Towards Low-Cost Tangible Extended Reality for Mathematics Education

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Abstract. Introduction: *Math anxiety is a common challenge for young students, often impairing learning and engagement. Tangible and extended reality (XR) technologies offer opportunities to make learning more interactive, collaborative, and less intimidating.* ***Objective:*** *This work proposes* `XR4Math`*, a low-cost tangible XR system designed to reduce math anxiety through personalized and engaging activities.* ***Methodology:*** *The system synthesizes principles from embodied cognition, collaboration, and multimodal design.* ***Results:*** *We demonstrate its potential through two proof-of-concept applications: ExpressionXR, a tangible game for solving arithmetic expressions, and PuzzleXR, a geometric construction puzzle.*

Keywords *XR, Education, Tangible interaction, Mathematics Learning.*