Designing A New System for Technical and Engineering Education

*—by Dr. K. Sadrnezhaad**

Abstract

The educational systems utilized for technical and engineering studies have been critically reviewed by a group of program makers gathered in the "Cultural Revolution Headquarters" in Tehran. The group has been involved in more than a year of extensive work on defining the objectives designing the system, and developing the necessary curricula for the technical and engineering universities. Brief outlines are made here of some developments that have been achieved. Reference is also made to a number of inprogress activities.

Introduction

It was more than a year ago that a group of people involved in such activities as teaching and research in the engineering institutes, working in the planning and research organizations, and investigating the present and future potentials of the nation's industry for independence and growth gathered in the "Cultural Revolution Headquarters" in Tehran with the principal purpose of revising the whole system of the technical and engineering education throughout the country. The group called itself "The Technical and Engineering Council" and started its work on the basis of a widely accepted idea that the educational system of the country needed a thorough and complete re-examination which could lead to the removal of every existing substance proved irrelevent and re-establishment of a new system that did only rest on the real national needs and capabilities.

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*Dr. K. Sadrnezhaad, Educational Programming of Materials, Ministry of Higher Education Room No. : 424 Bld., 173, Najatollahi Street, Tehran.—Paper Presented at the UNESCO Regional Seminar on "Role of laboratories in Technical Education at all levels" held at Colombo, Sri Lanka, during 2-5 December, 1981.

Some Shortcomings of the Previous System.

Careful studies, shortly, proved to the group that some major elements of the existing educational system of the country was almost blindly copied from that of the western industrialized nations which did not acceptably match the nations basic needs and necessities. An obvious example was the case of some universities of great fame and name whose graduates were best suited to work on research projects for such institutions as the "U.S. National Aeronautics and Space Administration", while they were generally unable to help their own country's technological problems of even simple nature.

The statistics, on both the number of the foreign specialists hired to work for the nation's industry, and the number of the engineering college graduates either jobless or being employed for the non-technical areas of no principal relation to their past acedemic requirements, showed some of the shortcomings of the system of the technical and engineering education as it had previously been adopted for the nation. The over-saturation of many product-oriented centres for college graduates, when combined with the strict need of such centres to special technical powers and skills that could not be achieved through accomplishment of the normal educational programs of most technical and engineering institutions, indicated that there was a gignatic lack of consistency between the kind of education that appeared essential to the nation and that which the colleges and universities ordinarily practiced.

Necessary Steps

For resolving the above shortcomings, the group found it necessary to make a relatively accurate survey of the kinds of the technical specialities needed by various sectors of the society both at the present and at the future, and to gather the essential information on the professional qualities and skills attributed to each kind. The next step, which of course was to be taken with a lot of care and consideration, was to re-design the technical academic programs based on the newly made technical and engineering educational system.

Development of a new educational system for accomplishment of the technical and engineering studies at the technical and engineering universities required making of a set of precise definitions describing the goals and objectives of such universities. These definitions could be of service to the group in many ways; some of them described as follows :

1. Illustrating a firm ground for educational planning and programming activities.

2. Serving as a valid criterion for determination of the boundries of the school related activities, such as research and development programs, consultation and outside-client services; etc.

3. Serving as a criterion for determination of the extent of the successfulness of a particular school in its regular activities.

Steps Forward

The group has so far been able to take the following major steps forward :

1. Stating a set of well defined goals and objectives for the technical and engineering institutions.

2. Plotting a new educational system for pre-college technical studies.

3. Development of a new educational system for the higher technical and engineering education.

The group has also been so far involved in working on several other significant tasks such summerized as :

1. Designing the academic programs of the technical and engineering universities,

2. Developing a new and harmonious system tor the technical and engineering research activities throughout the country, and

3. Proposing the practical means of formation of firm relations between the academic and the Industrial sectors of the society.

Objectives of the Technical and Engineering Universities.

Of the whole list of the definitions made on the objectives of the "Technical and Engineering Universities", the reference may be made to the following three axes :

1. Teaching and training of the students in order to develop their dimensions of responsibility and speciality for fulfilment of the needs and requirements of the society to the human expertise. Such needs being as the skillful personnel for the industry, the faculty for the colleges, teachers for the schools, personnel for the research organizations, etc.

2. Research and investigation in the direction of (a) resolving the technical and engineering problems of the society. (b) producing the essential grounds for reasonable use of the natural resources, and (c) expanding the technical and scientific borders of the understanding and knowledge of man about the nature. All three items being employed by an investigator as a means to approach the scientific and industrial independence.

3. Participating in the planning and development activities and in the other demanded service works.

New Educational System

Although the new educational system that has been developed by the group might be composed of many elements of particular interest to the academic as well as industery oriented people, but a sound and unambiguous treatment of the subject cannot be made except though a long and detailed discussion of the subject. Such an inclusive discussion is not the purpose of this article, but may be found appropriate to summarize here a number of the elements that have been evolved into the new system.

Here is a brief review of a few of such

elements that also serve as a means of attainment of the described goals and objectives of the technical and engineering universities :

1. Harmonious and integrated planning of the technical and engineering education throughout the country.
2. Programming the technical and engineering curriculum based on the principal needs of the nation to the individual expertise and skills.
3. Expanding the range of activities of the technical and engineering schools so that they may train greater varieties of the technical specializations and skills.
4. Designing special re-education programs for the workers of the industry.
5. Opening the gates of the school to the public and admitting free listeners.
6. Putting great emphasis on participation of the faculty members in research activities.
7. Establishing close ties with the industry.
8. Including practical training courses as an important part of the curriculum.
9. Great emphasis put on the accurate evaluation of the capability and interest of the candidates before entering any technical or engineering educational discipline.
10. Changing the direction of the pre-college education from college studies to the profession and job market.