Practical Cybersecurity

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Outline

1. Introduction
2. Background
3. How to teach people
4. What we should teach them
People fall for scams
Our brains are programmed to fall for scams
Education works but people are slow learners
The problem

- Made worse because the computer industry gives bad advice!

Through 20 years of effort, we've successfully trained everyone to use passwords that are hard for humans to remember, but easy for computers to guess.
How can we teach users better?

- Help!
- How do professional educators do it?
- *Transfer*: the ability to take what you have learned and transfer it to a new situation
  - Users don’t know how to transfer real life to cyber life
- How can we improve transfer?
Expertise

Organized

Details

Flexible

Lots of knowledge
Expertise

- People need to recognize scams
- How? Through **deliberate practice**
- Look at the aspects of the scam
- Abstract $\rightarrow$ specific
  - Be cautious $\rightarrow$ Hover mouse over a link
Experience

What if you believed the earth is flat?
Experience

But were told that it is round?
Experience

- If prior beliefs are not engaged, people revert back to old models (ball of yarn)
- Fake A/V
  - People need A/V
  - Security industry is trustworthy
- Integrate new information with prior knowledge
  - People need A/V
  - *And* they need to get it from a trustworthy source
  - Abstract better than specific
Metacognition

- “Thinking about thinking”
- The Revolutionary War
  - Why did the rebels want to secede?
  - Why did the loyalists want to remain?
Metacognition

- Why won’t banks ask for your password?
- Game – Think from the other side
What to teach?

- The Internet is fun but only deal with trustworthy sources
- Keep your software up-to-date
- Learn to recognize scams
How young to start?

- Start early
- Current efforts not enough
- Requires public and private partnership
What should we do?

- Smart defaults
- Easy-to-update

https://browsercheck.qualys.com
Conclusions

- Students need to know a lot of stuff, and organize it well, for that stuff to become useful to real life.

- Students take new knowledge and weave it into their pre-existing knowledge. Teachers need to know their students’ prior beliefs.

- Students retain knowledge when they have to think about why they are learning something.

- Defaults matter!
QUESTIONS?

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