World Conference on
Teaching, Learning, and Education

27 - 29 March 2026

Singapore , Singapore

An Eye-Tracking Study of Visual Strategies in Crime Scene Investigations

Rong-Chi Chang , Liang-Yi Chung

Taiwan Police College
Chihlee University of Technology, Taiwan

Abstract

The ability of crime scene investigators to accurately identify crucial evidence in complex environments is essential for judicial fairness. But the traditional means of measuring their professional skill are usually subjective and indirect, and there aren't any clear cognitive behavioral symptoms. The objective of this study is to utilize eye-tracking technology to assess and analyze the visual search strategies and attention distribution patterns of both seasoned and novice detectives in simulated crime scenes. This will assist develop an objective model for judging how good someone is. The study used a quasi-experimental method and had 27 experienced investigators (the expert group) and 34 police academy students (the novice group). Participants were told to look at four high-resolution pictures of fake crime scenes, each of which was shown for 60 seconds. We used an eye tracker to accurately collect their eye movement data during this operation. The analysis of the data indicates that the two groups possess markedly distinct perspectives. Compared to beginners, the expert group (1) can focus on key evidence much faster; (2) gives key evidence more of their attention; (3) can more easily ignore visual distractions that aren't important; and (4) has better search strategies, with shorter scan paths and much higher fixation/saccade ratios. The visual heatmaps and scan route diagrams also reveal that professionals search in a more structured and logical way. This study effectively demonstrated that eye-tracking technology can consistently and impartially distinguish the cognitive approach disparities between professionals and novices in crime scene investigations. It is a forensic science instrument that uses evidence to look at and give comments on professional skills.

Keywords: Attention Allocation; Competency Assessment; Expertise; Forensic Science; Search Patterns