Design of a Virtual Learning System Enhanced With Artificial Intelligence for Training Lighting and Shading Skills in 3D Design

Lighting and shading are crucial in the 3D industry, yet many learners struggle to connect theory with practice. Current learning methods are often passive (lectures, videos) and insufficient for developing deep understanding. Learners also face limitations such as access to high-cost software and a lack of real-time, expert feedback

Key Problems

- Learners lack an understanding of fundamental lighting concepts like diffuse, specular, and subsurface scattering
- Existing software interfaces are often complex and not suitable for beginners.
- There is a lack of systems that provide real-time guidance and evaluation.

mixed-methods research methodology, grounded in the principles of human-centered design (HCD) and human-computer interaction (HCI)

Data Collection Process

Qualitative: Semi-structured interviews were conducted with three experts in the domains of: 1) 3D lighting, 2) User Experience/User Interface (UX/UI) design, and 3) Virtual technology.

Quantitative: Learner needs questionnaires were used to gather data from a sample of 100 undergraduate Creative Media students at Mahasarakham University.

Wireframe and UI Mockup
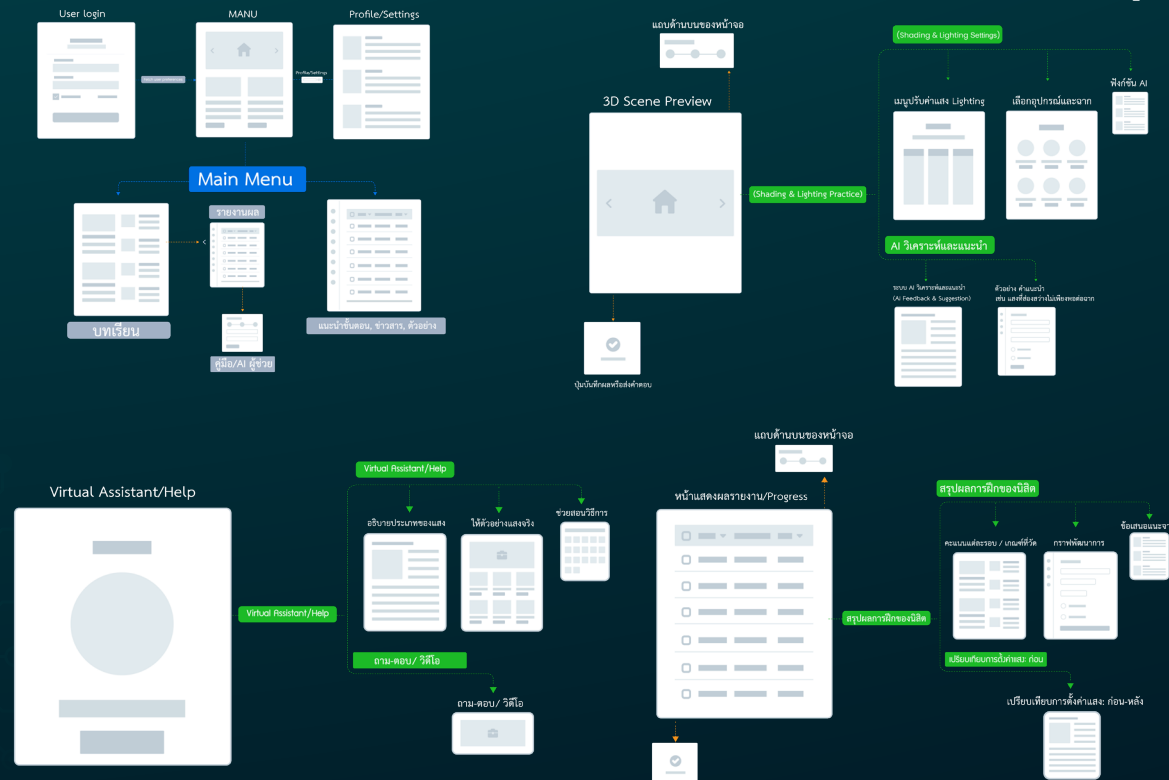
The research findings highlight a clear demand for an advanced and responsive educational tool for 3D lighting and shading
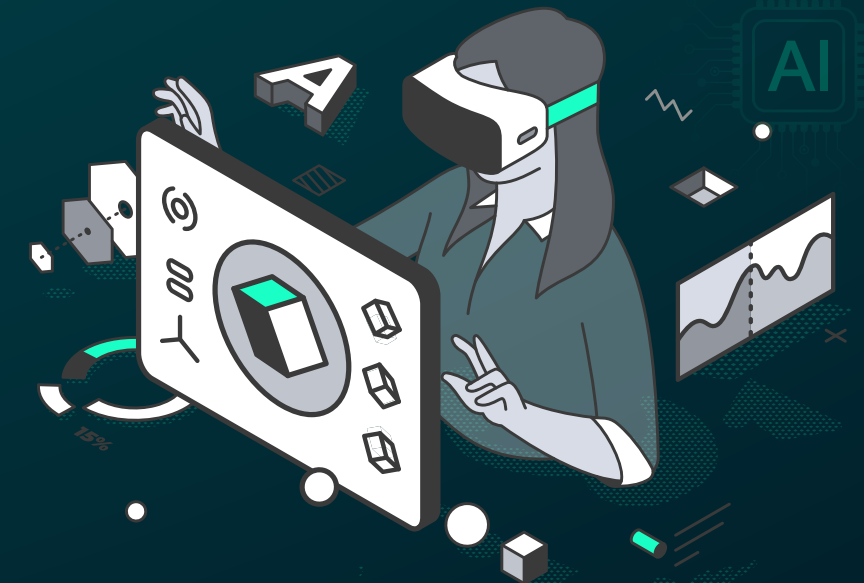
Key Results & Recommendations

The findings revealed a very high demand for the system among learners particularly for

A simplified and beginner-friendly interface ($M = 4.72$)

A system for automatic light placement recommendations ($M = 4.65$)

System usability on common devices ($M = 4.62$)

Recommendation

The study proposes the development of a system that uses AI to provide real-time feedback and suggestions. This system should include case studies from professional studios and feature a user-friendly interface to enhance learning effectiveness.

V. Jantarajaturaprat, P. Saithong, and W. Sangkatip (2025), Department of New Media, Faculty of Informatics, Mahasarakham University, Maha Sarakham 44150, Thailand, Corresponding author: pongpipat.s@msu.ac.th