
Environmental Studies Course for Engineering Programme

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ABSTRACT: *Environmental studies deal with every issue that affects a living organism. Following the Supreme Court directives (Supreme Court of India, 1999) environmental education course has been included in the curriculum of all universities and affiliated colleges in India. The prime objective of environmental education is to make everyone environment literate. Due to this reason environmental Studies has been included in the curriculum of engineering education. Many research papers find that education is positively correlated with pro-environmental behaviour in a range of contexts. For example, multiple studies find that individuals with higher education are more likely to recycle. Environmental education is not attaining much importance even though it is included in curriculum. Engineering students express their opinion that the environmental education is useful to save environment and conservation of resources, but students are in misconception that environmental education is not relevant to their core subjects and not useful for their engineering carrier. There is a significant gap between environmental education and engineering programme. To fulfill this gap we conducted present investigation. The main idea of this investigation is collect suggestions from engineering students and to implement Environmental Studies (ES) course more effectively and more interestingly in engineering programme. For this we prepared a simple questionnaire, distributed this questionnaire to 300 numbers of students of various engineering branches and collected their opinion.*

Keywords: *Environmental studies, Engineering programme, Questionnaire, Opinion, Core subjects.*

INTRODUCTION

In 500 BC, Chinese Tao patriarch Kuan Tzu is attributed with the following quote, “If you plan for one year, plant rice, if you plan for 10 years, plant trees and if you plan for 100 years, educate people”. The environmental awareness is expected to be a part of the character of young people. Most environmental education researchers suggest developing an environmentally literate society as the best strategy to overcome human exploitation of the world resources. The environmental awareness is expected to be a part of the characters of young people. Environmental issues have been a trending topic nowadays. UN Conference on Environment and Development [1] held in Rio de Janeiro, Brazil, in 1992. Agenda 21 of this conference identifies environmental education as one of the catalyst for sustainable development. In chapter 36, it states “Education is critical for promoting sustainable development and improving the capacity of people to address environment and development issues” [2]. Environmental education has dual purposes. First is to increase the students’ environmental awareness for preventing environmental damaging behaviours and natural disasters. Second is to develop their understanding that environmental preservation and improvement of environmental quality will lead to the comfortable living, which eventually improves the quality of life in the society as well. The environmental education here consists of increasing the environmental awareness in an individual’s everyday life, and as a group, in business and professional practices. Most environmental education researchers suggest developing an environmentally literate society as the best strategy to overcome human exploitation of the world resources [3-5]. Introduction about the environment in syllabus can help to create positive attitudes and actions towards caring for the environment and having strong sense of responsibility to the world [6]. Most universities around the world have developed strategies to integrate the concept of

environment and sustainable development into education. According to the organization for American Engineering Education, ASEE [7], engineering students should learn about environment and sustainable development and sustainability in the general education component of the curriculum as they are preparing for the major design experience.

METHODOLOGY

Environmental studies (ES) deals with every issue that affects a living organism [8]. Its components include biology, geology, chemistry, physics, engineering, sociology, health, anthropology, economics, statistics, computers and philosophy. Engineering students express their opinion that the environmental education is useful to save environment and conservation of resources, but students are in misconception that environmental education is not relevant to their core subjects and not useful for their engineering carrier. Environmental education is not attaining much importance even though it is included in curriculum. This subject has been neglected. There is a significant gap between environmental education and engineering programme. To fulfil this gap we conducted present investigation. The main idea of this investigation is collecting suggestions from students to implement Environmental Studies (ES) course more effective and more interestingly in engineering programme. For this we prepared a simple questionnaire, distributed this questionnaire to 300 numbers of students of various engineering branches and collected their opinion.

Following questionnaire designed to take the opinion from B.Tech. level students on Environmental studies course. Students are suggested to mark either *AGREE* or *DISAGREE*.

1) Does the course on Environmental studies (ES) a beneficial one for engineering programme?

(*AGREE / DISAGREE*)

2) Does the course syllabus in Environmental studies (ES) correlate at par with other engineering core syllabus?

(*AGREE/ DISAGREE*)

3) Is there a necessity to amend (Change) the existing course syllabus in Environmental studies?

(*AGREE / DISAGREE*)

Data collected from CSE, IT, ECE, EEE, ME and CE branch students. From each branch 50 students participated in this investigation. For each student one print copy of questionnaire was supplied and gave 15 minutes duration. Each branch called separately to a meeting hall to participate in this investigation. This survey conducted in an engineering college in a free and fair environment.

RESULTS AND DISCUSSION

Question1: Does the course on Environmental Studies (ES) a beneficial one for engineering programme?

(*AGREE / DISAGREE*)

Table 1. Data related to Question1

S. No.	Branch	Total number of students Agreed	Percentage	Total number of students Disagreed	Percentage
1.	CSE	45	90	05	10
2.	IT	47	94	03	06
3.	EEE	47	94	03	06
4.	ECE	45	90	05	10
5.	ME	48	96	02	04
6.	CE	50	100	00	00

All most all branch students agreed that ES is beneficial to engineering programme. Students expressed opinion that being a human being everyone should learn ES to get the knowledge about environment to save beautiful nature. Above data shown in the form of graph (fig.1 and fig.2)

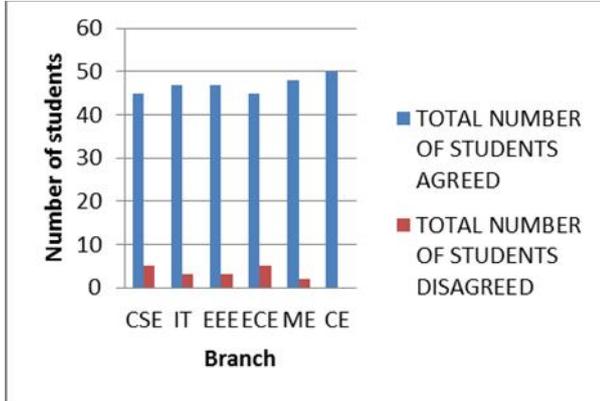


Fig. 1

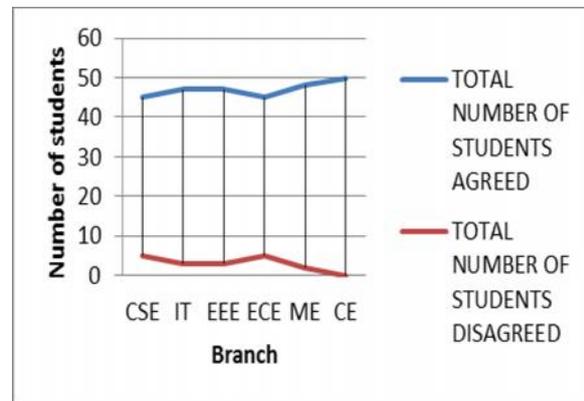


Fig. 2

Question2: Does the course syllabus in Environmental studies correlate at par with other engineering core syllabus? (*AGREE/ DISAGREE*)

Table 2. Data related to Question2

S. No.	Branch	Total number of students Agreed	Percentage	Total number of students Disagreed	Percentage
1.	CSE	10	20	40	80
2.	IT	13	26	37	74
3.	EEE	30	60	20	40
4.	ECE	25	50	25	50
5.	ME	45	90	05	10
6.	CE	48	96	02	04

Majority of CSE and IT students expresses opinion that ES syllabus does not correlate with their subjects because except topics like green computing, role of information technology in environment and remote sensing and GIS. Large part of ES syllabus does not match with core subjects of CSE and IT. Compare with CSE and IT , more students of EEE and ECE agreed with second question. Because topics like e-waste, renewable resources and other topics are correlate with their core subjects. Majority of ME and CE students agreed with second question because ES topics like water resources, thermal pollution etc are correlate with their core subjects. Table 3 shows correlation between ES topics with engineering curriculum. Above data shown in the form of graph (fig.3 and fig.4)

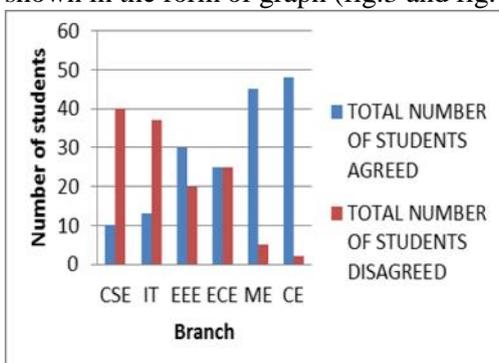


Fig. 3

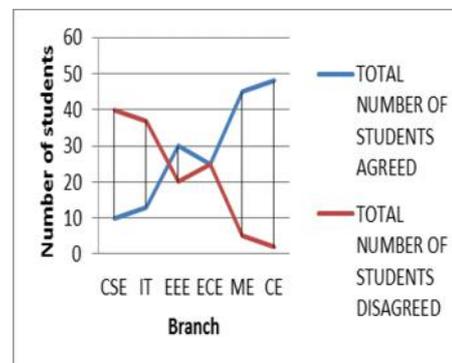


Fig. 4

Table 3. Correlation between environmental topics with engineering curriculum

S. No.	Environmental topics	Correlation with engineering curriculum	Courses
1.	Water resources	Water resources engineering	CE
2.	Dams benefits and problems	Dams construction	CE
3.	Watershed management	Watershed management	CE
4.	Water treatment methods	Water treatment technologies	CE
5.	Solid waste	Solid waste management	CE
6.	Thermal pollution	Thermal power stations	ME
7.	Noise pollution	Automobiles	ME
8.	Global warming	Fossil fuels	ME
9.	Ozone layer depletion	Air conditioners /Refrigerators	ME
10.	Air pollution`	Automobiles	ME
11.	Environmental effects of 2 stroke and 4 stroke engines	Automobiles	ME
12.	Renewable energy resources	Renewable/Non-conventional energy resources (Solar, wind, tidal, wave energy etc.)	EEE and ECE

Question3: Is there a necessity to amend (Change) the existing course syllabus in ES? (*AGREE / DISAGREE*)

Table 4. Data related to Question3

S. No.	Branch	Total number of students Agreed	Percentage	Total number of students Disagreed	Percentage
1.	CSE	48	96	02	04
2.	IT	47	94	03	06
3.	EEE	47	94	03	06
4.	ECE	48	96	02	04
5.	ME	20	40	30	60
6.	CE	10	20	40	80

CSE,IT,EEE and ECE branch students agreed with question 3. Because the present ES syllabus is not correlate with their core subjects. So they expressed opinion to modify the ES syllabus. ME and CE students disagree with question number 3. Because most of the ES syllabus correlate with ME and CE core syllabus. Particularly Environmentally engineering is an important core subject for CE branch. Above data shown in the form of graph (fig.5 and fig.6)

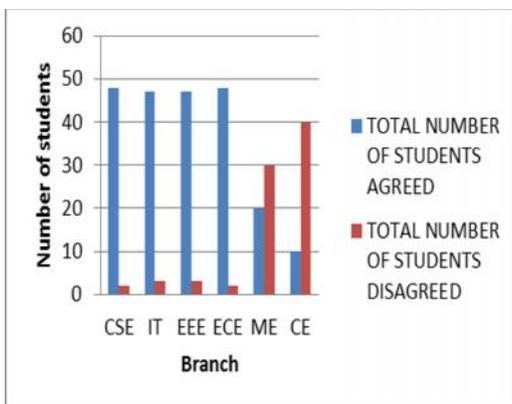


Fig. 5

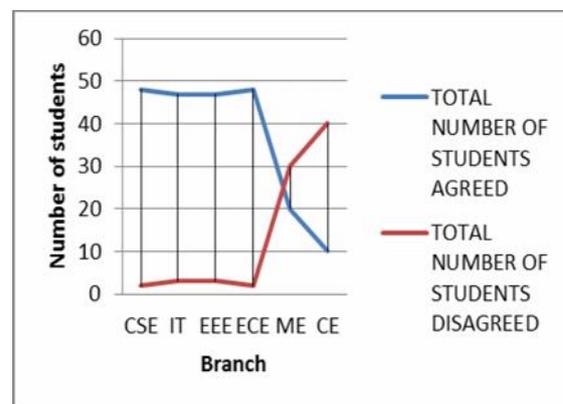


Fig. 6

CONCLUSIONS: This investigation results indicates that majority of engineering students of all branches agreed that ES is a beneficial course to them. Majority of engineering students express opinion that ES syllabus is not correlate with their core subjects. So ES syllabus should be designed such way that which correlate with their engineering core subjects. This will create interest among students to study the ES course and this will develop pro environmental behaviour among students. In future this type of investigations can be conducted on chemical engineering and biotechnology students. There is no chemical and biotechnology branches in our present investigation college, hence these two branches data was not collected. Large portion of chemical and biotechnology branches core syllabus correlate with ES syllabus, hence we may get different type of investigation data. So in future this investigation can be conducted on chemical engineering and biotechnology students.

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