The Effect of Augmented Reality on Spatial Perception in Computer-Aided Drawing Education

Seval Özgel Felek
Assoc. Prof., Ordu University, Turkey

Abstract:

This study examines the impact of Augmented Reality (AR) on spatial perception in Computer-Aided Drawing (CAD) education, with a particular focus on architectural discipline. Spatial perception—the ability to mentally visualize and manipulate three-dimensional objects—is a critical skill for CAD students, yet traditional 2D CAD interfaces often limit its development. AR technologies overlay digital 3D models onto real-world environments, providing immersive and interactive learning experiences that can enhance spatial visualization, perspective-taking, and mental rotation abilities. By reviewing recent empirical studies, this paper highlights how AR-supported CAD instruction improves students' comprehension of complex designs, reduces cognitive load, and fosters higher engagement and motivation compared to conventional methods. Studies reviewed include comparative experiments between AR-based CAD systems and traditional CAD software, as well as applications in collaborative architectural design education. The findings indicate that integrating AR into CAD curricula can significantly improve learning outcomes and spatial reasoning skills, particularly for novice learners. The paper also discusses practical implementation strategies for educators, including step-by-step guidance, layered model complexity, and mobile AR solutions, and provides a framework for future research using mixed-methods approaches combining quantitative and qualitative data. Overall, the study underscores the pedagogical potential of AR in bridging the gap between abstract digital representations and real-world spatial understanding, thereby preparing students more effectively for professional practice in design and architecture.