

A CLOSER LOOK AT ACCREDITATION OF COMPUTING AND ENGINEERING PROGRAMS IN KYRGYZSTAN

(from the U.S. experience)

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Abstract

The early years of the twentieth century witnessed societies and their economies transition from an agricultural base to an industrial base. Similarly, the latter part of the twentieth century has witnessed the society transitioning from an industrial base to one which is based on the use of information technology. As Kyrgyzstan enters the third millennium, the country is pressing for a speedy transition to the development of society based on widespread use of knowledge and information as a strategic resource. In order to make information technology infrastructure and know-how available to its citizens, Kyrgyzstan needs to align its national initiatives with its educational initiatives. This paper discusses possible benefits of aligning the national Computer Science curriculum standards, with those defined by the international accreditation agencies such as ABET.

Key words: Accreditation, national educational initiatives in Kyrgyzstan

Introduction

In a recent report from UNESCO [1] the authors assert that Kyrgyzstan's economic growth rate will remain relatively modest. The report also identifies some potential areas for growth such as eco-tourism and the development of hydro-electric power. Curiously, one area which has been left out of the UNESCO report is the potential growth of information technology related jobs and commerce in Kyrgyzstan. The early years of the twentieth century witnessed societies and their economies transition from an agricultural base to an industrial base. Similarly, the latter part of the twentieth century has witnessed the transition from an industrial society to an information technology society. As Kyrgyzstan enters the third millennium, the country is pressing for a speedy transition to the development of society based on widespread use of knowledge and information as a strategic resource. In order to achieve this goal, Kyrgyzstan needs to align its national initiatives with its educational initiatives. To provide everyone the opportunity to participate in the global information society Kyrgyzstan must make information technology infrastructure and know-how available to its citizens.

National Initiatives

President Kurmanbek Bakiyev, in his speech on November 27, 2009 at the *Connect the CIS¹ Countries Summit* indicated that "We all want to build a people-centered information society for the development of the State" [2]. Kyrgyzstan has also adopted the National Strategy "Information and communication technologies for development of the Kyrgyz Republic". The National Strategy represents a document outlining an incremental, yet comprehensive and systematic shift toward a state, society, and economy based on knowledge. At the same time, Kyrgyzstan is working on the introduction of such projects as "Electronic Government", and "Internet in Every Village" which will create more than 500 points of public access to information and communication services in rural and remote localities of the country.

In the recent years the total number of Internet users in Kyrgyzstan has increased annually by an average of 100,000. Current estimates indicate that nearly 10% of the population (550,000) has access to the Internet. Among both the private sector organizations as well as individuals, the preferred technology for accessing the Internet appears to be broadband technology; however the cost of broadband internet service remains prohibitively expensive. (Broadband is a method of sending and receiving data over high speed networks that use the existing telephone line using the Asymmetric Digital Subscriber Line (ADSL) technology to allow greater data transfer capacity compared to that of standard telephone lines.)

¹ Commonwealth of Independent States

According to a report published by the General Director of the Institute of Development of Information Society [3] only 80,000 users access the Internet from home. If the goals of the National Strategy are to be realized, the county's computing and network infrastructure and access to the internet must be improved and the cost of such access must be significantly reduced.

Educational Initiatives

Another important parameter for the realization of the national strategy and the development of a "people-centered information society" is education. Both K-11 (Kindergarten to 11th grade) as well as higher education in information technology is essential, however, higher education in computer science and informatics plays a central role. First, higher education institutions are charged to educate and prepare computing professionals who will ultimately provide information technology leadership in business and government. Second, it is higher education institutions who will educate K-11 teachers who will in turn prepare the next generation of students entering higher education. Hence, higher education can be viewed as the primary vehicle for moving Kyrgyzstan toward a trajectory of development in the modern global context, namely the formation of a mass information society, and the training of future knowledge workers such as software engineers, system designers, programmers, and information technology educators.

Although the government is making progress in the development of Information Computer Technology (ICT) infrastructure, many challenges remain. Today a number of higher educational institutions of Kyrgyzstan such as Kyrgyz National University, Kyrgyz Technical University, Kyrgyz State University, Naryn State University, and Osh State University prepare specialists in ICT. However, as noted by Lira Samykbaeva, the executive director of the Kyrgyz Association of Software Developers and Service, "Every year universities in Kyrgyzstan produce two thousand programmers; however, their level of preparedness is very low. Of the two thousand, only 40 graduates find employment in the field". [4]

Acknowledging this challenge, the Ministry of Education and Science is working to change the standards for educating computer scientist. Although Kyrgyzstan follows a single state standard for educating computer science students, many faculty find it difficult to achieve this standard in their classes. The reasons for the inability to achieve the standard vary across the country; however there are some common themes that include:

- Lack of preparation of students before entering the university
- Lack of specialized instructors, both at secondary and college level
- Lack of computer equipment and proper software

Another concern is the lack of enthusiasm among the computer science faculty about the current standards. This concern is primarily due to the perception of instability of these standards. An approach to change this perception is to adopt the international standards for computer science education, one that is developed by the international organizations for accreditation of programs in engineering and technology. One such organization is the Accreditation Board for Engineering and Technology (ABET). ABET was founded in 1932 and it is comprised of a large number of professional engineering societies and organizations. Among the founding member organizations are:

- IEEE - Institute of Electrical and Electronics Engineers
- ISA - International Society for Measurement and Control
- ASME - American Society of Mechanical Engineers
- ASEE - American Society of Engineering Education
- SAE - Society of Automotive Engineers

Accreditation

ABET Accreditation primarily applies to American universities, however, ABET also maintains strong relationships with other international accreditation organizations and agencies through the mutual recognition agreements known as the Washington Accord [5]. These agreements among accreditation agencies facilitate better understanding and recognition of the quality of students who graduate from international educational institutions.

It is important to note that ABET accreditation is not meant as a ranking of educational institutions. It is simply an indicator that the educational program and the institution that offers it, meet established quality standards in such areas as:

- Faculty commitment and qualifications
- Up-to-date and rigorous curriculum
- Up-to-date laboratory and computing facilities
- Student support (access to faculty and proper advising)
- Institutional support and financial resources
- Adequate institutional facilities (library resources and classroom technology)
- Defined objectives and proper assessment instruments and analysis

Computer Science programs seeking ABET accreditation must demonstrate that they meet the following criteria. More complete information about the criteria can be found at the ABET web site [6]:

Criterion 1. Students

All students must be able to have access to faculty, be able to receive academic advice, be able to complete the program in a reasonable time.

Criterion 2. Program Educational Objectives

The program objectives and educational goals must be documented, and measurable.

Criterion 3. Program Outcomes

The program outcomes must be documented, and measurable.

Criterion 4. Continuous Improvement

The institution must have a regular, established, and documented process for assessing its program. The process must allow for continuous and incremental curricular and program adjustments based on collected data.

Criterion 5. Curriculum

The program's requirements should be consistent with its educational objectives and should be designed in such a way that each of the program outcomes can be achieved.

Criterion 6. Faculty

The program faculty must be qualified, active in the discipline, and collectively, they must have the educational and technical breadth and depth needed to support the program.

Criterion 7. Facilities

Institutional facilities such as libraries, computer networks, classrooms, and laboratories, must be adequately equipped to support the educational objectives and outcomes of the program.

Criterion 8. Support

The institution's support for the program and the financial resources available to the program must be adequate so that it may attract and retain qualified faculty, to maintain up-to-date computing resources and laboratories, and to provide an environment in which the program can achieve its educational objectives and outcomes.

Conclusion

The 2008 UNESCO report on Central Asia [1], asserts that Kyrgyzstan's economic growth rate in the near future will remain relatively modest. The report also identifies some potential areas for growth such as eco-tourism and the development of hydro-electric power. Although tourism and power generation can be an effective vehicle for economic growth; by themselves, they will have a limited impact on the national goal to create a "people-centered information society". In order to achieve this goal Kyrgyzstan must explore the potential growth of information technology related jobs and commerce. Both government as well as the national educational institutions must fulfill their role in order to facilitate Kyrgyz society's move toward a more knowledge based economy. An important role for the government is to establish long term initiatives that improve the cyber infrastructure within the country and provide ubiquitous access for computing resources to the citizens of Kyrgyzstan. Equally important is the role of national higher education institutions. Universities must be sensitive to both national and international standards [6] for educating computer scientist as well as other information technology professionals, allowing Kyrgyz graduates to compete and excel in the global information society.

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