Chapter 4
Developing Right Graduate Attributes through Project-Based Teaching

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ABSTRACT

Engineering education all over the world is of paramount importance as it is this education which provides economies with opportunities for development and growth. Engineering education is important for both developed and developing economies—for the former to maintain their lead position and for the latter to ensure decent livelihood and utilization of natural resources. In such a situation, engineering education needs to continuously upgrade itself to meet the ever changing needs of the economy, society, and mankind. Hence, understanding **e***ngineering education and reviewing the methods and standards are important if all stakeholders have to be satisfied. With the driving force of the globalization of the engineering profession, adopting project-based teaching methods have mutual recognition across the world, and also help to develop the right graduate attributes while continuing to assure the standards and quality of engineering education.*

INTRODUCTION

Engineering education all over the world is of paramount importance as it is this education which provides economies with opportunities for development and growth. Engineering education is important for both developed and developing economies—for the former to maintain their lead position and for the latter to ensure decent livelihood and utilization of natural resources.

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cation reviewing the methods and standards are important if all stakeholders have to be satisfied. With the driving force of the globalization of the engineering profession, adopting teaching methods, which will have mutual recognition across the world, and develop the right graduate attributes is crucial while continuing to assure the standards and quality of engineering education. The proposed chapter is aiming to address these issues.

Objectives

This chapter will address the issue of developing right graduate attributes through project-based teaching and will provide:

- Guidelines for the development of right graduate attributes.
- Learning and teaching objective to promote project-based teaching.
- The benefit of promoting consistency in developing graduate attributes
- A means of evaluating project-based teaching effectiveness based on learning outcomes and graduate attributes.

In this chapter, we make a distinction between 'graduate attributes' and 'right graduate attributes' since we believe that the right graduate attributes can be developed better by adopting project-based teaching. The chapter focuses on understanding the importance of right graduate attributes and how they can be better developed and enhanced through project-based teaching. It raises a number of questions: What is a right graduate attribute and how should it be developed? What role can project-based teaching play? How should institutional resources and capabilities be configured to develop the right graduate attributes through project-based teaching?

The goal of these questions is to provide the reader with a suitable analysis platform for decision-making that enhances all phases of the engineering education and knowledge management process.

Understanding Engineering

Engineering courses should be designed with reference to a philosophical framework about the educational experiences of students, spelt out in a list of Graduate Attributes (see Appendix 1). Project-based teaching should be included for at least 30 to 40% of the evaluation for all core subjects taken by all engineering students. This is intended to be both an introductory overview of the doing part in engineering and also to develop a comprehensive and holistic approach to university study.

To achieve those ends, some of the graduate attributes to which the subject contributed more heavily than to others is:

- critical appreciation of the concepts;
- appreciation of the importance of advocacy in the community and professional contexts, and
- formulation of reasoned arguments in writing and speaking

Starting the process of developing these attributes is critical because they are at the core of the overall engineering course philosophy, that the course be learner-centered and that it treats ability to engineer on a sustainable basis which is a central concern in engineering education. Being learner-centered has a meaning in this context beyond the sharing of power (through negotiated curriculum, for example) and paying attention to individual student needs, both aspects of which are also reflected in the curriculum. Learner-centeredness in the context of the engineering course also includes recognition that students are the future shapers and movers of the engineering profession, and that engineers influence the sorts of societies, which will evolve.

From the teachers' perspectives, a learner-centered curriculum is also about their responsibility for acknowledging, respecting, continually informing and challenging students' diverse visions