15. Mental Models; User Education

Blase Ur and Mainack Mondal
May 14th, 2018
CMSC 23210 / 33210
Today’s class

• Mental models
• User education
Mental Models
Mental Models Study

Rick Wash, “Folk Models of Home Computer Security” (SOUPS 2010)
Wash 2010

• How uses *perceive* and *understand* computer security

• Understand the *mental models* of users
Wash 2010

- 33 semi-structured interviews
- About 45 minutes each
- Broad questions
- Hypothetical scenarios
Wash 2010

• Folk models used to decide whether to follow security advice

• For example, “Use anti-virus software” was viewed as important to users who saw viruses as supporting crime and less important to users who viewed viruses as buggy software
Wash 2010: Viruses

- “Virus” as general term for malware
- Generically bad
- Buggy software
- Virus as annoyance
- Support crime
- Multiple of the above
Wash 2010: Hackers

• “Hacker” term used for malicious actors
• Digital graffiti artists
• Burglars
• Criminals who target valuable targets
• Contractors who support criminals
• Multiple of the above
Wash 2010

• Main takeaway: How users perceive threats can affect their security-related behavior.
• Users often do not understand threats the same way that sophisticated users do.
• Users may take actions that only make sense if you understand their behavior.
Software Updates

Java Update Available
A new version of Java is ready to be installed.

Java Update - Update Available
Java 6 Update 22 is ready to install. Click the Install button to update Java now. If you wish to update Java later, click the Later button.

More information...
Software Updates


• Update = New features? Or security fix?
Expert vs. Non-Expert Mental Models

Expert vs. Non-Expert Mental Models

• What are the top three things you do to stay safe online?

• Experts
  – Update system
  – Use unique passwords
  – Use strong passwords
  – Two-factor auth
  – Password manager
  – Check if HTTPS
Expert vs. Non-Expert Mental Models

• What are the top three things you do to stay safe online?

• Non-experts
  – Anti-virus
  – Use strong passwords
  – Visit only known websites
  – Change passwords
  – Don’t share information
  – Use unique passwords
Drawing Mental Models

User Education
Why Does Phishing Work?

- How do you tell if a site is legitimate?
- How do you tell if an email is legitimate?
Legitimate or Phish?
Legitimate or Phish?
Anti-Phishing Phil / PhishGuru

How To Avoid Online Scams

Prefix Address File Name

Notice that the URL in your browser’s address bar has several parts.
How Do You Tell if a Prince Is Legit?