

DEVELOPMENT OF ENVIRONMENTAL ENGINEERING EDUCATION IN MALAYSIA

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ABSTRACT

With the ever increasing awareness on environmental issues these days, education in Malaysia has been geared to incorporate and instill environmental issues and awareness in the primary, secondary and tertiary level. Education is a powerful factor in establishing and defining members of the society who will be deeply rooted in the environmental conditions of the society, aware of his civic responsibilities, his duty to the family and society and be prepared to play a useful role as a producer and as a citizen conscious of his impact to environment.

This paper will try to bring into focus the development of the environmental engineering in Malaysian education system, in conjunction with the extensive economic growth of the country, hence the need to create and improve the environmental division of higher institution to meet the objective of producing more specialist in the field of environmental engineering.

INTRODUCTION

Beginning in the late seventies and gathering momentum ever since, the country and society's concern regarding the environment has changed. The demand for cleaner environment required better skills and knowledge amongst the engineers who are also associated with development and environmental problems that later arises.

Malaysia in its rapid pace of industrialisation and development towards achieving a developed nation

status by the year 2020, has aim at balancing economic and social development against the need to maintain sound environmental conditions. Besides implementing preventive and management measures to protect the environment, improving the environmental engineering education and training has been sought to raise the awareness towards the long term adverse implications of environmental degradation.

This paper attempts to review the development of environmental engineering education in Malaysia in preparing itself towards achieving sustainable development. Even though environmental education can be carried out on both non formal and formal basis, the focus of this paper will be more on the education institution which include schools and universities in implementing environmental syllabus for the students.

THE PRESENT STATUS OF ENVIRONMENTAL EDUCATION IN MALAYSIA

Primary School Curriculum

The development of the New Primary School Curriculum (KBSR) in 1983 is an intergated curriculum that emphasises the general education concerned with the balanced growth of the child through the development of basic skills and the inculcation of healthy life-long attitudes and moral values that are fundamental to the maintenance of Malaysian society.

The KBSR saw the implementation of three basic domains, namely Communication, Man and the Environment, and Individual Development. The subject on Man and the Environment is an integration of

elements from science, history, health, geography, art, morality and civics. The environmental education is an infusion of many subjects which deals with the social, cultural and biophysical environment directed toward achieving a balanced and harmonious relationship between not only human beings and nature but also among the various ethnic groups in Malaysia.

Secondary School Curriculum

The Integrated Secondary School Curriculum (KBSM) was implemented in 1989 to maintain continuity of learning experiences provided by KBSR. However, there is no specific subject on environmental education in the secondary school syllabus. It is more carried out on a multiple infusion basis. The bio-physical environmental education is located in the sciences while the social and cultural aspects are situated in the humanities.

The secondary school pupils are required to take core and elective subjects in both the humanities and the sciences in order to achieve the desired balance between biophysical and the socio-cultural environmental education. A thematic approach is used where themes like Man and Diversity of Life, Energy for Life, Man and Balance in the Environment. The Richness and Diversity of Life are taught in the science syllabus. Whereas in the upper secondary, Biology has the most environment related contents like Man and the Management of the Environment, Man and the Maintenance and Continuity of Life, and Man and Community Health.

Tertiary Education

Out of the six universities in Malaysia, only two institutions offer degrees specifically in environmental engineering. They are the University of Technology of Malaysia which offer degree under the faculty of Civil Engineering and the University of Agricultural Malaysia under the Faculty of Civil and Environmental Engineering and the Faculty of Science and Environmental Studies.

In the University of Technology Malaysia, students specialising in Environmental Engineering in his final year are taught on courses like Environmental Engineering 1 & 2 and Advanced Environmental Engineering which encompass subjects ranging from

water and wastewater treatment to air and noise pollution, radioactive waste and using mathematical modelling in environmental monitoring.

The Agricultural University of Malaysia has a Faculty of Science and Environmental Studies which award degree in Bachelor of Science (Environment). Besides this, there are also the Department of Civil and Environmental Engineering, Department of Process Engineering and Environment and the Department of Field Engineering. All these departments offer some subjects related to the environmental elements and control like Principles of Plant and Animal Environment and Soil and Water Conservation Engineering. However being an agricultural based university, most of its engineering subjects emphasize on the relationship of the environment to plants, livestock and mankind.

In the University of Malaya there are a few departments which offer courses either directly or indirectly related to environmental engineering. The Department of Civil Engineering in the Faculty of Engineering offer specialisation elective course to their final year student in Environmental Engineering. This course covers all aspect of environmental engineering and is more comprehensive than the Water Resources and Environmental Engineering core subject that is taught to the second year students. The other engineering departments also do conduct some environmental related subjects like Engineer in Society which is a compulsory subject for all their students. Even though the environmental engineering contents are not fully incorporated in the whole syllabus, management and responsibilities of the engineers in the society do relate to the environmental aspect and principles.

The University Science of Malaysia have a few schools which offer environmental subjects. The School of Civil Engineering for example conduct various environmental courses throughout their undergraduate study. Courses like Introduction to Environmental Science is already taught in the first year, while Environmental Engineering 1 & 2, Environmental Science, Engineers in Society 1 & 2 and Coastal Engineering makes up the whole component

of environmental engineering. Their syllabus seems more intensive in terms of the environmental content probably due to the fact that being a newly set up department, it has more liberty to incorporate more environmental contents due to its increased importance over the recent years. Other schools like the School of Material and Mineral Resources Engineering, School of Housing, Building and Planning also have a certain amount of environmental engineering in its course syllabus.

The National University of Malaysia conduct a compulsory course entitled Engineering Ethics to all its engineering students. Courses like Environmental Pollution and Control, Energy from Renewable Sources and Pollution Control is taught by the Mechanical and Chemical Departments to further enhance the environmental contents of their engineering syllabus. Introduction of a new course to the first year student is also being done to start the awareness early amongst the engineering students. Other integration of environmental contents is also carried into the other engineering subjects like Geotechnique Principles, Geology, River Engineering and Maritime Engineering.

Another government funded institution that is the Mara Institute of Technology also offer diploma and advanced diploma courses in Engineering. The subject that has some environmental aspect would be the compulsory course on Engineers in Society where aspects of management and issues relating the engineers and the environment is taught.

It is undeniable that the education syllabus in the Malaysian system from primary right up to tertiary level do incorporate to a certain extent environmental related topics and contents. However on the other hand, it must be realised that some of the courses offered in the tertiary level are not compulsory and most are taught later towards the end of the course period. It is felt that due to these circumstances, some of the engineering students have very minimal exposure and lacking in environmental awareness and responsibilities. A more organised and well planned curriculum has to be formulated to improve the contents of environmental aspects especially in

the engineering syllabus.

FUTURE CONSIDERATION IN CURRICULUM CHANGES

Throughout the developments taking place in environmental education, Malaysia has been taking efforts to improve on its education curriculum for the betterment of the students. With respect to environmental education, the behavioural changes involve both cognitive and affective outcomes.

Johnson (1978), highlighted the various characteristic in the approach of environmental education:

- I . it is inter-disciplinary in approach
- II . it is a continuous, life-long education process
- III . it adopts a holistic perspective which examines the ecological, social, cultural and other aspects of a problem
- IV . it is a problem solving approach

Most of the effort and resources spent on the formal environmental education is devoted to increasing awareness, knowledge and understanding of the environment which is more cognitive in approach i.e. dependent on the element of persuasion in getting people to realise the long term damage to the environment caused by a short-term development goals and to develop desirable environmental values that will commit them to protect the environment. However, it is felt that these environmental knowledge and values must be supplemented by legislation and enforcement to keep environmental polluters in check and punishment of negative behaviour in a supportive environment.

The environmental education can also be carried out in a non-formal basis in the form of raising public awareness through public campaign and published materials by the non-governmental organisation (NGOs). Non-govermental organisations that play an important role in environmental education in Malaysia include the Environmental Protection Society of Malaysia, the Malaysian Nature Society, World Wild Life Fund and others. Apart from distributing information on the environment to the public, they tend to be more action oriented in raising environmental issues and mobilising public opposition to develop

mental projects that affect environmentally sensitive areas.

Whilst on the other hand, the effectiveness of the formal environmental engineering education has to be enhanced amongst the engineering undergraduates so as to be better equipped with more comprehensive environmental issues and legislation with sound understanding of basic environmental principles. Hence concerted effort has to be made to intergrate the environmental courses effectively into the main-stream engineering curriculum. The students should be introduced to environmental related courses early during the course and expanded constructively throughout the course duration.

Also, all engineering undergraduates irrespective of their discipline, need to be exposed to sufficiently broad-based environmental related courses in addition to the more specific areas of environmental subject. Practical training experience through real life case studies addressing the direct and technical aspects of environmental issues for example conducting an environmental impact study (EIA) where the interaction of engineering students with their counterpart from other faculties would further enhance the effectiveness of environmental engineering

knowledge. Other practical courses like field studies, laboratory analysis, seminar projects can also be included as components of environmental courses. It is crucial that these engineering students realise the importance of environmental considerations in the technical aspects of engineering projects either in the construction, design or operation stages.

In conclusion, the present engineering education strategy in terms of environmental context has to be re-examined and improved so as to produce better environmentally responsible engineers besides the enforcement of environmental laws to generate better environmental civic consciousness not only to the students but also to the whole population of Malaysia.

REFERENCE

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