SOCIAL SCIENCE COURSES IN ENGINEERING: AN EMPIRICAL STUDY ON TEACHER ENGAGEMENT AND SATISFACTION OF ENGINEERING STUDENTS

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Abstract: Purpose: *Of late, there have been many arguments favouring the holistic amalgamation of ethics, morals, sociology, psychology and other disciplines with usage of science in order to eliminate the devastation caused by the by products of science and technology and to foster human development, creativity and innovation that would pave way for a better society. This study focuses on the satisfaction among the engineering college students towards the incorporation of social sciences courses in their curriculum.*
Approach: *This study used random sampling technique with a sample of 1500 engineering students being administered structured questionnaires out of which only 1449 were deemed fit for the study because of rejection of partially answered questionnaires and questionnaires that had inconsistent answers. Descriptive research design was adopted for analysis.*
Findings: *This study reveals that the satisfaction levels of the engineering students towards social sciences subjects in their curriculum is not very high particularly with regards to the curriculum implementation and incorporation of ethics for the practical application of science and technology.*

Key Words: *Social Sciences, Curriculum Objectives, Curriculum Implementation.*

Paper Type: *Empirical*

1. INTRODUCTION:

It is undisputable that engineers predominantly need to learn and apply mathematics, sciences and technology for their academic endeavours and future profession, but doing so without considering the social dimension to the same has led to a pool of graduates- majority of them having comparatively poor scholastic performances in the final year at the engineering school, which adversely affects the bargaining power of engineering profession with regards to the academic talent which is otherwise needed, thus keeping engineering education and profession unconnected with the world of employment as well as community well- being. The ever increasing speed and volume of technological research on the other hand comes with vast opportunities but is not without any disadvantages and challenges thus making it all the more important that the innovator takes responsibility of the same and understands its relevance in social context.

In this paper we would initially outline the need for incorporation of social sciences courses in engineering curriculum and then provide elementary data on the satisfaction of the engineering students towards the design and implementation of the same in their curriculum. We would conclude with the implications for further research.

Social Sciences and Engineering: It is by far undisputed that what we need today is a more comprehensive perspective towards technical education so as to improve design skills, communication and interpersonal skills, problem-solving and more importantly behavioural skills (Black, 1994; Spinks, Silburn, & Birchall, 2006). The classification of knowledge into “hard” and “soft” sciences-technical skills being hard and applying the same in the real world being soft (Berliner, 2002, p.18) poses challenges with regards to the importance of these for an engineering graduate. Added to it is the paradigm shift calling for more responsible and empathetic solutions in the greater interest of the society. What we need is a more holistic approach towards organizations being socio-technical systems promoting group harmony, teamwork and operational synergies in line with ethical and moral practices to promote sustainability of the organization and societal well-being simultaneously (Akay, 2008; Bentley et al; 1992; Bijker, Hughes, & Pinch, 1987; Law & Callon, 1988). One of the most undermined issue is the adherence of technology and practices to the domestic and international legislations ensuring harmony between humans, society, nature and science thus eradicating unfair trade and labour practices (Samuelson & Scotchmer, 2001; Sweet & Schneier, 2008). The role of economics in engineering cannot be overlooked. Familiarity with economic theory and concepts helps the engineers to .understand

optimal utilization of resources which not only leads to increase in the productivity in the organization but also leads to maximum satisfaction of the individuals. It is the need of the hour to use economics in the engineering discipline for becoming a licensed professional engineer (Boehm, 1984; Fish.1915; Riggs et al., 1996; Samuelson & Scotchmer, 2001). No doubt technology paves way for a better tomorrow but in the process of putting the technology into use, the change agents need to make certain value judgements which out which technology can lead to adverse societal implications (Ihde.2008; Kroes et al.'2008; Pinkus, Shuman, Hummon, & Wolfe, 1997). Hence it becomes imperative to blend science and technology with the above mentioned branches of social sciences to help individuals and organizations steer through this period of turbulence and ensure enrichment of the individual and sustainability of the organizations.

2. STUDY OBJECTIVES:

- To find out the satisfaction of the engineering students towards the curriculum content and objectives of the social sciences courses.
- To know whether the engineering students are satisfied with the curriculum implementation of the social sciences courses designed for them.
- To understand the role of teacher commitment towards the implementation of these subjects

3. DESIGN:

Participants: Sample size consisted of 1500 engineering students studying in various engineering institutions in and around Hyderabad out of which only 1449 were suitable for the study.

Procedure: Data was collected by administering a Likert-Scale, five-point measure questionnaire comprising of closed-ended questions developed in English language to the engineering students for getting an insight into two parameters: Curriculum objectives and content and Curriculum Implementation.

4. RESULTS:

Statistics of the respondents

Parameters	Items	Mean
Curriculum Objectives, Outcomes and contents	Satisfaction with course objectives and outcomes	3.55
	Relatedness to future needs	3.30
	Sufficient credits for the course	3.08
	Incorporation of ethics for practical applicability of science and technology	2.98
	Adapted to solve practical problems	3.07
Curriculum Implementation	Adequate resources	2.98
	Adequate no. of hours	3.06
	Faculty academic track and research capabilities	2.91
	Teaching pedagogy	2.18
	Library resources	2.96
	Teaching quality	2.09
	Accessibility to teachers outside the class rooms	2.93

5. DISCUSSION:

As is evident from the above statistics, the students are high to moderately satisfied with the course objectives (3.55) and feel that it comes handy to them for meeting their future needs (3.30) and claim that adequate credits have been allotted to these courses making them at par with their core technical subjects (3.08). Though they find the social science courses helpful in real-time decision making and problem-solving (3.07), still, majority of them feel that human values and ethics has been insufficiently incorporated into the curriculum (2.98) thus making it inconsistent with the societal dimensions. Moreover, statistics on curriculum implementation show that students are specifically not satisfied with the way these courses are planned and implemented in their institutions. Though adequate number of hours are allotted for these subjects (3.06) , still they find that the faculty members dealing with these subjects follow a very primitive teaching pedagogy (2.18) consisting of watered down classroom lectures confined to getting through the external exams with little attention given to using more interactive exercises and case studies that would help the students to read, understand and reflect to the real time socio-technical systems by promoting inquisitiveness, constructive criticism, familiarity with the real-time organizational system and structures, organization citizenship behaviour and a culture of mutual respect and sensitivity in the organization. They find the library resources to be inadequate (2.96) and more importantly there is lack of internalisation on the part of faculty members leading to poor teaching quality and lack

of relatedness and belongingness among the students and the faculty members (2.93). As is clearly evident from the study, there is a lack of engagement and commitment of the teachers dealing with these courses to the so called technocrats and this resulted in poor implementation of the same thereby defeating the very purpose of incorporating them despite of the fact that the curriculum content had been meticulously designed to meet the requirements of bringing about a fit between technology and human touch.

6. IMPLICATIONS:

There is a dearth of research on the impact of social aspects of inclusion of social sciences on students' attitudes, and perceptions and empirical evidences on the role of social sciences in creating social and technical synergies. Despite of the fact that there is a need for extensive studies on learners' affects and perceptions, there is a need for investigation into the challenges of learners interplay within the social systems and its impact on engineering. There is an urgent need for the engineering educators and researchers to streamline their efforts for identifying the human face of technology as an integral part of learning science and make way for research inculcating this dimension.

7. LIMITATIONS:

The results of this study has been understood in wake of the responses of the engineering students. The subjective bias of their responses cannot be completely denied. The sample size is also not very large to be capable for generalization.

8. CONCLUSION:

Based on the research among the engineering students in and around Hyderabad city, it is evident that their satisfaction is high in case of curriculum objectives and outcomes but, their satisfaction with regards to the various dimensions of curriculum implementation are obviously different from high to low. The results of this study stresses on the relevance of faculty members trained in social sciences and technology research for designing the blueprint for effective implementation of the courses whereby the fusion of social sciences and technology would make way for new formats and expressions imbibing technology, culture, network, innovation, ethics, democracy, challenging assumptions and building knowledge hence leading to a better world where there would be harmony between science and art. And all this calls for engagement and commitment of the faculty members towards the courses and the students at large.

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