Chapter 6
Ask New and Challenging Questions Towards Reasoning Skills:
Active Approaches in Higher Education

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ABSTRACT

This chapter explores innovative approaches to fostering reasoning skills in higher education. It delves into various dimensions of active learning, emphasizing the importance of inquiry-based methods, outdoor experiences, and technology integration. The chapter highlights examples from the Lisbon School of Architecture, University of Lisbon, across different study cycles. Notable examples include using Kahoot and MathCityMap in the bachelor's, student-generated challenges in architecture and design master's, and teacher-led research project challenges in the Ph.D. course. The methodologies and outcomes of these active approaches are discussed, emphasizing lifelong learning and metacognition. Overall, the chapter advocates for a holistic view of education that transcends traditional boundaries and prepares students for complex, real-world challenges. The results obtained in all students' degrees reveal improvements in students' commitment, motivation, and engagement in learning and the production of solid and well-founded knowledge.

DOI: 10.4018/979-8-3693-3699-1.ch006

INTRODUCTION

In the ever-evolving landscape of higher education, fostering critical thinking and reasoning skills is both an art and a science. This includes the responsibility of nurturing inquisitive minds capable of grappling with complexity and seeking innovative solutions, that delve into strategies that empower students to become active participants in their learning journey. At the heart of intellectual growth lies the ability to ask questions that transcend the obvious. When students learn to pose thought-provoking inquiries, they engage in a process that extends beyond mere information retrieval. Curiosity fuels the quest for knowledge. Encouraging students to ask questions, whether in the classroom, during research, or in collaborative projects—ignites their intellectual curiosity. Thoughtful questions prompt students to explore deeper layers of understanding. They challenge assumptions, probe complexities, and invite interdisciplinary perspectives. The art of questioning extends beyond academia. Students who master this skill develop a lifelong capacity to approach problems with curiosity, creativity, and critical analysis.

Learning is an active undertaking that involves cognitive, social, and physical dimensions. Not all students learn in the same way, and effective teaching must consider these diverse learning needs. Figure 1 shows that active learning provides a powerful framework for achieving these goals, it recognizes that learning is not solely a cognitive process, it involves social interactions, physical engagement, and the integration of multiple dimensions that help develop reasoning skills. Asking new and challenging questions thrives from an active learning process including transdisciplinary approaches and outdoor exchanges (Figure 1).

Inspired by the ancient Greek philosopher Socrates, this method encourages dialogue, debate, and critical inquiry. By engaging in thoughtful conversations, students refine their reasoning abilities in different areas of knowledge (social and technological). Real-world problems serve as catalysts for learning. Students collaborate, analyze data, and propose solutions, honing their reasoning skills in the process. Immersive scenarios challenge students to apply reasoning to complex situations.