

## **Evaluating the effect of computer graphics rendering quality on memory awareness states in synthetic worlds.**

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This paper describes the methodology and results of experimental studies employing human judgments of memory awareness states for assessing the simulation fidelity of a Virtual Environment (VE). In order to demonstrate the distinction between task performance based approaches and awareness states' investigation, the same computer graphics space was rendered in varied quality of rendering (flat shaded and radiosity). The space in question represented two interconnected rooms that included primitive objects (boxes, spheres, pyramids). Resulting scenes were displayed on a stereo capable Head Mounted Display (HMD) with head tracking. A between subject's experimental design was utilised and participants were exposed to each computer graphics environment for a specific amount of time. Participants described how they completed their spatial recollections by selecting one of four choices of awareness states after retrieval. These reflected the level of visual mental imagery involved during retrieval, the familiarity of the recollection and also included guesses, even if informed. Also assessed were participants sense of 'presence', simulator sickness and subjective impressions of illumination.

The results of this study will be presented. Generally, simulation of task performance does not necessarily lead to simulation of the awareness states involved when completing a memory task. The general premise of this research focuses on '*how*' tasks are achieved, rather than only on '*what*' is achieved, in a simulated environment. The extent to which judgements of human memory recall, memory awareness states and presence in the physical and VE are similar provides a fidelity metric of the simulation in question. This fidelity metric is not solely based on the quality of the computer graphics rendering but also on the human perceptual mechanisms.