

Building a 3D simulation program to guide fire escape skills in schools.

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Abstract: This study presents the development of a 3D simulation program designed to train fire escape and emergency response skills within school environments. Recognizing the critical gap between theoretical fire safety knowledge and practical application, particularly among students, this research employs interactive 3D technology to create immersive, scenario-based training modules. The simulation reconstructs common school layouts, including classrooms, hallways, and stairwells, and models various fire scenarios with dynamic elements such as smoke propagation and alarm systems. Users navigate these virtual environments to practice essential survival skills, including identifying safe exits, executing proper evacuation procedures, and responding to blocked routes. The program emphasizes active learning through real-time feedback and repeatable drills. Preliminary evaluation results indicate that the simulation significantly improves users' reaction times and decision-making accuracy compared to traditional instructional methods. This tool offers a cost-effective, safe, and scalable solution for enhancing fire preparedness in educational institutions, ultimately contributing to improved safety outcomes during actual emergencies.

Keywords: 3D simulation, fire escape skills, school safety, emergency training