Standard Metrics and Scenarios for Usable Authentication

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Our experience


• Reviewed numerous authentication papers
• Empirically evaluated seven web-authentication proposals
Problem

• Unclear whether any real progress is being made
• Steady stream of authentication proposals, but...
  • Most lack empirical analysis
  • Few are compared against existing password-based authentication
  • Fewer still are compared against competing proposals
• We need a more scientific approach to this research area
Head-to-head Comparisons
Direct Comparisons

• Evaluate whether new proposals are making tangible progress
  • As compared to passwords
  • As compared to alternative proposals

• Within subject or between subject
  • Within subject can be preferable
Standard Metrics
System Usability Scale (SUS)

- Simple and effective evaluation of usability
  - 10 questions
  - Single usability score from \([0, 100]\)

- Reliable
  - Across studies
  - Across populations
  - More accurate than mean time-to-authenticate

![SUS Scoring Table](image)
Other Potential Metrics

  • Post study questionnaire – PSSUQ
  • Post-task questionnaire – SMEQ, SEQ

• User Burden Scale (UBS)
  • New scale introduced at CHI 2016

• Mean time-to-authenticate
  • Less reliable than SUS
Standard Scenarios
Real-World Scenarios

• Allows for more rigorous comparisons
  • Systems evaluated against same criteria
  • Reduces confounding factors

• Real-world scenarios with relatable tasks
  • More accurately evaluates a proposal’s usability
Example Scenarios

• Banking
  • High security environment
  • Occasional usage

• Discussion board
  • Lower security environment
  • High usage

• Available for download
Recommendations
Recommendations

• Direct Comparisons
  • Within subject or between subject
  • Measure against baseline

• Standard usability metrics
  • SUS

• Standard scenarios
  • Banking
  • Discussion board
Discussion
Discussion

• Standard usability metrics
  • Alternatives
  • Is SUS a good fit for usable security?

• Scenarios
  • Other compelling scenarios
  • Scenarios for emerging forms of authentication
SUS Questions

1. I think that I would like to use this system frequently.
2. I found the system unnecessarily complex.
3. I thought the system was easy to use.
4. I think that I would need the support of a technical person to be able to use this system.
5. I found the various functions in this system were well integrated.
6. I thought there was too much inconsistency in this system.
7. I would imagine that most people would learn to use this system very quickly.
8. I found the system very cumbersome to use.
9. I felt very confident using the system.
10. I needed to learn a lot of things before I could get going with this system.