talented graduates are recruited for short-term positions at international and non-governmental organizations. The main employer in the country is the Afghan government where most of recruitment is based on political affiliation rather than academic merit.

The universities in Afghanistan ought to have close collaboration by sharing their best practices and hence guide the Afghan government to establish sustainable policies that will create wealth within the country and generate more employment opportunities.

3.7. Creating a vibrant private sector

Due to high demand, over ninety six private higher education institutions has been established in Afghanistan during the last twelve years. However, the purpose of that expansion is not clear, and major concerns remain in the following areas:

- a. The lack of suitably qualified academic staff teaching at such institutions.
- b. The lack of appropriate learning resources in science and technology-based subjects.
- c. The management practices and the experiences of the senior managers of such institutions.
- d. The lack of suitable learning environments; most institutions have been accommodated in small buildings or, in some cases, in houses.
- e. Most government employees (in some cases high rank) study a few hours during evenings in such institutions and they are awarded degrees after four years. The quality of their education is questionable and sadly some institutions in this category are considered degree generating institutions.

3.8. Improving job prospects for higher education graduates

Traditionally, the Afghan government has been the main employer for graduates from high schools and higher education institutions, including the universities, across Afghanistan. However, during the last decades many national and international organizations have recruited the most talented individuals by offering higher salaries and better work conditions. In addition, the private sector has been established specifically in the construction, telecom and IT industries.

Despite the limited progress, the Afghan government has not carried out a thorough assessment to establish a relationship between the existing courses at universities in Afghanistan and employment opportunities in the country. Furthermore, to the best of the author's knowledge, there is a lack of a sustainable policy to create an industry in the country which can create jobs and wealth.

4. The importance of engineering education in promoting of economic development in developing countries

Science and engineering education is crucial for economic development in countries such as Afghanistan and the lack of “economic development” usually means that a country is locked in production of raw materials or basic manufacturing rather than advanced manufacturing or command and control functions. History has shown that because of the advances in technological development, the quality of life over the last 200 years has been improved more than the preceding 7000 years [6]. Regrettably, because of instabilities and numerous wars, not every part of the world has benefited from such development over the last 200 years. For such countries, it is essential to establish high quality science and engineering education beside strong government institutions.

In addition, economic development is also closely related to social development and there are several ways to build up an economy, which can be tried at the same time. One is attracting foreign direct investment. That tends to introduce large-scale industry, with a sharply fluctuating demand for skilled labour. The other is by endogenous growth, encouraging small-scale industry. These strategies can be pursued in parallel, but they have different, possibly conflicting, implications for the development of engineering education.

The existence of a wealth of raw materials in Afghanistan is not necessarily conducive to its development of a sound and resilient manufacturing base. This can be seen in other examples, for example Saudi Arabia and the Gulf States, where there is considerable wealth but based entirely on exploitation of raw materials and not on a varied range of primary, secondary and tertiary activities.

Technology transfer is also important and may have vital role in economic development. As a Nigerian engineer has argued: “Engineers provide the bridge between science and society.” In this role, engineers must actively promote and participate in multidisciplinary teams with other professionals, such as: ecologists, economists, medical doctors, and sociologists, to effectively address the issues and challenges of sustainable economic development because engineers working on a global scale will help promote public recognition of the engineers and understanding of the needs and opportunities in today’s fast developing world in order to ensure the engineers’ role in a sustainable economic development in it [7].

As the industrial base in countries such as Afghanistan is extremely limited, it will not be productive simply to copy the engineering education from a western country in order to establish engineering schools over there. In fact, it will be important to learn from history and perhaps take a different approach and prioritise training the youngsters in vocational engineering schools. For instance, in the early 1960s all vocational education developed on the model of engineering education. Developed countries like the USA and the UK spread this model to the rest of the world. In Afghanistan the USA and USSR and Germany built some engineering and technical vocational schools.

The role of the technician was also stressed, and what has come to be known as “intermediate skills”. The UK realised that the relative success of American engineering, evidenced in industries like aerospace that had been crucial in the Allied victory in the Second World War, was based on a well-developed education system, with particular emphasis on the development of draughtsmen (generally men in those days). It was also in the USA that “co-operative education” emerged. In the UK this became the “sandwich course” model, usually the “thick sandwich”, where an undergraduate studied for two years in the university or college, then had one year in industry, returning for a final year of full time study.

In many countries in the West, institutions have been subject to long-term “academic drift”. They drop lower level courses in favour of academic ones, and then offer fewer undergraduate opportunities and more postgraduate ones. It is understandable that institutions act in this way when these are the highest prestige courses. However, the question of educational progression is crucial. There has to be a system of ladders and bridges so that people from all sorts of backgrounds and all parts of the country can steadily develop their expertise. And these progression routes need to allow for cross-movement between education and training institutions on the one hand and the labour market on the other.

In developing countries like Afghanistan, there is a large social and economic gap between the majority of the population, with few education and training opportunities of any kind (especially women in the case of Afghanistan), and the small number of well qualified people, especially when they have studied in the West.

5. Conclusions

The issues related capacity building of engineering education in war affected countries has been investigated in the papers and most of the factors have been identified which were

presented in the previous section. Further requirements for the capacity building of engineering institutions in the war torn countries are as follows:

- a. The relevance of the existing engineering education system in the country should be fully evaluated. Then, the system which is more suited to the environment should be implemented. The present system where US-style or European-style engineering education is copied without modification may not be beneficial for such countries where there is a lack of industry. Nor does the production of qualified engineers in itself lead to the development of manufacturing industry. In the developed world engineers learn basic knowledge of engineering at universities and learn practical skills in industry, through structured work experience programmes developed in collaboration with educational and industrial partners.
- b. Suitably qualified and experienced academic, technical and administration staff is essential for any educational institution. Despite the fact that effort has been made to train a large number of academics abroad, especially at master's level, these efforts have not tremendously improved the quality of education. This is because the majority of teaching staff at higher education have more than one job. In turn this is because their salaries are low, although they are much higher than those in higher education institutions in the 1980s. Still, the commitment of staff is rather limited compared to their colleagues in the 1980s.
- c. Learning resources such as libraries, laboratories and IT facilities with of course fast Internet connections will have huge impact on improving the quality of engineering education.
- d. The expansion of the education system should carefully planned in such a way as not to compromise the quality of education.

5.1. Recommendations

To build the capacity of engineering institutions, the following recommendations are made:

- i. A working group be formed by the Afghan government to study the shortcomings of the existing education system in Afghanistan at all levels. Hence, seek solutions to

address such problems. It will be will productive to invite Afghan and other experts at some stage to discuss various issues related to engineering, science education in Afghanistan at all levels and hence develop policies that will improve science, engineering and technical vocational education in Afghanistan, which is vital for the future development in the country. Then, those policies should be implemented by the various ministries of the Afghan government.

- ii. Regulatory bodies must be formed to evaluate the existing courses at the universities and set benchmarks for each course. The standards education provided by the private institution is inadequate at present.
- iii. Particular attention must be paid to agriculture, mining, energy and other essential sectors which are vital for the economy of the country.
- iv. Technical Vocational Education and Training (TVET) are essential for any country, which has not been properly exploited in the country. TVET can be related to vital sectors such as construction, agriculture, mining, energy, telecommunication and etc. We need people with skills for the above sectors.
- v. Stone Age management practices are currently used in Afghanistan where ministries are not created to address the fundamental issues in the country.
- vi. Establishing partnerships with universities in the developing countries will have a major impact on the quality of education.
- vii. There are many youngsters who are looking for jobs; it will be productive to investigate ways to create jobs and seek solutions for this problem.
- viii. Educational services are expensive; therefore, it is essential to debit the financial aspect of education system in the country.

6. References

1. Baha, B., Baha, Z., "*Technical Vocational and Engineering Education in Afghanistan*," Proceedings of the 2008 American Society of Engineering Education (ASEE) Conference, Pittsburgh, USA, June 2008.
2. Samady, R. S., "*Education and Afghan Society in the Twentieth Century*," United Nations Educational Scientific and Cultural Organisation (UNESCO), November 2001.
3. Holland, D. G., Yousofi, M. H., "*The Only Solution: Education, Youth, and Social Change in Afghanistan*," *Anthropology & Education Quarterly*, Vol. 45, Issue 3, pp. 241–259, ISSN 0161-7761, online ISSN 1548-1492.
4. Ministry of Higher Education report (2015), National Higher Education Strategic Plan 2015-2019; Ministry of Higher Education (MoHE), Kabul.
5. The World Bank (2013), Higher Education in Afghanistan, The World Bank, Washington DC.
6. Ngai, R. (2009), *Macroeconomic Principles*, Pearson Education Inc, pp. 23 -87.
7. <http://nigeriaworld.com/articles/2010/dec/093.html>, accessed 27.01. 2016.