Biometric Usability Studies

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User behavior can affect throughput and the quality of the captured fingerprint image

Guidelines for developing interactions with biometric applications will provide:

For developers:

- consistent development of hardware, software, and interaction techniques

For users:

- consistency across biometric system user interfaces
- enhance user understanding
- enhance performance (throughput and quality)
- improve user satisfaction / acceptance

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The usability of biometric system user interfaces need to be improved

- Biometric technology and systems have matured
- Biometric systems are going to be ubiquitous in the future
- Different way of doing business
  - The end-user is not prepared
  - Must communicate and teach the end-user
- The transition from the unfamiliar to the familiar requires an understanding of the users
- Need to share usability research

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Project objectives include

- Evaluation methodologies for the usability of biometric systems
- Guidelines for:
  - Human computer interfaces (operational)
  - Instructional materials
  - Symbols and icons (M1.6 Pictograms, Icons and Symbols for use with Biometric Systems).
  - Accessibility and Section 508
  - Affordance

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Currently developing Guidelines for Operational Use

Studies include:

- Habituation and Feedback
- Counter Height
- 10 Print Timing (Instructions)
- Accessibility

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Does counter height affect user's performance?

- Time required to capture fingerprint image?
- Quality of images captured?
- Do users prefer a particular height?

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Design and implementation of 4 standard surface heights

Table
26'' (660 mm)

Desk
32'' (813 mm)

Counter
36'' (914 mm)

Standing Counter
42'' (1067 mm)

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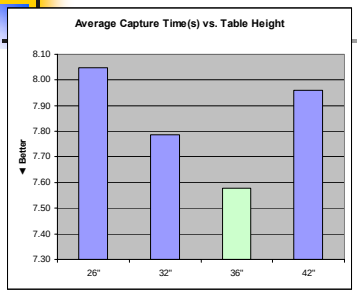
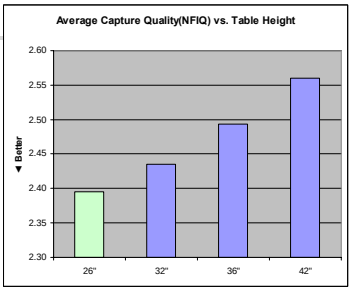
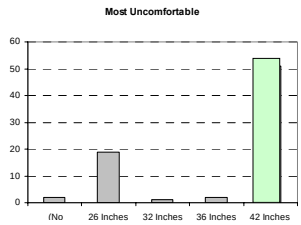
ISO 9241-11 identifies three areas of measurement



Efficiency



Effectiveness



User Satisfaction

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What can we conclude?

Optimal Counter height for:

- Time on Task = 36 inches
- Quality = 26 inches
- User satisfaction = 32 or 36 inches

Guidelines include:

- Start with right hand
- A counter height of 42 inches and greater does not satisfy the efficiency, effectiveness, or satisfaction requirements and should not be considered

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10-Print Study

- How do instructional modes affect the fingerprint capture process?
  - Timing
  - Errors
  - Operator assistance
- Is there a relationship between pressure and quality?
- Iris and face also captured

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Three Instructional Modes

Verbal:

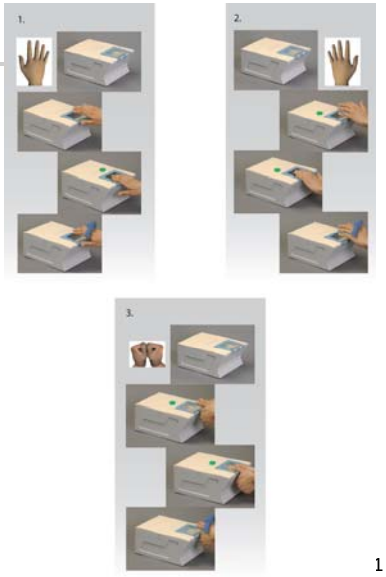
Step #1: When the right most light starts flashing green; place your right four fingers (demonstrate what four fingers) on the scanner and press down. Hold your fingers in place until the green light stops flashing

Step #2: When the left most light starts flashing green; place your left four fingers (demonstrate what four fingers) on the scanner and press down. Hold your fingers in place until the green light stops flashing

Step #3: When the center light starts flashing green; place your 2 thumbs (demonstrate thumbs side by side) on the scanner and press down. Hold your fingers in place until the green light stops flashing.

Would you like me to repeat the instructions?

Poster:



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Three Instructional Modes

Video

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Early Observations include:

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Early Observations include:

- Scanner affordance was poor
- Lights were not obvious to participants
- Participants understand biometrics from pop-culture

"I understand about fingerprints because I watch CSI"

Reminded him of the Minority Report movie with Tom Cruise

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Early observations on instructional methods

"initially lights did not mean anything"

Poster:

- Appeared to be least effective.
- Subjects could not determine LED state changes
- Subjects would glance and move on

"label the lights on the machine. Left and Right"

Verbal:

- Appeared less effective as Video, but more effi
- Problems due to lack of visual preparation and difficul hand placement.
- Implied that the operator would assist them through the process.

Video:

- Appeared to be most effecti
- Subject took time to look
- Encouraged subjects to p

Should fingers be centered on the scanner? The less you have to think the better.

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Operators are critical in the acquisition of fingerprints

60% of participants were not able to complete the acquisition process correctly with no operator assistance

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Further data analysis is required to address:

- Which instructional mode is best with respect to timing, errors, and quality?
- Is there a relationship between pressure and quality?
- What about user's reactions to iris and face scans?

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