AC 2008-1032: TECHNICAL VOCATIONAL AND ENGINEERING EDUCATION IN AFGHANISTAN

Zarjon Baha, Purdue University

Zarjon Baha is currently professor of Building Construction Management at the College of Technology at Purdue University, West Lafayette, Indiana. Prof. Z. Baha received his BS degree from Kabul University and Washington University, St. Louis, Missouri, MS degree from Purdue University, West Lafayette, Indiana, and Ph.D. from North Carolina State University, Raleigh, North Carolina.

Prof. Z. Baha has been teaching at Purdue University since 1982. Prior to 1982 he was working at the Faculty of Engineering at Kabul University, Kabul, Afghanistan. He served as the head of Civil and Agricultural Engineering as well as the Dean of Engineering at that faculty before joining Purdue University. The Department of Vocational and Technical Education (VTE) was one of the five departments of the faculty as the first such department in the country. The main focus of VTE was to train teachers for the Vocational and Technical High Schools in the country.

Since 2002, Prof. Z. Baha with other team members of Purdue University has made four trips to Afghanistan to help the country in the area of higher education. The latest project where Z. Baha served as the principal investigator was on Vocational and Technical Education for Afghanistan. There were two country workshops conducted in Afghanistan to train the trainer on the issue of Vocational and Technical Education related to Afghanistan. Also several Afghans were brought to Purdue University where they could learn about the different approaches used for Vocational and Technical Education in the State of Indiana.

Purdue University has been working with the Higher Education Institutions of Afghanistan since med 1960s and recently got a significant grant for helping in the area of Agriculture and Veterinary sciences.

Bahawodin Baha, University of Brighton

BAHAWODIN BAHA is a senior lecturer (equivalent to associate professor in the U.S.A.) at the Faculty of Science and Engineering, University of Brighton, UK. He received his BS from Kabul University and his M.Sc. and Ph.D. degrees in Electrical Engineering from the Universities of Salford and Brighton respectively. He has been teaching at University of Brighton since 1989. He has conducted a survey for the Afghan government and UNDP about the current state of Technical, Vocational Education (TVE) and Engineering Institutions in Afghanistan in 2004. In addition, he has been actively involved to help higher education in Afghanistan, especially Kabul University since 2005. He has published several papers and reports on improving higher education in Afghanistan. Since December 2006, Dr. B. Baha has been helping Engineering Educational Institutions in Afghanistan under a DFID funded project, which is called Developing Partnership on Higher Education (DelPHE); this programme is managed by the British Council. The details about various activities of this project can be found at the following website: http://www.uobkupartnership.talktalk.net.

The University of Brighton has recently signed a major partnership contract with Kabul Polytechnic University (KPU) and the Ministry of Higher Education in Afghanistan under the World Bank sponsored programme, which is called Strengthening Higher Education Programme (SHEP). The project is aimed at improving Engineering Education in subjects related to electrical, electronics, communication and computer engineering at KPU. Dr. B. Baha is the principle investigator of this project.

Technical Vocational and Engineering Education in Afghanistan

Abstract

Technical vocational and engineering education in Afghanistan has a long history but because of the instabilities in the country, this sector like many other sectors, has experienced catastrophic destruction. This paper discusses the history, present conditions, and the progress of Engineering and Technical Vocational Educational (TVE) institutions in Afghanistan. It has been recognised that the establishment of Engineering and TVE institutions is vital for the reconstruction and future development in the country. Therefore, recommendations are made as to how TVE and Engineering education in Afghanistan may be re-established to meet international standards and to address local needs.

1. Introduction

Afghanistan was a stable country during the period of the early 1930's to the late 1970's and had a relatively established educational system in the country. Although education was compulsory in the country at the primary level where such facilities were available, the literacy rate was still very low. The country was progressing well towards democracy and the people in general were realizing the importance of education for attaining individual achievements and development of the country. Education through high school was becoming more common throughout the country.

Several institutions of Technical Vocational Education (TVE) were established in Kabul and other provinces. Due to the lack of technical facilities in the country, the development of Technical Vocational Education was slow compared to the general education of first through twelfth grades. Most of the TVE institutions, especially the successful ones, were established with the help of other countries such as the USA, the USSR, Germany, the United Kingdom, and others. Technical Education in Afghanistan was initiated at the university level with the establishment of the Faculty of Agriculture and Engineering in 1956, with the help of the USAID, and with the establishment of Kabul Polytechnic in 1968, with the help of the USSR.

During the Communist regime, 1978 to 1992, the educational system was downgraded systematically, and many male students above the age of fifteen were either conscripted to the military or forced to leave the country to avoid military drafting. Many of the faculty members and other intellectuals, who were found to be unsympathetic to the new Communist government, were imprisoned, killed, or left the country to avoid persecution.

After the withdrawal of soviet forces from Afghanistan in 1989 and the subsequent collapse of the Communist government in 1992, a more chaotic situation, and civil war conditions prevailed in the country. The buildings and other facilities of the higher educational institutions, including TVE, that were until this time under government control were severely damaged or totally destroyed in all major cities. Laboratory equipment, furniture, and libraries were looted and in some cases burned to ashes.

Since the establishment of the new government with the help of the international community in 2001, the progress in establishing a proper educational system in the country has been very slow as most of the effort has been focused on security and governance in the country. There is an urgent need for teacher training, new buildings or repair of existing physical facilities, establishing suitable libraries and computer centres, and equipping the laboratories, among other needs. However, despite all these difficulties, most educational institutions are functioning with very little teaching facilities and with severely inadequate academic staff.

It has been realized that Technical Vocational Education (TVE) institutions can play a major role in the reconstruction of war-ravaged Afghanistan. Therefore, this paper highlights the current situation of TVE institutions in Afghanistan, and provides recommendations for the establishment of new TVE institutions throughout the country. The challenges to rehabilitate or establish new TVE institutions to achieve the objectives are discussed.

2. History

Technical Vocational Education, and Engineering Education, has a relatively long history in Afghanistan. The Faculty of Engineering, and Kabul Polytechnic, were the two main institutions in the country which provided Bachelors of Science (BS) degrees in undergraduate engineering education in the country before the Communist takeover in 1978. Several TVE and agricultural high-school level or community-college level institutions were established throughout the country to provide technical and vocational education in the construction, energy, telecommunication, automotive, and agricultural fields. Engineering and TVE institutions were mainly established with the financial and technical assistance of the international community including the USA, West Germany, and the USSR. A brief discussion on this subject is presented here. Further details on the historical development of these institutions can be found in the references "Education and Afghan Society in the Twentieth Century,"[1] "Engineering Education in Afghanistan,"[2] and "Presentation of Engineering Curricula to the National Committee for Engineering Education."[3]

Before 1978, the curriculum of the Faculty of Engineering at Kabul University was virtually identical to typical engineering program curricula in USA institutions. The majority of faculty were trained in the USA and they were using USA text books. From the beginning of the school in 1956 until 1978, the school had continuous affiliation with the USA institutions through USAID support. At the beginning, from 1956-1963, the University of Wyoming at Laramie, Wyoming, helped the school. Then, a team of ten universities under the name of USET (US Engineering Team) helped the school from 1964 to 1974. The team of ten universities included Georgia Institute of Technology, Purdue University, Rice University, University of Cincinnati, Carnegie Mellon University, North Carolina State University, Stevens Institute of Technology, Illinois Institute of Technology, University of Notre Dame, and Washington University. From 1974-1978, the University of Nebraska at Omaha helped the Faculty of Engineering as the last affiliation before the Communist takeover of the country.

During the time of the affiliations, from 1956 through 1978, an important part of their mission was to train Afghan academic staff to become self-sufficient in their teaching abilities for the future. At the end of these affiliations, the Afghan faculties were able to carry the academic operation of the school with enormous success, compared to non-affiliation-assisted higher-education institutions in the country. The majority of the faculty members at the School of Engineering possessed Masters of Science (MS) degrees from US institutions and a good number of faculty members possessed Doctors of Philosophy (Ph.D.) degrees.[3] The Civil Engineering departments which had the greater number of Ph.D.'s were seriously considering starting a graduate program. This would have been the first graduate program in the country.

After the invasion of Afghanistan by Soviet Union forces in December 1979, the first cabinet meeting of Afghanistan decided to close the School of Engineering at Kabul University. Thus the story of a successful centre of excellence in the higher education system in the country ended. Sadly, there was no recognition of the hard work which was conducted by the faculties and staff in making this centre of excellence a success story in the country. Instead, the school was named such as the school of rebels, etc. Many faculty members and students were killed, some were sent to prison, and many were forced to leave the country from the fear of persecutions.

Before the Communist takeover of Afghanistan in 1978, the Faculty of Engineering had the following six departments[3]:

Department of Civil Engineering
Department of Electrical Engineering
Department of Mechanical Engineering
Department of Agricultural Engineering (administered jointly with the Faculty of Agriculture)
Department of Architecture
Department of Vocational Technical Education

The Faculty of Engineering in Kabul University was offering typical USA university-style courses leading to Bachelor of Science (BS) degrees in agricultural, civil, electrical, and mechanical engineering and architecture. In addition to the above departments, in 1974, the department of Vocational Technical Education, which was part of the Faculty of Education, was transferred to the Faculty of Engineering. The primary objective of this department was to train qualified teachers in civil, electrical, and mechanical technologies for the Vocational High Schools and Community Colleges of Afghanistan.

The BS program in the Faculty of Engineering was a five-year program divided into nine semesters of academic work, and six months of a practical training program. In the first five semesters, all engineering students took a common-core curriculum and then were divided into the Departments of Agricultural, Civil, Electrical, and Mechanical Engineering following their own specialty curriculums. Of the other two departments, the Department of Architecture students had only the first year in common with the rest of the five-year program, and were selected through a special exam for those interested in such a program. In the Department of Vocational Technical Education, the students were selected directly

through University Entrance Exam for a four-year curriculum. The medium of instruction for the Faculty of Engineering was English, attracting many international students to this school, as well.

The second institution that offered undergraduate-level engineering education in the country was Kabul Polytechnic Institute, which was established in 1968 with the technical collaboration of former Soviet Union (USSR). The Kabul Polytechnic curriculum closely followed the curriculum of a typical institution of higher education in the USSR. Teaching materials, laboratories, and the bulk of the academic staff were provided by USSR as part of technical assistance. This program, too, had an organized plan to train Afghan faculty to carry the academic operation of that institute in the future. The curriculum of Polytechnic was devoted to the Civil Engineering, Mining, and Geology fields. The curriculum in each area was much more specialized at the undergraduate level than the typical undergraduate program in the US institutions of higher learning. The Polytechnic curriculum was a five-year BS program with six months practical. Most of the teaching materials were translated into the local languages, Pashto and Dari. In some cases, students in the last few semesters could use Russian textbooks in their courses.

Both male and female students were admitted to the Faculty of Engineering at Kabul University, and Kabul Polytechnic Institute, through a general University Entrance Exam that was conducted by the Ministry of Higher Education. Among the applicants, Engineering Faculty was the third favourite career of higher learning after the Medical and Law faculties in the country.

In addition to Faculty of Engineering at Kabul University, and Kabul Polytechnic, several technical community colleges and vocational high schools existed in Afghanistan where technicians and skilled workers in various fields of technology were educated. There was also a well-established two-year telecommunication college within the Ministry of Communications which trained technicians for the telephone and telegraph network throughout the country. Most of the successful vocational programs in the community college or high school levels were also established with external technical assistance from countries such as the US, the USSR, West Germany, and the United Kingdom.

The curricula of technical vocational education at the community college and high school levels were designed to primarily address local needs of technicians in the country. However, due to the importance of higher education in the country, graduates of these programs were also allowed to pursue higher education at the university level through special entrance examinations. Most of the TVE schools had adequate buildings, modern workshops, and laboratory equipment, compared to other colleges and schools in Afghanistan.

Besides technical schools and colleges, there were various agricultural high schools in Afghanistan providing training for skilled technicians and workers in the agricultural field. The authors are unaware about the present state of such schools, but it is known that there is a serious shortage of qualified personnel in the agricultural sector.

The Afghan government was the main employer for the graduates of most educational institutions of higher learning, including Engineering and TVE institutions. Before the 1978 Communist takeover of the country, the development in various industrial and commercial areas in Afghanistan was progressing rapidly. The government took initiative for a major expansion of engineering and TVE institutions in Afghanistan. Examples of such expansion were the increase in the number of students (both male and female) to the Faculty of Engineering from 250 per annum to over 1000 per annum in 1977, the founding of an additional Engineering program at Nangarhar University, and the establishment of several TVE and agricultural schools throughout Afghanistan. The expansion of the Faculty of Engineering of Kabul University was another proof that the leadership in the country favoured the US style of education rather than the Soviet Union system of education which was followed in the Kabul Polytechnic Institute.

3. Current situation

At present, the issues related to academic staff, physical infrastructure, curriculum development, learning resources, and the income of academics have been identified as the main issues to be rectified. To quantify each of these needs, an extensive survey would be required at the field. Attempting to estimate quantifiable figures could result in being misleading. Obtaining figures from the various government departments could also be misleading considering these figures could be subject to the interpretation of the specific departments. Therefore, the authors decided to avoid discussing these controversial issues, and chose instead to solely present the ascertainable issues at this time. Each of the topics stated previously is discussed here.

3.1. Academic Staff

Decades of war, instability, and brain drain in Afghanistan have brought a severe shortage of qualified academic staff in all institutions of higher learning. Most teachers in technical vocational high schools and colleges were trained either by foreign donors who contributed to the establishment of those institutions or by the VTE department of the Faculty of Engineering and Faculty of Agriculture of Kabul University. In the early 1980s, the Faculty of Engineering of Kabul University was closed down and the teacher-training program in the Faculty of Agriculture was stopped. The majority of those teachers had been retired, left the country, or were killed.

The majority of academic staff of engineering institutions at present is educated up to BS level within Afghanistan, under the circumstances where the quality of education was not a high priority on the list of the responsible authority. The present academic staff had very little exposure to the advances that have been made in engineering during the last two decades. Few of those who possess postgraduate degrees, mainly from ex-USSR and East European countries, who still remain in the system, have been isolated for decades from the outside world, and their knowledge is sadly outdated in most subjects.

The concerned authorities should address this problem with urgency, establishing a system that can update the existing faculty by providing short workshops in the country, and by sending a large number of young faculty members abroad for post-graduate work in all

fields, selected on the basis of merits only. Unless there is a qualified cadre of academics in the higher education system, nothing will bring sustainability, and Afghans will never be able to compete globally in the future.

3.2. Physical Infrastructure

The majority of the buildings of TVE and other engineering institutions have been severely damaged by war or due to many years of neglect. Those buildings that survived the war are in a poor state of repair, i.e., leaking roofs, dampness, etc. These buildings have not been maintained for at least two decades and the interiors were totally gutted by warring factions. Running water and the existence of regular power are considered a luxury and the sanitation facilities are in a very poor condition. Considerable work has been done to restore the buildings to a level to carry on partial academic activities, but their situation is far below the time they were 30 years ago.

It is very important that all the buildings be restored to a minimum standard, and the existence of power is absolutely necessary if it is expected that routine work can be carried out in such buildings on a daily basis. The new buildings must also be built with a standard where Afghan economy can afford to maintain them in the future, rather than erecting modern buildings that are beyond the ability to be maintained with local means.

3.3. Curriculum Development

The curricula of all engineering institutions, technical vocational high schools, and two-year colleges were developed using foreign models, depending on who was the donor of the specific establishment. Most of the curricula in engineering institutions were based on theory, with little integrated practical work. It would be beneficial to introduce practical courses, placing emphasis on laboratorial components of the subject so that graduates will be ready for work upon their graduation. Due to the very limited industrial base in the country, Afghan students are not as fortunate as students who live in industrial countries. The Afghan students are not able to complement their education in the workplace during their academic careers or upon graduation.

Similarly, the vocational training schools and colleges were also mostly following foreign models of curricula with some degree of adaptation to local needs. The syllabi of many courses have not been updated for decades and the existing teaching staff in most disciplines may not be aware of the advancement of knowledge in their respective fields in the outside world.

The graduates of technical and engineering education are expected to play a major role in the reconstruction of the country. It is this aspect of the workforce that consumes the lion's share of the international assistance, and very little of the funds are left for actual development projects in the country. It is not unusual to hire 500 Afghans for the salary of one international expert. Instead, less international experts could be used, and replaced by Afghans through proper planning and by shadowing international experts in a very short period of time. Many of the reconstruction projects at the present situation are carried by foreign companies with foreign labourers. As a result, the Afghan professional will have

little chance to acquire the experience needed for developing expertise for future leadership in the country.

A comprehensive review of the curricula, with the help of both local and international experts in the field, should be undertaken and new curricula should be developed for universities, colleges, and technical vocational high schools throughout Afghanistan. This review should address the current shortage of experienced engineers, technicians, and skilled workers in the country. The curricula of technical and vocational high schools should consider the skills required in the location of the school, so that the graduates will have a chance to remain in proximity of their homes upon graduation.

3.4. Lack of Suitable Learning Resources

At present, there are little or no laboratory equipment at most technical schools, colleges, and engineering institutions in Kabul or around the rest of the country. For example, students who are studying electricity at engineering and technical education institutions may not have seen electronic components such as diodes, transistors, or operational amplifiers nor have they access to basic laboratory equipment such as multi-meters, oscilloscopes, signal generators, etc.

The shortage of teaching materials such as textbooks, computers, and laboratory equipment is another issue to be addressed. The majority of learning resources within most TVE and Engineering institutions are outdated, and teaching in most cases is restricted to the lecture notes that have been written decades ago.

Access to the Internet is very limited and the majority of students and staff are not properly trained to use Internet. The lack of suitable and updated reference books, journals, and magazines in many scientific and engineering subjects including TVE is evident in the libraries throughout the educational institutions in the country. Learning an international language in order to learn from up-to-date resources emanating from other countries is an issue that must be tackled throughout the educational system. Books and reference materials in the libraries in local languages are outdated, and students using them will be in a disadvantageous position in the long run.

3.5. Salary Structure

One of the major problems that the whole educational system is facing is the salary structure of academic and technical staff. The salary one makes at the university level can never meet the minimum requirements of a small family in Afghanistan. At this time, an expert working in a non-governmental organization (NGO) may be earning five to ten times more than he would make at a technical institution. It is not realistic to expect an academic staff to be fully devoted to academic work with the existing salary structure in the country.

The majority of technical institutions' staff leave their academic positions totally, or work as part-time employees of the academic institute while earning a living working full-time outside the institute. This is a serious issue and the government who is responsible for practically all academic institutions needs to devise a system where the academic staff can

spend more time in class with the students and on research activities. Only by keeping these professionals can technical education be made a success in the country.

4. Progress since 2001

As discussed in the preceding sections, the majority of TVE and higher educational institutions that existed in the country before 1978 are currently in ruins or are under very poor conditions as of this moment. Of great concern is that while these institutions are in the current state of ruins, additional TVE and higher educational institutions are being established in the capital and in other parts of the country without proper planning, and without the availability of essential human, financial, and academic resources.

As an example, the Ministry of Education in Afghanistan has recently produced a National Educational Strategic Plan for 2006-2010[4], which highlights the existence of 42 TVE schools in the country, and the proposed expansion of such schools to 62 by 2010. However, one of the authors has recently visited one of the newly established TVE schools in the capital, and has identified many problems, as discussed in Section 3 of this paper.

The Ministry of Labour and Social Affairs in Afghanistan has produced a National Skill Development Program[5], which presents a more realistic view of TVE in Afghanistan. The reports states "The current situation of the vocational education and training sector is one in chaos, with a myriad of unregulated, unqualified, and inexperienced organizations, providing what is often an arbitrary range of vocational education activities which ignore the labour market, waste resources, and leads to the disillusionment of the trainees." It has also claimed in this document that eighteen TVE centres have been established mostly in the provinces which make it difficult to verify. One of the authors has visited perhaps the new and perhaps the only well-equipped TVE centre in the capital which was established with the technical assistance of the republic of South Korea. It was noticed that the facilities within the department of electrical technology were not being properly used, and that the trainees could not gain sufficient knowledge and experience within a six-or-twelve-month period to conduct practical work outside the classroom.

The establishment of two new institutes such as Afghan Technical Vocational Institute (ATVI)[6] and National Institute of Management and Administration (NIMA)[7] are the latest additions in Kabul for training vocational personnel in the country. The authors have received good reporting about the ATVI from various sources.

5. Recommendations

The issue of vocational education is a serious issue for the development of Afghanistan. Policy makers and other stakeholders need to develop short- and long-term planning and strategies. A national curriculum for technical and vocational education should be developed and the integration of this curriculum into the existing educational institutions should be investigated. Priority should be given to vocational education programs due to their importance for reconstruction of the country. To further improve TVE and Engineering education in Afghanistan, the following specific recommendations are made:

5.1 Present Status of TVE Education

At present, TVE and Engineering Education is managed by the ministries of education, higher education, labour, communication, energy, transport, and many non-governmental organisations (NGOs), and there is very little coordination among them. An organization under the umbrella of the Ministry of Higher Education in close collaboration with the Ministry of Education should be created to oversee all technical education activities within the government structure in Kabul and throughout the provinces. Close collaboration between all stakeholders, i.e., government and non-government organizations, is required to work for a common objective in order to maximise the effects of international assistance and to avoid duplications.

The starting point will be to evaluate the existing technical and engineering educational institutions in Kabul. The facilities and the level of education of the teaching staff of the Faculty of Engineering of Kabul University, Kabul Polytechnic, and TVE colleges and schools should be investigated. The needs and facilities of these technical vocational educational institutions should be identified. Priority should be given to re-establish these institutions with urgency as these institutions can be used for both short- and long-term training and educational purposes. At the present time, it would be impossible for the Afghan authorities to accomplish this work alone, therefore establishing an international team with Afghan counterparts, and with an international funding resource, is needed to enable a comprehensive evaluation of the existing situation.

5.2 TVE Staff Training

The creation of a TVE Faculty or College within Kabul University or Kabul Polytechnic is highly recommended and is aimed to address the following issues:

a. Train teachers for all TVE and agricultural high schools and two-year colleges in the country
b. Formulate and develop training programs at TVE institutions for skilled labourers
c. Provide the rules and regulations and certifications for technicians such as electricians, plumbers, and others.

5.3 Areas of Immediate Concern for TVE

Two types of technical vocational training programs should be developed in the country. The first category of vocational education programs should be focused on high-school level and two-year college-level students where technicians and a high-level, skilled workforce will be trained for the country. Some of the areas that need to be covered are the following:

a. Agriculture
b. Building Industry including highways and roads
c. Electricity and Energy Resources
d. Telecommunication, IT, and Electronics
e. Architecture and Graphics
f. Hotel Management and Hospitality
g. Food and Nutrition industries
h. Accounting, business, and office management

The second type of VTE training program should be focused on people with no formal education such as ex-combatants, refugees, widows, and other adults who have the responsibility for feeding their families. The government needs to create training schemes for people in this category, and train these people in various vocational skills relevant to local needs. Short-term, non-formal, TVE training programs for millions of unskilled and unemployed people, especially in the villages, should be developed. Local TVE institution facilities could be used for this type of training. People in this category can be trained as skilled workers in the following industries:

a. Farming and Agriculture sector
b. Building Industry needs
c. Carpentry and furniture
d. Plumbing
e. Masonry
f. Auto Mechanics

5.4 Addition of TVE Subjects in General Education Curriculum

A few relevant TVE-based subjects should be integrated within the curricula of mainstream general education in the country to create skills and interest in TVE field.

5.5 The Need for Financial Investment

Limited progress has been made since 2001 to rebuild some of the engineering and TVE institutions in Afghanistan. While some of these institutions are functioning with limited resources, new institutions have been established without proper planning and needed investment. Technical education needs substantial investment, and present resources in the country are very limited and cannot afford to establish a viable system of technical education in the country. The need for technical education in the country is obvious if Afghan professionals are going to take part in the reconstruction of the country. Significant international aid is required to address this issue. While the country shall pursue the long-term goal of re-establishing the traditional education program to become competitive in the global market, the country also needs to devise special and quick arrangements to overcome the unique problems of the shortage of skilled workforce that the country faces at this time.

It is a huge task for the people of Afghanistan to overcome the catastrophic destruction of her institutions and educational infrastructure. This task cannot be accomplished without extensive foreign aid and investment. It is hoped that USAID, the European Union, Japan, China, India, other concerned countries, various U.N. aid agencies, and other international corporations will provide the urgent help necessary to re-establish Technical Vocational and Engineering education in Afghanistan.

In order for the Afghan population to take a role in their country's present reconstruction projects, the Afghan government needs to be proactive in attracting international assistance in building its human capacity. However, total reliance on foreign aid will not provide a

sustainable long-term solution. The government must plan and measure her progress towards self reliance.

5.6 Collaboration with the Outside World

The Afghan government needs to explore the possibility of close collaboration, including student and staff exchanges with educational establishments through USAID, the British Council, the European Union, Japan, China, India, various UN agencies, and other bilateral assistances.

Afghan expatriates working at colleges and universities in the Western world can play a catalytic role in re-establishing proper technical vocational and engineering education in Afghanistan. Afghan expatriates teaching at such institutions in the Western world will have up-to-date knowledge in their disciplines, could easily comprehend the existing situation in the country, would be instrumental in bringing rapid changes, and would properly utilizing the existing resources. These academics could participate in short-term training of the existing staff at the institutions of higher learning in Afghanistan. Expatriates could help in preparing curricula, training junior academics, and offering timely seminars in the urgently needed areas of each institution. Some progress has been achieved to address these issues as the five major engineering institutions in Afghanistan have established a kind of partnership with well-known universities in the USA, Europe, and Asia through a World Bank sponsor program entitled Strengthening Higher Education Project (SHEP). The aim of this program is to promote strategic planning and the introduction of a development and reform program at key higher educational institutions. Although there might be other less-publicized international affiliations, the following is a list of the Afghan engineering institutions and their international partners that are known to the authors:

a. Faculty of Engineering, Kabul University, Afghanistan, with Kansas State University, and Ohio University, USA, and with institutions in other countries such as Japan.
b. Department of Electrical Engineering, Kabul Polytechnic University, Afghanistan, with the University of Brighton, UK.
c. Faculty of Engineering, Nangarhar University, Afghanistan, with San Diego State University (SDSU), USA.
d. Faculty of Engineering, Herat University, Afghanistan, with the University of Hartford, USA.
e. Faculty of Engineering, Balkh University, Afghanistan, with Asian Institute of Technology (AIT), Thailand.

The success of the above and other partnerships should be closely monitored by the Afghan government and the World Bank.

5.7 Distance Learning and Information and Communication Technology (ICT)

People around the world have been witnessing rapid technological changes, particularly in Information and Communication Technology (ICT). These changes subsequently bring

new opportunities and challenges emerging from the widespread transformation of products, services, and the organizations we are working in. Educational institutions find themselves at the core of this change, both as service organizations in responding to these changes, as well as being the fundamental provider to facilitate this change in the extensive social learning.

Distance learning is an important strategy to be considered for the promotion of all types of education including TVE and engineering education. However, there are major obstacles in introducing suitable distance-learning programs in Afghanistan at this time. The lack of suitable communication networks, reliable power source, affordable ICT equipment, ICT experts, and computer programs using the local Pashto and Dari languages to name a few. Due to the very limited qualified academic staff in the country, distance learning shall be looked into as a serious alternative to resolve some of the immediate staff shortage problems.

5.8 Strategic Planning for Higher Education

The creation of new, and the expansion of existing, higher education institutions should be based on a national strategic plan where the need of the workforce is predicated and the education facilities are created to respond to such need. The present aspiration of high school graduates towards higher education, and the resulting pressure created by them on higher education institutions, is enormous and is forcing the government to expand the higher education institutions without proper planning. Serious attention must be given to the present status of higher education institutions to be of any value for the students who attend them and for the employer who is expecting to utilize the graduates of these institutions. One of the solutions is to create short-term TVE institutions so that the badly needed workforce could be provided in the country. Once the proper role of the TVE is recognized in the society, many graduates of high school will choose TVE education instead the present trend where everyone would like to go to the university.

6. Conclusions

The authors believe that the establishment of appropriate engineering and TVE institutions in the country will play a major role in speeding up the reconstruction process. Furthermore, the education of citizens in general is an important step in establishing a peaceful and prosperous society in Afghanistan. Effective rules of law can only be established through education. The society, after three decades of war, could become a modern society through seeking appropriate solutions to its problems. These objectives cannot be accomplished without extensive external help from the international community.

It is imperative to make an overall evaluation of the international assistance and its impact on the whole of the country. Re-engineering of the international assistance may be needed where present methods of disbursing the international aid are ineffective.

The success of most development and reconstruction projects can only be guaranteed if suitably qualified and experienced Afghans are placed in the front line, as they will have the eventual responsibility of establishing civil society in the country. Keeping only a few

selected Afghans on the payroll of the donors will result in developing animosity among the various social classes in the country, instead of helping the country. As in every other society, the development of the middle class through education can help to bring stability, and avoid extremism. Perhaps one of the criteria to measure the effectiveness of international assistance in the country would be to measure how much of each Dollar of aid spent will remain in Afghanistan.

The establishment of the various educational institutions at the present time seems to be based on criteria other than academic long-term endeavour. Each of the 32 provinces in the country is competing for having an institution of higher education without consideration of the prerequisites of the establishment for such an institution. During a series of workshops being held in Afghanistan, a study was conducted through USAID funding, where a few Afghan participants were brought to the US to look into the Technical Vocational Education in Indiana. The final recommendation of the study came in the form of a white paper entitled "Technology Workforce Development."[8] In this paper, it is recommended to establish five Human Resource Development Centres, four regional centres, and one in Kabul. The four regional centres include one in Mazar-i-sharif to serve the northern region of the country, one in Herat to serve the western region, one in Kandahar to serve the southern region, and one in Nangarhar to serve the eastern region of the country. Each centre would have a subject area of emphasis, depending on the need of the specific region. It is obvious that substantial support of the international community will be needed to establish these five centres for human resource development. It would be advisable to start one such centre as a pilot project before attempting the other four. The already-established Afghan Technical Vocational Institute[6] in Kabul could be strengthened as one of those five centres, and could also learn from its experience.

Currently, there is a tremendous pressure from high school graduates, that all high school graduates be absorbed by the higher educational institutions, and as a result, the capacities of the higher educational institutions are stretched beyond their limits trying to accommodate such large numbers of students. There are two basic problems with this situation: Firstly, under the present circumstances, these students will learn very little (no materials, no facilities and no equipment) during their four years of college or university. Secondly, finding suitable employment for these graduates who received a very limited college/university education is a serious issue. Until the country's academic resources are restored, it would be much more suitable to prepare many high school students for semi-skilled and vocational positions rather than encouraging them to move towards college. If the government continues to allow so many high school students into resource-limited colleges and universities, those graduates will not be suitable for their post-graduate jobs, and they will remain a burden on the government's shoulders, and a headache for the rest of society. Regrettably, there is an apparent lack of suitable planning discerning the needs in the job market, and providing the proper education.The Afghan government should be proactive in attracting foreign assistance and investments for the country's education sector and must plan for short- and long term projects. However, total reliance on foreign assistance is not enough to provide sustainable and long term prosperity in the country; hence, the government must ultimately make progress towards self reliance.

Bibliography

1. Samady, R. S. (2001). *Education and Afghan Society in the Twentieth Century*. France: United Nations Educational Scientific and Cultural Organisation (UNESCO). Retrieved from: http://www.reliefweb.int/library/documents/2002/unesco-afg-nov01.pdf
2. Baha, B. (2003, June). Engineering Education in Afghanistan. *Proceedings of the 2003 World Federation of Engineering Organizations (WFEO) and American Society for Engineering Education (ASEE) Conference*.
3. Baha, Z. (1976, October). *Engineering Curricula* (Seminar Presentation at Kabul University to the National Committee for Engineering Education).
4. Islamic Republic of Afghanistan Ministry of Education. (n.d.). National Education Strategic Plan for Afghanistan 2006 -2010. Retrieved from http://www.moe.gov.af/Misc/National%20Education%20Strategic%20Plan.pdf
5. Ministry of Labour, Social Affairs. (2007, May). National Skills Development Program.
6. Ministry of Labour, Social Affairs. (n.d.) National Skills Development Program. The Afghanistan Technical Vocational Institute (ATVI).
7. U.S. Agency for International Development (USAID) in Afghanistan. (n.d.) *Afghanistan to Revitalize Technical and Vocational Education*. Retreived from http://afghanistan.usaid.gov/en/Article.176.aspx
8. Purdue University. (2006, Summer). *Technological Workforce Development* (White paper submitted for Afghanistan Authorities, Kabul, Afghanistan). West Lafayette IN: Baha, Z.; Dyrenfurth, M.; Kline, C.