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The Role of Extra-Curricula Activities in the Life-Long Education of Engineers

Salih Murat Egi
Erol Inelmen
Bogazici University, Bebek, Istanbul 80815, Turkey

Considering the sweeping changes that modern technology is creating in daily life, the authors argue that *extra-curricula activities* can help enhance the quality of engineering education. Students working with their teachers on projects relevant to society as a whole can be better motivated to commit themselves to a life-long education programme. School administration should do the utmost to provide incentives to students so that they engage in activities that will make the whole education process more effective.

INTRODUCTION

Many institutions facing rapid technological changes now recognise that the quality of engineering education needs to be enhanced by implementing a life-long learning programme. Committing a student to such a programme requires a high degree of motivation and devotion on both sides of the education equation. The authors' experience shows that if students are involved in a highly motivating activity relevant to the profession early enough in their studies, then they are more likely to succeed at school and in their working lives. Unfortunately, although extra-curricula activities can be an important part of the learning process, there seems to be little incentive for students to be engaged in non-academic work. Only a minority of the student body recognise that there is intrinsic value in undertaking extra-curricula activities, including exhibition and conference management, such as diving, parachuting and racing. These activities can enhance the quality of education and encourage students to become involved in a life-long learning process.

As the economic conditions in the world change, graduates find themselves coping with altogether new problems. Since future developments are unpredictable, continuous learning, a life-long process, promotes adaptability when new situations arise. While teaching the art of applying scientific tools to problems that require the use of natural resources for the convenience of men, an education system should also develop *self-learning* skills in the suggested *common fields of activities*. Unfortunately the fact that textbooks are written along disciplinary lines, means that the need to break the disciplinary barriers is blocked. The gradual removal of barriers can be accomplished by gearing all the available resources to a reduced number of basic headings. When students are allowed to make decisions regarding their education, fitting education to their abilities, a *counselling system* must be implemented [1].

A recent UNESCO Report pinpoints the need for dramatic changes and suggests the *four pillars* that must be strengthened for the reformation of education in the next century. According to this Report, learning must enhance the quantity/quality of knowledge, the ability of do, the development of the self and the skill to share with others [2]. In this paper a *project-centred learning* environment, where teachers and students can engage in a *learn and work* life-long programme, is suggested. We strongly believe that all the actors involved in the education process should focus on topics that are indeed relevant to the whole of society. The review of a real case presented in the next section will hopefully encourage others to make the best use of extra-curricula activities in education.

A CASE STUDY

The administration of the Bogazici University (the former American Robert College established in Tur-

key in 1863) has traditionally encouraged students to participate in extra-curricula activities under the guidance of academic staff. Parachuting, diving and radio-transmission are typical examples of activities in which students have joined forces to practise their skills in technology and management while enjoying their free time. A review of the history of diving in the University since 1961 highlights several academic achievements and positive contributions to the education of several graduates.

The second author of this paper was among the first members of the Skin and Scuba Diving Club, which was organised by a former psychology instructor who participated actively in the weekly operations. The club continued on to become almost a professional society and the members were involved in many important water salvage activities. While two of the older members, who have already graduated, are currently involved in doctoral work on diving physiology, two other graduate members have specialised in the area of oceanography. It is important to note that with the collaboration of these graduates the *First Underwater Science and Technology* meeting was organised and now has became an annual conference (see references listed in the Appendix). Reviewing the life of these and other club members can help develop adequate educational policies that would enhance overall performance.

The first author of this paper became an active member of the Skin and Scuba Diving Club in 1984 when he began his undergraduate studies at Bogazici University Electrical Engineering Department. He also completed the Turkish Navy Frogman Course with outstanding results and was made Diving Instructor. In 1989 he received his BS degree in Electrical Engineering, implementing a project on a dive computer, and received the University President Award due to his success on both academic and extra-curricula activities. After completing an MS degree in Biomedical Engineering, he commenced doctoral studies on the *Evaluation of Altitude Decompression Procedures and the Development of New Decompression Strategies*. A research grant from the European Council for Higher Education allowed the animal experiment phase of his thesis to be carried out in SINTEF UNIMED, Section for Extreme Work Environment, Trondheim, Norway. 212 dives were accomplished without any case of decompression sickness during 1994 and 1997 and he completed his PhD studies in 1999.

CONCLUSION

The work of graduates can be an important and active force in the strategic decision making process of a university. It is our hope that university/industry collaboration will help to show the importance of extra-curricula activity in developing the necessary skills that students need to meet future employment requirements [3]. The strategic model aims at reducing the influence of the government in the day-to-day running of the institution while providing an enhanced environment that will be more in touch with the requirements of the real world. An example of how extra-curricula activities can help students and teachers to develop projects of mutual interest is given in the landing system shown in Figure 1.

Extra-curricula activities can form an integral part of mainstream education. Proper accreditation of extra-curricula activities, which is not possible under the present regulations, will hopefully encourage academic staff and students to participate jointly in a more rewarding and life-long learning process. The experience gained by the authors while attempting to find the means of *integrating the engineering curriculum* to meet the demands of the community in the next century is summarised in this paper.

As a concluding note we wish to recall the story of a traveller who, amazed by the beauty he saw in the construction site of an imperial building he was visiting for the first time, asked an artisan what he was doing. The artisan answered reluctantly that he was putting bricks one on top of the other. The traveller asked a second artisan the same question. This time the artisan answered by explaining that he was building the wall of the government's new headquarters. Not satisfied with the second answer, the traveller repeated exactly the same question to a seemingly more experienced artisan. The third artisan answered enthusiastically: *I am working on one wall of a building that will be the pride of the citizens of our country*.

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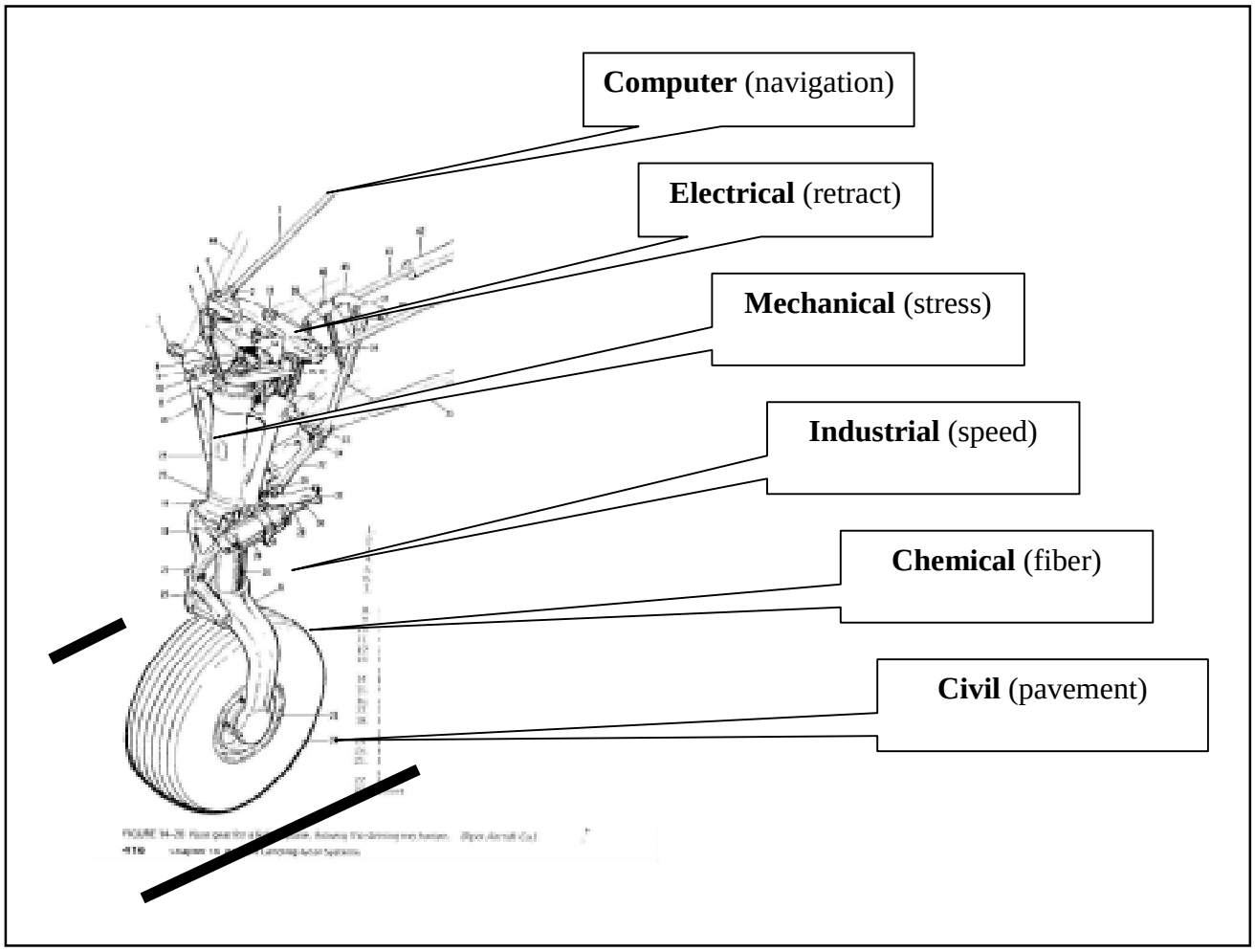

Figure 1: Example of integration of engineering undergraduate curriculum (landing system).

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BIOGRAPHIES

Salih Murat Egi was born in Istanbul, became an active member of the Bogazici University Diving Club, completed the Turkish Navy Frogman Course with outstanding results and was assigned as Diving Instructor of the Club. In 1989 he received his BS degree in Electrical Engineering from Bogazici University. He completed his MS degree in 1992 in the Biomedical Engineering Institute at the same University. The same year he started his doctoral studies in the same Institute. His thesis was titled *Evaluation of Altitude Decompression Procedures and Development of New decompression Strategies*. In 1993 he received a research grant from the European Council for Higher Education for the animal experiment phase of his thesis to be carried out in SINTEF UNIMED, Section for Extreme Work Environment, Trondheim, Norway. In 1994 he began the manned testing stage of the thesis, planned and directed two high altitude diving expeditions at 3500m, where 212 dives were accomplished without any case of decompression sickness. He is a part-time lecturer in the Istanbul University Department of Underwater Science and Technology. He writes for a monthly Turkish underwater magazine and his articles on decompression computation are published in several proceedings of the European Underwater and Baromedical Society (EUBS) and Undersea and Hyperbaric Medical Society (UHM). He has been a regular participant of the annual EUBS meetings since 1992.

Erol Inelmen graduated from the American Robert College in Istanbul, Turkey in 1963 as a Mechanical Engineer. After spending ten years in industry as a project engineer he joined Bogazici University in 1982. In 1992 he received his PhD in engineering management from the Marmara University in Istanbul, Turkey. He is now assistant professor and is involved in subjects related to project management, computer-aided design/learning and engineering education. He has been attending UICEE meetings regularly since 1998.