

## E70 Comparing Virtual Tools for Investigator Training

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**Learning Overview:** After attending this presentation, attendees will better understand different types of extended reality platforms and their facility for building models for investigation.

**Impact on the Forensic Science Community:** This presentation will impact the forensic science community by illustrating the benefits and drawbacks of using a virtual platform for teaching crime investigation.

The concept of extended reality encompasses all forms of augmentation or digital representation in a virtual arena.<sup>1</sup> Augmented Reality (AR) blends interactive digital elements, such as overlays and sensory projections, with real-world environments. Using a device like a smart phone camera, viewers can project game items that look like part of the physical environment.<sup>2</sup> The United States Army uses AR tools to digitally enhance training missions. Virtual Reality (VR) is a 3D computer-generated environment with which one can interact as a participant in the virtual world, manipulating virtual objects. Participation requires a VR device, such as headset with a display and headphones.

Extended Reality (ER) has moved into forensics.<sup>3</sup> Using AR and VR tools, investigators can generate different perspectives to enhance their ability to make effective decisions about a crime scene, and students can learn how to investigate without corrupting it. The virtual recreation of a crime scene has potential uses for teaching in a course, a police training, and court demonstrations. In VR, investigators can modify the scene to remove irrelevant objects for easier observation of evidence or add objects as red herrings.<sup>4</sup>

Most crime investigation trainings dispense information rather than offer hands-on experience, because they cannot use actual crime scenes. With the development of ER platforms, students and police officers gain opportunities to experience realistic scenes. However, the technology can be confusing and expensive, which leaves this approach underutilized. Comparative research with ER methods can help to identify the most accessible and affordable approach.

A Forensic Sciences Foundation (FSF) Lucas grant enabled a team to compare two methods in a virtual scene. The team rebuilt the 1971 John List familicide scene in New Jersey from crime scene photos and actual house dimensions on Linden Lab's Second Life gaming platform.<sup>5</sup> They set up a Roar AR app to use avatars to view the items inside. Approaching a body, for example, they could activate the app and read the autopsy report. Using the app on a note that List wrote, they could hear him reading it. They also tried out the Unity gaming platform.

The VR method used untethered Oculus<sup>®</sup> Quest headsets, which place wearers inside a vivid 3D, 360-virtual environment. They could move through a scene as if walking and use virtual hands to touch and grab things. In a virtual crime scene, participants could look at evidence from different angles and devise a reconstruction.

The team showed their work to a local coroner who runs training sessions and discussed the pros and cons of both methods in terms of cost and accessibility. The consensus was that a recent upgrade to the Oculus<sup>®</sup> headset made it the best tool to couple with a Second Life/Roar combination, but while cost-effective, the helmet still had key limitations.

### Reference(s):

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3. National Center for Audio and Video Forensics. Forensic Crime Scene Reconstruction, Virtual Reality. <https://ncavf.com/what-we-do/crime-scene-reconstruction/> (no date).
4. Pool, R. Virtual and Augmented Reality Tech Join the Fight Against Crime. *Spie.org*. <http://spie.org/news/spie-professional-magazine/2019-january/ar/vr-tech-joins-the-fight-against-crime?SSO=1>. 2019.
5. Sharkey, Joe. *Death Sentence: The Inside Story of the John List Murders*. New York City: Signet, 1990.

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### Augmented Reality, Virtual Reality, Digital Crime Scene Investigation