

15. Mental Models; User Education

Blase Ur and Mainack Mondal

May 14th, 2018

CMSC 23210 / 33210



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 users *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

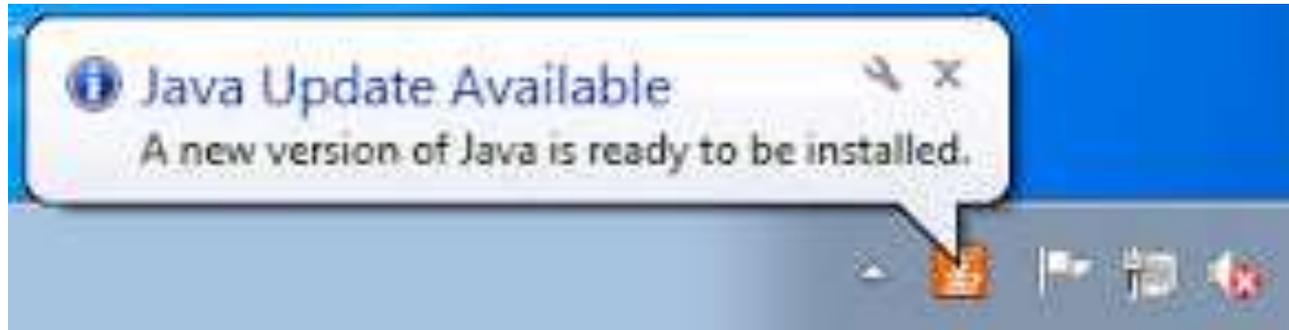
Wash 2010: Hackers

- “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

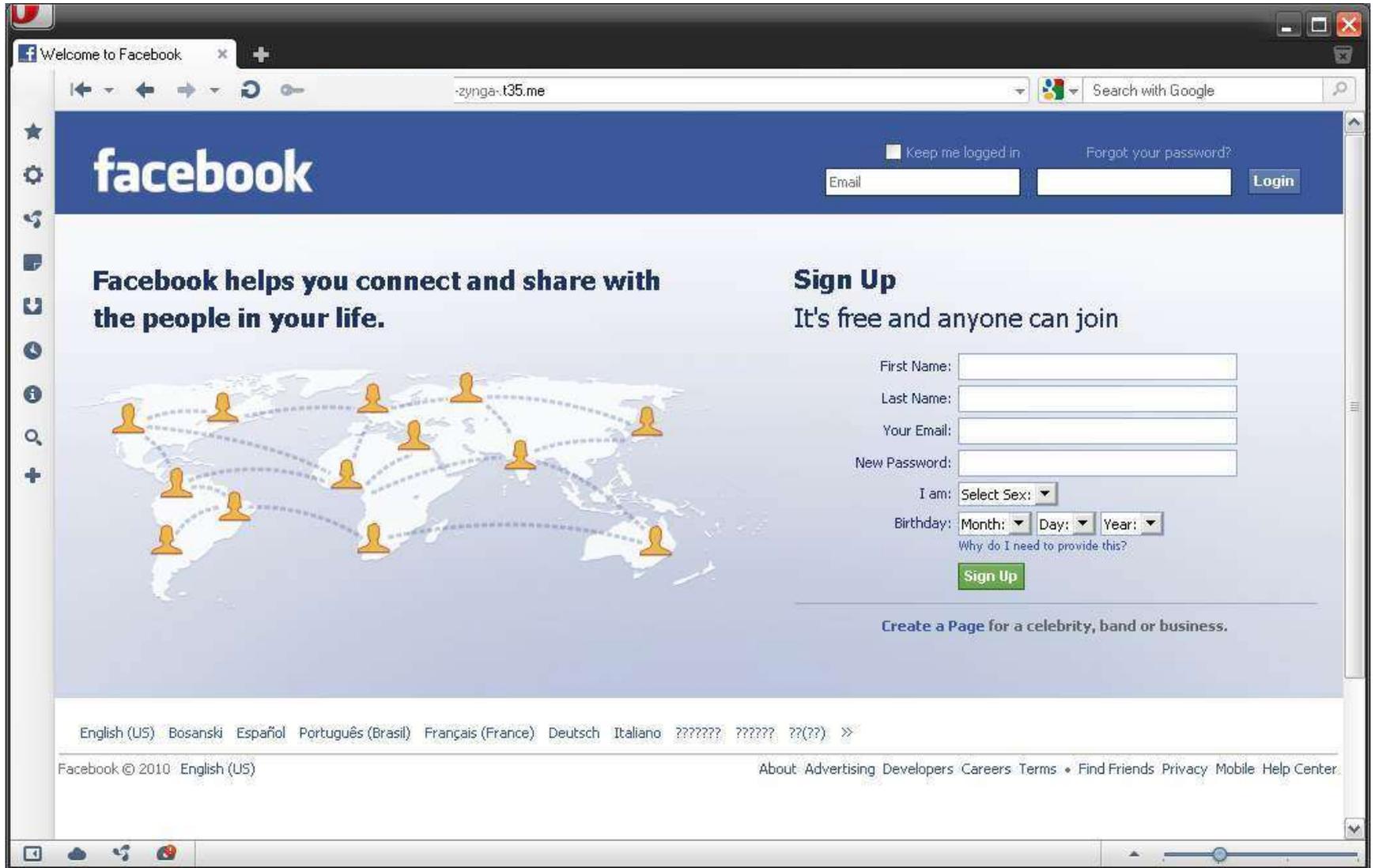
- Ruogu Kang, Laura Dabbish, Nathaniel Fruchter, Sara Kiesler. “My Data Just Goes Everywhere”: User Mental Models of the Internet and Implications for Privacy and Security. SOUPS 2015.

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?

Bank of the West |

Back Forward Reload Stop Home

http://www.bankofthewest.com/BOW/home/index.html Go

Friday, July 29, 2005 中文 Chinese | Locations | Employment | Contact Us | Search: GO

BANK OF THE WEST 

PERSONAL SMALL BUSINESS COMMERCIAL ABOUT US

Online Banking
[Learn More](#) | [Enroll Online](#)
eTimeBanker® Sign In:
User Name:
Password:

[Forgot Password?](#) 
Other Online Services:
Select...

HOME EQUITY
Get in on the Great Rate Lock-in! [Click here for the key](#) 

Locations
State: All
ZIP code:

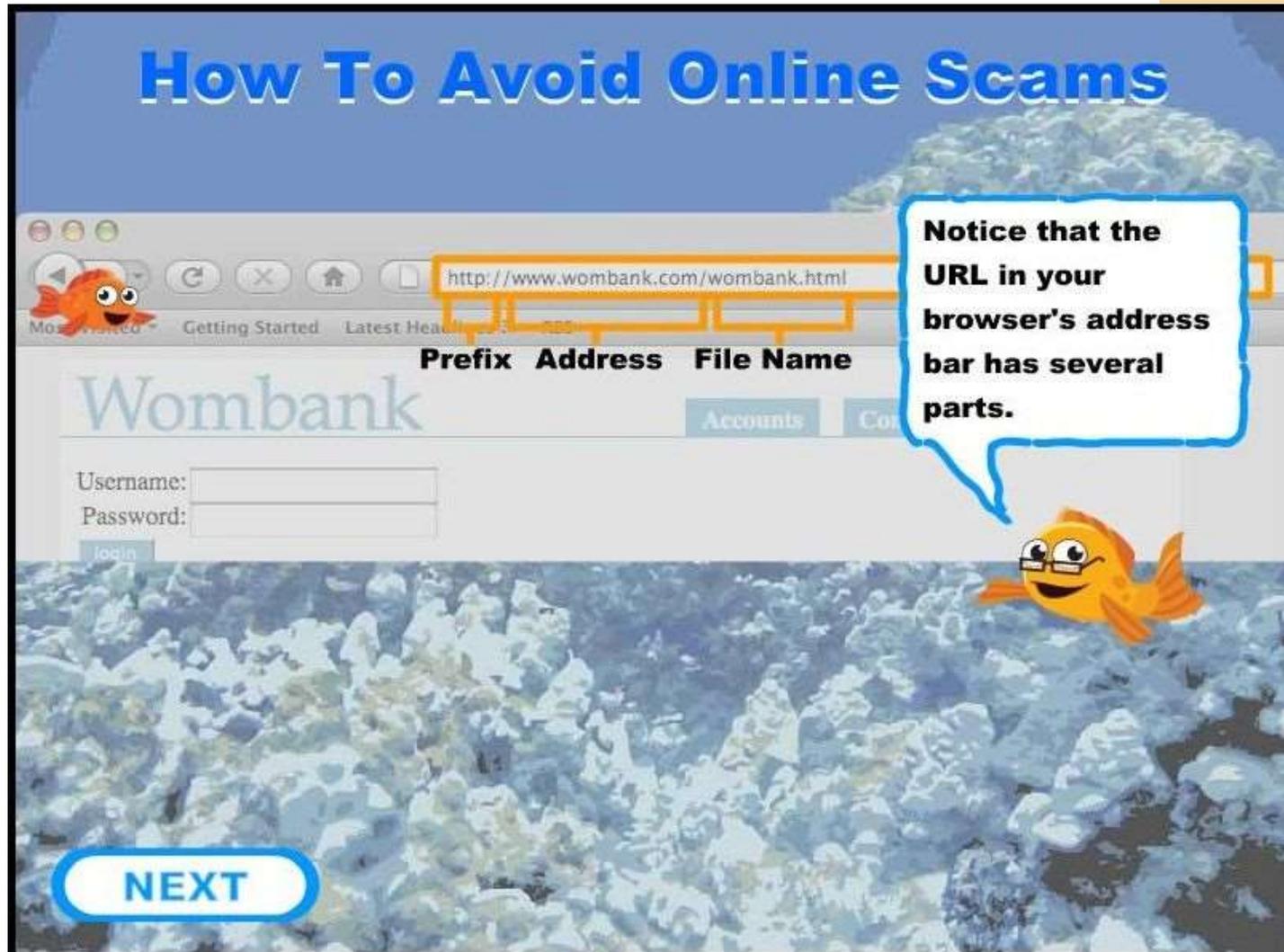
Personal Banking
[Welcome to your community bank.](#)
First job. Last job. New home. College tuition. We're here to help guide your finances through the challenges of every life stage. Stop by a branch to experience our hallmark service for yourself.

Small Business Banking
[Taking care of business. Across town. Around the globe.](#)
As you navigate your business through all its cycles, you're not on your own. We assign a

Anti-Phishing Phil / PhishGuru



How To Avoid Online Scams



Notice that the **URL** in your browser's address bar has several parts.

Prefix **Address** **File Name**

Wombank

Accounts

Username:

Password:

login

NEXT

How Do You Tell if a Prince Is Legit?

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