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MOBILE PHOTOGRAMMETRY AS A TOOL FOR INDEPENDENT LEARNING: PEDAGOGICAL POTENTIALS OF POPULAR 3D SCANNING APPLICATIONS

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Abstract

Mobile photogrammetry has the potential to become increasingly relevant in contemporary education, offering students accessible tools for exploration, visualization, and autonomous learning. This study investigates the pedagogical potential of four widely used and easily accessible mobile 3D scanning applications: Luma AI, Polycam, KIRI Engine, and the iOS based 3D Scanner App. The primary aim was to examine how these applications can support independent learning and enhance cross-curricular connections through the creation and analysis of 3D models. As part of the research, two objects of different structural and material characteristics,

an HDD and a pine cone, were scanned in each application, allowing for a comparative evaluation across both technical and educational dimensions. A multi-criteria analysis was employed to assess the usability of the applications, focusing on the visual quality of the generated 3D models, user-friendliness, rendering times, and underlying technological mechanisms (e.g., AI-based reconstruction versus traditional photogrammetry). The findings indicate differences in both output quality and ease of use, suggesting that certain applications are more suitable for classroom environments and independent student projects than others. Luma AI and Polycam demonstrated strong performance in producing visually detailed models with minimal user effort, while KIRI Engine offered high mesh precision. The 3D Scanner App provided advantages in speed and ease of use, but showed limitations with smaller, complex objects. Overall, the results highlight that mobile photogrammetry applications can significantly enrich learning experiences by enabling students to create and analyze their own 3D representations. The study concludes by recommending specific applications for educational use, emphasizing their potential to foster engagement, autonomy, and interdisciplinary learning.

Keywords:
Photogrammetry, 3D Models, Education, Interdisciplinary Learning, Artificial Intelligence