







# Unload the load: Optimizing anatomy instruction with cognitive load theory

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## Abstract

Anatomy is a demanding subject due to the complex nature of anatomical structures and intricate terminology, placing high cognitive demands on students. These challenges can lead to cognitive overload, hindering retention, comprehension, and the ability to integrate anatomical knowledge into clinical practice. Cognitive Load Theory (CLT) provides a structured framework to optimize instructional strategies, reducing unnecessary cognitive burden while enhancing learning efficiency and student engagement. Although the principles of CLT have been explored in anatomy education for over two decades, their systematic integration into routine instructional practice remains limited. This short communication therefore aims to bridge the gap between theory and practice by demonstrating how CLT principles can be effectively translated into day-to-day anatomy teaching and learning strategies. This paper highlights key cognitive load challenges in anatomy education and presents evidence-based strategies to improve retention and understanding. Practical applications, including lecture-based, work-based, and online anatomy practical approaches, are explored with insights from research. Additionally, the role of cognitive load measurement as a quality improvement tool is discussed. CLT's potential in shaping the future of anatomy instruction through artificial intelligence, virtual reality, mixed reality, and transdisciplinary research is also considered. By integrating CLT-informed strategies, educators can foster deeper learning experiences and improve students' ability to apply anatomical knowledge effectively.

## KEYWORDS

CLT-based strategies, cognitive load theory, cognitive overload, learning efficiency, learning engagement

## INTRODUCTION

Sound knowledge of functional and clinical anatomy, along with an accurate comprehension of the spatial relationships between anatomical structures, is the key to becoming efficient medical and allied health practitioners who can examine, diagnose, treat, and communicate proficiently with patients.<sup>1,2</sup> Anatomy taught through human body dissections develops unique skills such as acquiring experience

with teamwork, developing confidence, and learning how to cope with death.<sup>1,3</sup> The introduction of problem-based learning (PBL) integrating basic and clinical sciences focused on ensuring students glean clinically relevant knowledge regarding human structure and function.<sup>2</sup> The introduction of this reform, along with an increasingly dense medical curricula, has led to a decline in the number of allocated hours for teaching anatomy,<sup>4,5</sup> which, combined with the intense workload of the subject, presents a challenge to students