Chapter VI

Enhancing Student Understanding of Packet-Forwarding Theories and Concepts with Low-Cost Laboratory Activities

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Abstract

Teaching packet-forwarding theories and concepts in a practical way to undergraduate students requires both a teaching and learning framework and a laboratory infrastructure. Creating a teaching and learning framework in which students can develop a deeper knowledge and understanding of abstract concepts is not a simple task. In addition to teaching materials, the teacher requires a clear idea about learning theories and issues: (1) what is learning; (2) what is knowledge; and (3) how do students go about learning. This chapter describes a low-cost
laboratory infrastructure for teaching and learning packet-forwarding theories and concepts. The framework is learner-centred and is focused on learning experiences in both classroom and laboratory. The laboratory-based activities form a critical component of the overall framework.

Learning Objectives

After completing this chapter, you will be able to:

- Explain how packet-forwarding theories can be taught in a practical way.
- Discuss the effectiveness of hands-on laboratory activities in teaching and learning contexts.
- Define the following key terms: experiential learning, packet forwarding, and static and dynamic routing.
- Suggest further improvements to the laboratory activities described in the chapter.

Introduction

This chapter presents a teaching and learning framework for packet-forwarding concepts which aims to give students a deep understanding of these concepts. The framework is learner-centred and focuses on learning experiences in the classroom and the laboratory. The laboratory-based activities form a critical component of the overall framework; however, the other elements of the framework are equally important in achieving the intended aim. The chapter begins with a philosophical basis for the teaching and learning framework and then describes the elements of the framework and how these are put into practice, illustrated by several examples. The chapter concludes with a discussion on some initial indicators of the efficacy of the framework and directions for future work.