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## Biometric Device Training and its Impact on Usability and User Performance

Stephen D. Cargo<sup>2</sup>

Advisors: Eric P. Kukula, Ph. D.<sup>1</sup>, Robert W. Proctor, Ph. D.<sup>2</sup>

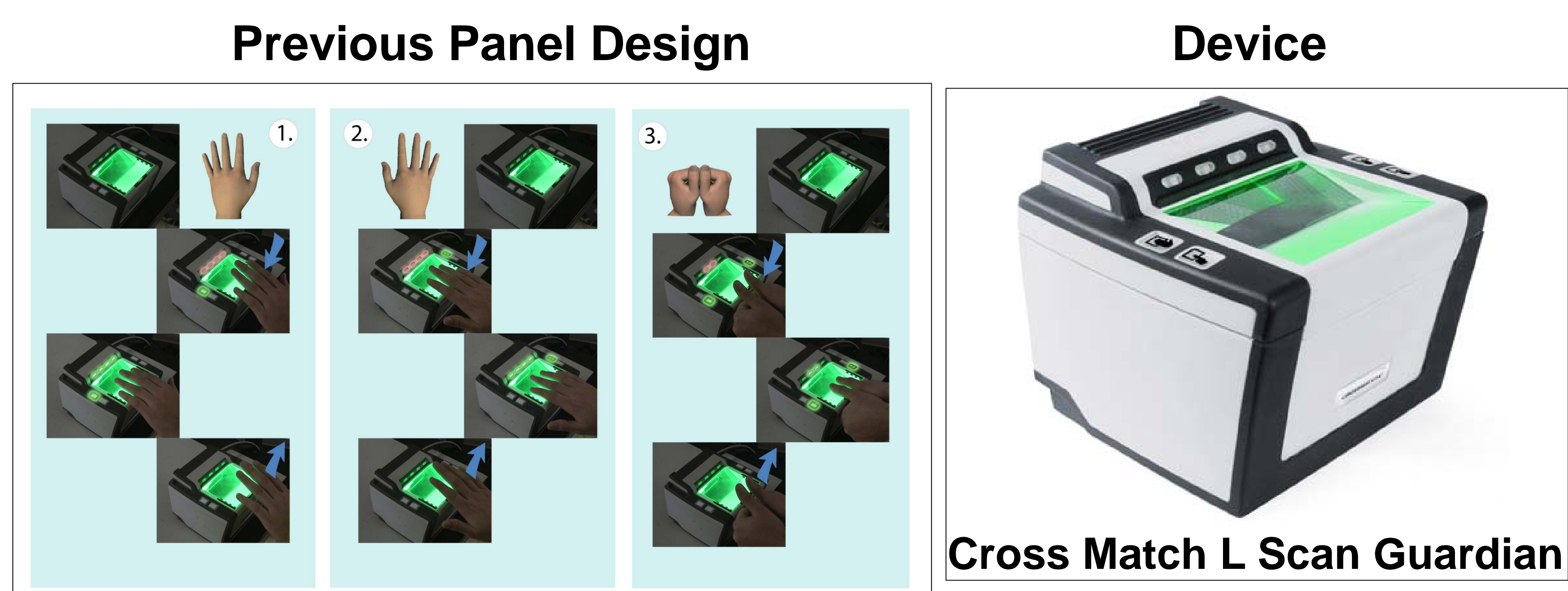
<sup>1</sup>Biometric Standards, Performance, and Assurance Laboratory; Dept. of Industrial Technology, <sup>2</sup>Dept. of Psychological Sciences  
Purdue University

### Abstract

The U.S. Department of Homeland Security currently requires a 10 fingerprint-capture process at immigration checkpoints, implementing a biometric fingerprint enrollment device. The device has some design deficiencies leading to system usability issues, and users of the device at checkpoints emigrate from many different countries around the globe and speak various languages. Thus, there is a need for a universally understood instructional panel that is able to train all users, increasing device/system usability, user satisfaction, and overall system effectiveness. Problematic training methods and instruction panel designs were identified from previous research, and this information was used to redesign two new panels. One was a detailed version addressing all of the identified usability issues, and the other was a simplified, minimalistic version designed with the additional concern of minimizing cognitive load. In the present study, the detailed and minimalistic designs are being tested and evaluated to determine which provides the most improvement over the previous design and the best overall usability of the biometric system.

### Current Status

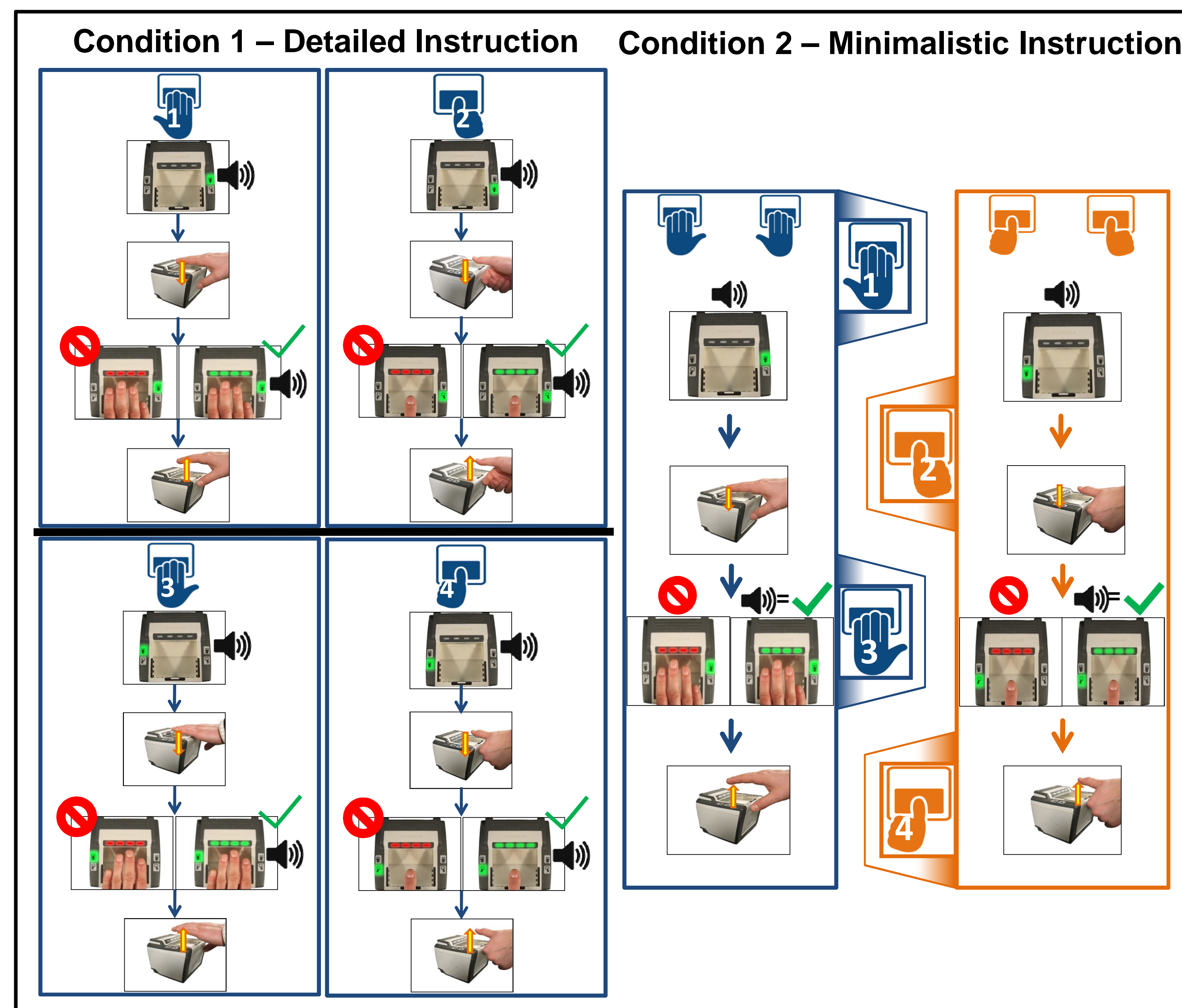
Data collection is currently being conducted. Approximately 80 students from Purdue Industrial Technology courses are participating in this study. During a session, each participant will be instructed how to use the device by the detailed version or the minimalistic version of the instruction panel. The user will be videotaped, and panel viewing time will be measured. When the participant is ready to proceed, s/he will be asked to enroll her or his fingerprints successfully, using the device in the panel-instructed order: right four fingers, right thumb, left four fingers, left thumb. Device software feedback will be recorded, and the user interaction will be videotaped. After fingerprint extraction, the participant will complete a questionnaire about her or his experience with the device. After data collection is completed, we will analyze the data and compare the two designs in this study, and determine any improvement over previous designs.



### Design Criteria (in order of importance)

- Indication of how long user should keep fingers on scanner
- Information regarding finger position
- Increased emphasis on tone significance
- Increased emphasis on light significance
- Clearly display which hand is slapped first
- Show appropriate amount of pressure
- More overall detail on panel

### Redesigned Training Instruction Panels



### Expected Results

The design of the new instruction panels directly addresses the issues that led to errors. Therefore, we expect that the new designs will improve user performance and reduce these errors. If highly detailed instruction is required for increased performance, the detailed instruction panel will be the better of the new designs. Conversely, if the cognitive load of a more detailed panel interferes with training, the minimalist design should produce better user performance.

