15. Mental Models; User Education

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THE UNIVERSITY OF CHICAGO

Security, Usability, & Privacy Education & Research

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

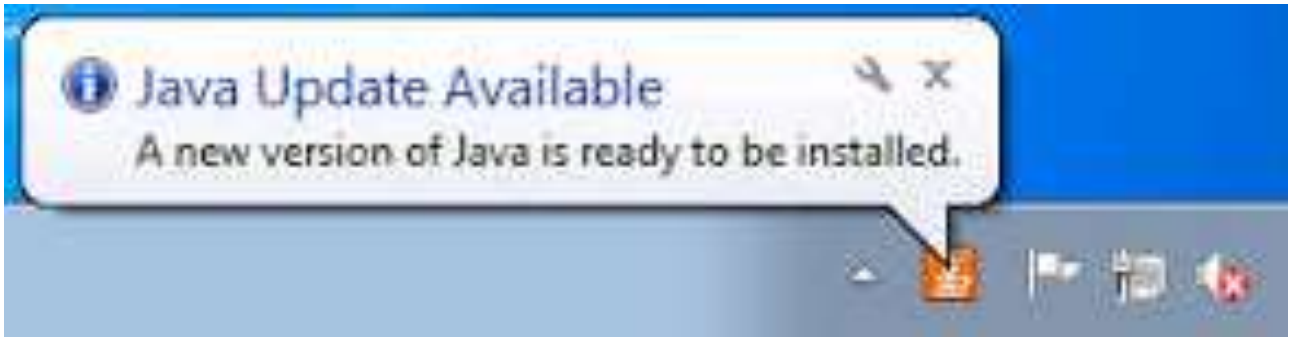
Wash 2010: Hackers

- “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



Software Updates

- Kami Vaniea, Emilee Rader, Rick Wash. Betrayed By Updates: How Negative Experiences Affect Future Security. CHI 2014.
- Update = New features? Or security fix?

Expert vs. Non-Expert Mental Models

- Iulia Ion, Rob Reeder, Sunny Consolvo. "…No One Can Hack My Mind": Comparing Expert and Non-Expert Security Practices. SOUPS 2015.

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

- Ruogu Kang, Laura Dabbish, Nathaniel Fruchter, Sara Kiesler. “My Data Just Goes Everywhere”: User Mental Models of the Internet and Implications for Privacy and Security. SOUPS 2015.

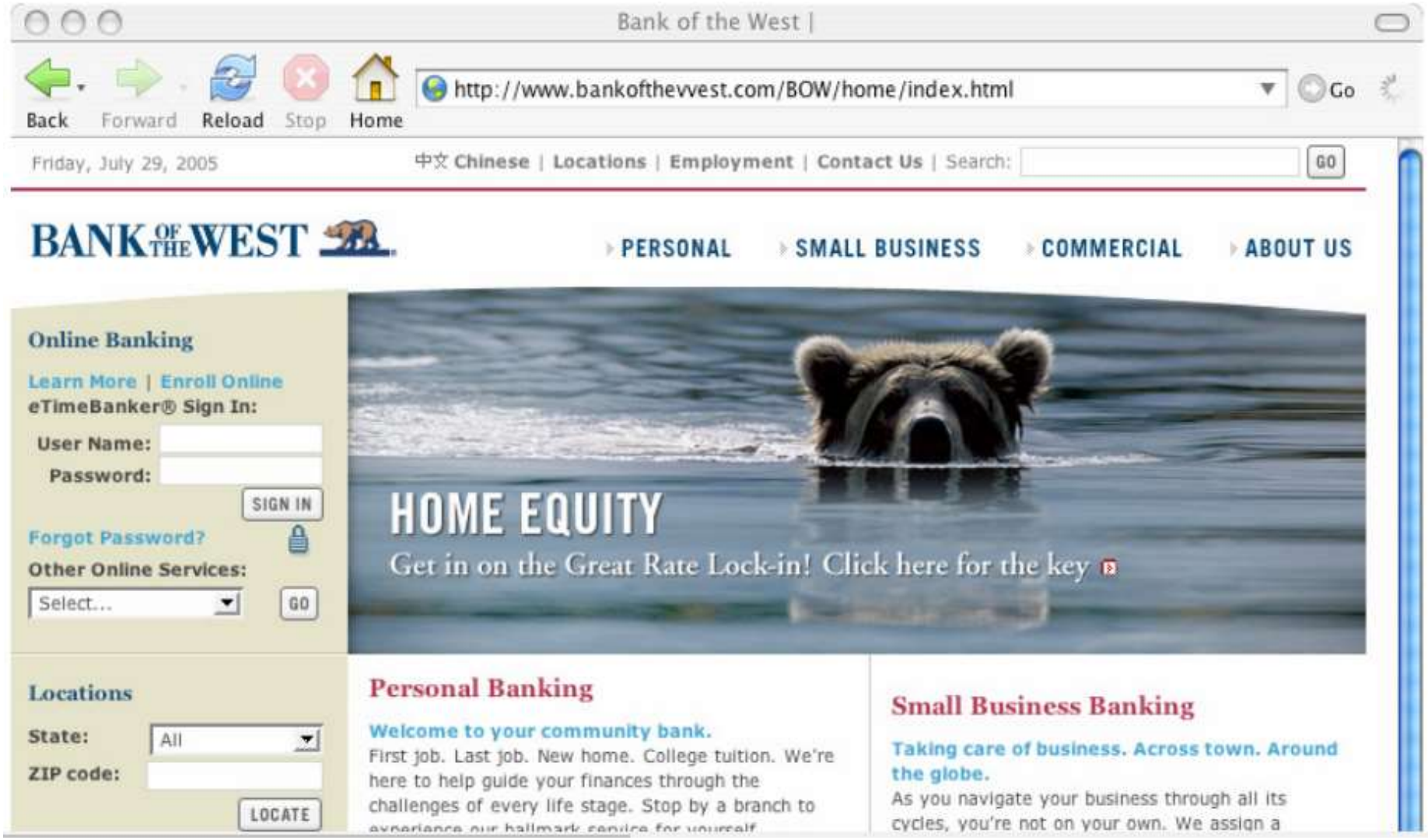
User Education

Why Does Phishing Work?

- Rachna Dhamija, J.D. Tygar, Marti Hearst. Why Phishing Works. CHI 2006.
- 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 Do You Tell if a Prince Is Legit?

- Cormac Herley. Why Do Nigerian Scammers Say They’re From Nigeria? WEIS 2012.