

# **The eye movement analysis of 3D spatial problem with cue effects between successful and unsuccessful problem-solvers**

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**Abstract:** Previous studies found that eye movements of geometry problem-solving process were different between experts and novices. 3D spatial problems are more complicated and advanced. Present study aimed to investigate the cue effects in 3D spatial problem solving between successful and unsuccessful problem-solvers. Experimental design was 2 (cue: present/absent) [U+FOCD] 2 (group: successful/unsuccessful problem-solvers). There were four experimental conditions: successful problem-solvers on the problem with non-cue (S-NC), unsuccessful problem-solvers on the problem with non-cue (US-NC), successful problem-solvers on the problem with cue (S-C) and unsuccessful problem-solvers on the problem with cue (US-C). Participants were 52 undergraduates. Results revealed that US-NC was more fixation counts than in the other conditions. However, there was no significant difference in the four conditions in the gaze duration. The technique of fMRI is suggested for studying the brain mechanism in the future. In pedagogical aspect, animations of keys and procedure of problem solving can help unsuccessful problem-solvers to acquire 3D spatial concepts.