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Mobile 360° Panoramic Training for Commercial Kitchen Safety: Usability and Learning Outcomes

[Buletin Ilmiah Sarjana Teknik Elektro](#) • Article • 2025 • DOI: 10.12928/biste.v7i4.13919

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Abstract

Commercial kitchens are high-risk workplaces where staff routinely face hazards such as slips, burns, lacerations, and chemical exposure. Conventional classroom-based safety training often suffers from low engagement and weak retention, limiting preparedness for dynamic, high-pressure conditions. To address this, the present study developed and evaluated a mobile 360° panoramic training platform to enhance hazard awareness in commercial kitchens. Unlike fully modeled virtual reality (VR) simulations or generic training contexts, the platform delivers authentic kitchen imagery in dual modes—immersive via Google Cardboard and non-immersive via smartphone—balancing realism, accessibility, and cost efficiency. This exploratory quantitative study involved thirty semester-one culinary students (ages 18–23) from Kolej Komuniti Bukit Beruang, Melaka, recruited through a convenience sampling approach. Participants completed pre-and post-training hazard-identification tests and the System Usability Scale (SUS). Usability ratings were consistently

high across ease of use, learnability, efficiency, and satisfaction (means 4.27–4.70). Hazard-identification scores increased significantly from 29.33 to 83.67; a paired-samples t-test confirmed the improvement ($p < 0.001$, $d = 3.46$). Participant feedback highlighted realism and accessibility as strengths, though reduced interactivity compared to full VR was noted. Findings align with prior VR-based training studies in healthcare and construction, suggesting that panoramic imagery can deliver comparable learning gains at lower cost and deployment effort. Limitations include the small, short-term sample, absence of a control group, and user-reported issues such as headset discomfort and accessibility concerns. Future research should examine longitudinal retention, controlled comparisons with traditional training, and scalability across diverse settings to establish broader real-world impact. © 2025, Universitas Ahmad Dahlan. All rights reserved.

Author keywords

360° Panoramic Training; Commercial Kitchen Safety; Hazard Awareness; Mobile Immersive Learning; Virtual Reality in Education

Funding details

Details about financial support for research, including funding sources and grant numbers as provided in academic publications.

Funding sponsor	Funding number	Acronym
Pusat Pengurusan Penyelidikan dan Inovasi, Universiti Utara Malaysia See opportunities ↗		
Universiti Teknikal Malaysia Melaka See opportunities by UTeM ↗		UTeM
KPT		
Ministry of Higher Education, Malaysia See opportunities by MOHE ↗		MOHE
Fakulti Teknologi Maklumat Dan Komunikasi, Universiti Teknikal Malaysia Melaka See opportunities ↗		

Funding sponsor	Funding number	Acronym
Fundamental Research Grant Scheme Exploratory Research Consortium	FRGS-EC/1/2024/ICT09/UTEM/03/2	

Funding text

Thanks are extended to Fakulti Teknologi Maklumat Dan Komunikasi (FTMK), Universiti Teknikal Malaysia Melaka (UTeM), for their technical support and research resources. Appreciation is also given to the Centre for Research and Innovation Management (CRIM), UTeM, for funding this research through the PJP Perspektif 2024 grant. And gratitude also expresses to the Ministry of Higher Education, Malaysia (KPT), for supporting this study through the Fundamental Research Grant Scheme Exploratory Research Consortium (FRGS-EC) FRGS-EC/1/2024/ICT09/UTEM/03/2.

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Abstract

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