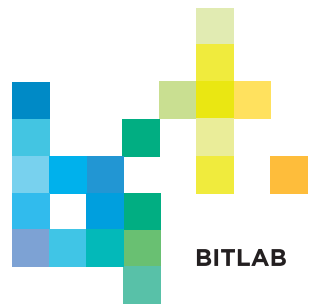
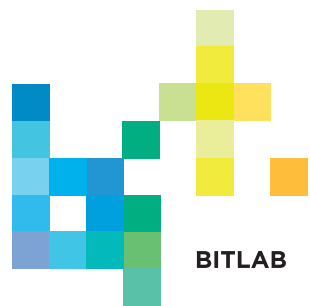


Stories as Informal Lessons About Security

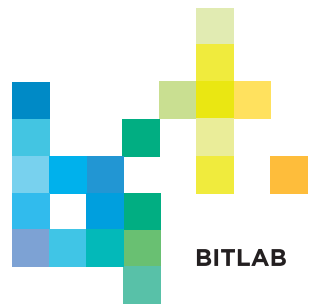
Emilee Rader, Rick Wash, Brandon Brooks
Michigan State University
bitlab.cas.msu.edu



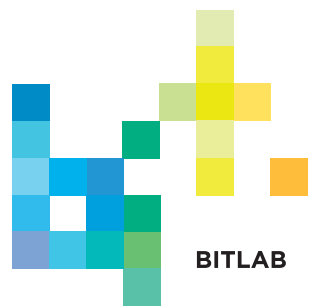
A system's security depends on
the choices made by its users.



One way to influence users' choices is to influence what they know about security.



How do people learn about security?



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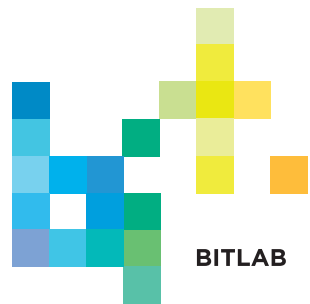
BEHAVIOR INFORMATION TECHNOLOGY

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Learning from Stories

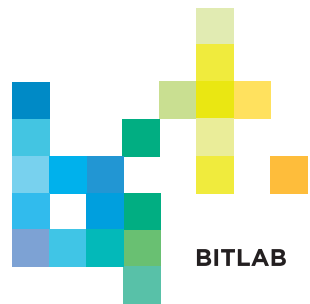
Learning from Stories

- What stories have people heard about computer security?
- What would these stories be about?
- What might people learn from them?
- What impact might these stories have?



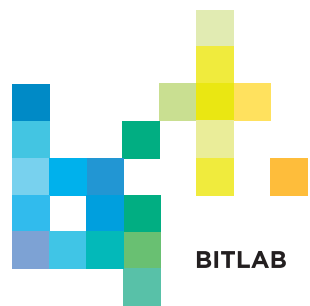
Survey

- Undergraduates in intro comm/telecom classes
- 301 Responses (41% response rate)
- Tell us a story you heard about security



Respondents

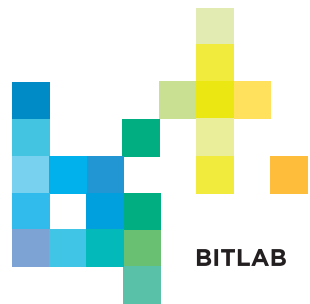
- Most were 18-23 years old (max 38)
- Majority full-time undergraduate students
- 179 male (59%) and 119 female (40%)
- 172 subjects use Macs; 123 use PCs, and 6 reported some form of “Both”
- Averaged 3.4 out of 5 on “Internet Skills” self report
 - 37 Report having worked in a high-tech job



Security Stories

#377: My friend decided he wanted to watch some inappropriate videos and went to a shady site. He did not have a firewall or any sort of anti virus so his computer got infected. His computer slowly got worse and worse until he couldn't handle it and took it to his parents. His parents did not know what to do and before they could figure it out, the computer died.

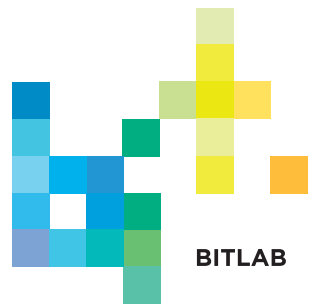
#3: It appears that Facebook has gotten yet another virus and people are posting weird things onto their friends walls without them knowing. So if you get a notification about someone posting on your wall be careful and not directly click on it or else your Facebook might get hacked or a virus.



Stories...

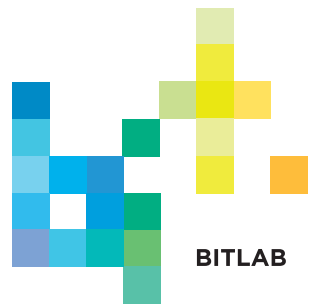
Stories...

- Are about security incidents
 - PC Effects (95 stories)
 - Theft (75 stories)
 - Breaking In (59 stories)
 - Phishing (53 stories)
 - Spam (37 stories)



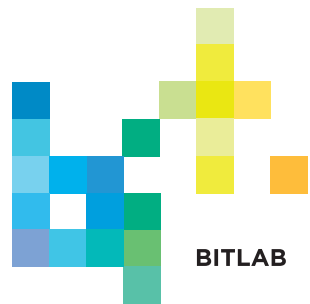
Stories...

- Are heard informally from family and friends
 - 70% heard in informal settings (home, friend's house)
 - 55% told face-to-face
 - 64% told by family or friends
 - 71% more than a month old



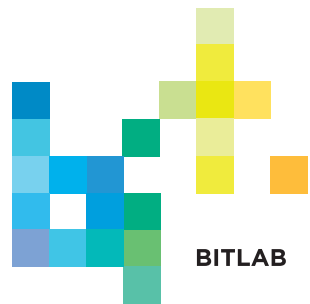
Stories...

- Are lessons about everyday people facing moderately serious threats
 - 55% about family and friends
 - 51% auto-biographical
 - 72% contain a lesson
 - 95% believe the story is true



Stories...

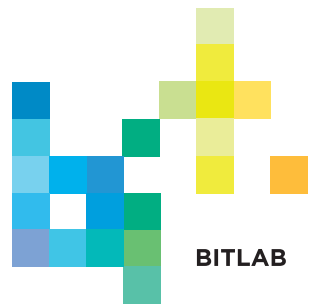
- Convey important security lessons
 - The Internet is a dangerous place
 - Beware of specific threats (shady email, shady webpages)
 - Keep “personal” information private



Changing Thinking and Behavior

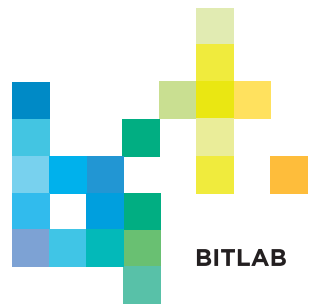
Changing Thinking and Behavior

- 94% report changing how they think about security
- 52% report changing behavior



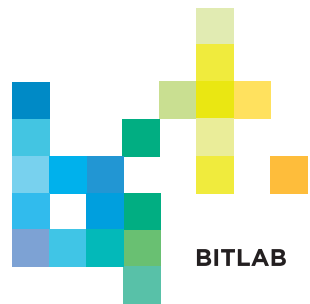
Changing Thinking and Behavior

- Stories with lessons...
 - Over doubles the odds of influencing behavior
 - Significantly larger increase in change in thinking
 - Lessons are important for learning?



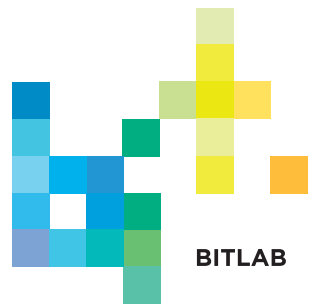
Changing Thinking and Behavior

- People perceived as knowledgeable are influential...
 - 40% increase in odds of changing behavior
 - Very small effect on change in thinking



Changing Thinking and Behavior

- Characterizing the behavior change...
 - Completely **stop** doing risky behaviors
 - **Start** using more security technologies
 - **Pay attention** to useful information



#412: Don't click on sketchy links; #3: Don't click on weird links.

#44: Making sure my computer did not remember any of my passwords.

STOP

#428: Make sure you choose a well-trusted antivirus program to protect your computer from spyware and virus threats.

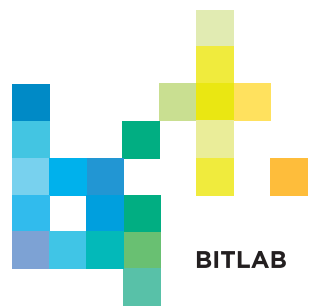
#448: Started scanning torrent contents before opening. Also reading torrent comments.

START

#121: To not be stupid and recognize when a virus is attempting to harm your computer.

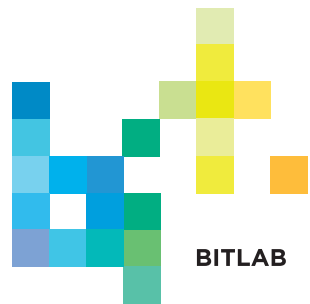
#356: Reading more carefully the subject line in emails.

**PAY
ATTENTION**



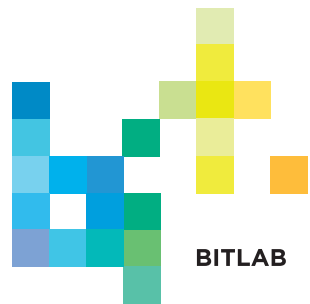
Stories...

- Are retold
 - 45% of respondents retold the story
 - 90% retell within a week
 - Settings:
 - Casual (87%), Face-to-face (89%),
to family and friends (97%)



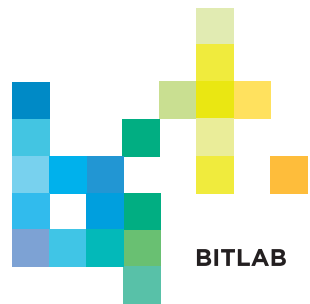
Four Implications

- People's choices about security are **interconnected**
- Influential stories come from **familiar, trusted sources**
- Stories seem to convey the **complexity** of security, but not **what to do** about it
- Stories seem to help with **reactive** security, but not with **proactive** security

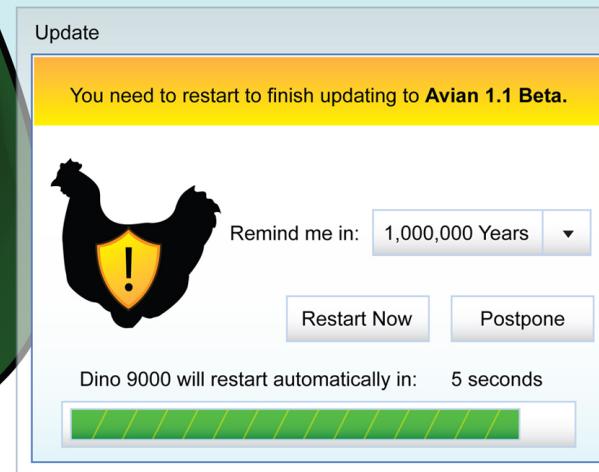
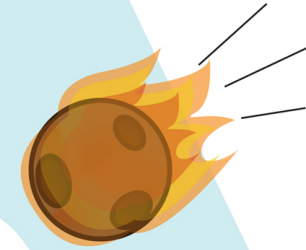


Next Steps...

How does information from different sources and people affect mental models, and security outcomes?



UPDATE



BEFORE YOUR COMPUTER BECOMES EXTINCT!

While it may not protect your computer from meteorites, updating regularly can keep your computer and files safe from malware. Software is organic and evolves to counter threats. Making sure your software is up-to-date is a sure way to keep your personal information secure.

PROTECT YOURSELF. KNOW THE THREATS.



This message brought to you by Computing, Communications and Information Technologies (CCIT).

October is National Cyber Security Awareness Month. For more information, please visit:
<http://inside.mines.edu/NCSAM>



<http://inside.mines.edu/UserFiles/Image/ccit/Security/2010/8.pdf>



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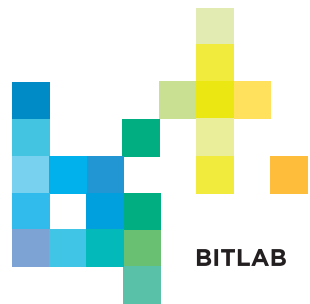
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Evolving threats...

Interviewer: Do you think there's anything that limits your ability to protect yourself on the internet?

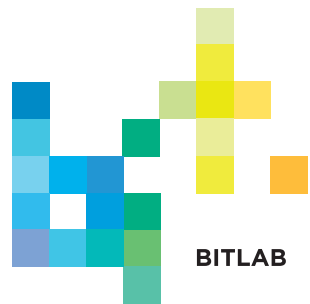
P2: **You can't control what you receive.** You can control what you open, but you can't control what you receive.



Thank You!

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This presentation is based upon work supported by the National Science Foundation under award number CNS-1116544 and CNS-1115926.



Eliciting Stories

INSTRUCTIONS In this survey, we are interested in things you have heard about or learned from others related to protecting your computer and yourself from computer security threats.

These threats might include things like hackers, viruses, identity theft, shady URLs in spam emails, etc. It can be very hard sometimes to tell when you are facing a computer security threat---symptoms might include when your computer is slow or freezes unexpectedly, when programs won't close, or lock up, unwanted popup windows, spam email, posts appearing in your Facebook account without your permission or knowledge, or other undesirable computer issues.

Sometimes people cope with these threats by using tools such as anti-virus or firewall software, or by making sure to back up their data, or not clicking links or installing apps from people they don't know or trust.

DEFINITION For this research project, we are particularly interested in things you have heard or learned about computer security through stories from OTHER PEOPLE, such as something told to you by a friend, coworker or acquaintance, social media sites like Facebook, blogs and newspapers, or any other sources you can think of. We are NOT interested in something that happened to you personally---only stories you've heard related to computer security that are mostly about other people.

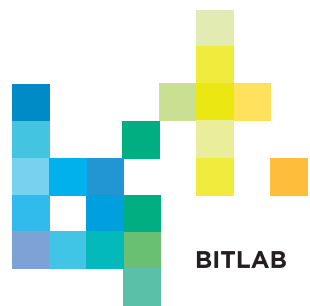
THREATS First, to help you start to remember any stories related to computer security that you might have heard, please name as many different kinds of computer security problems or threats that you can think of.

LEARNING Next, think of all of the different ways you have learned about how to protect yourself and your computer from computer security problems or threats, and make a list of these below.

STORY LIST Take a moment to think back to times in the past when you remember being told or reading about a story related to computer security. Please make a list of as many of these stories as you can remember, using only a couple of words to describe each story (you may want to read over your answers to the previous questions to jog your memory).

STORY Finally, please choose one story for which you can most easily recall details about where you were and what happened when you heard or read the story. You will be answering further questions about this story in the rest of the survey. In a sentence or two, briefly summarize what happened.

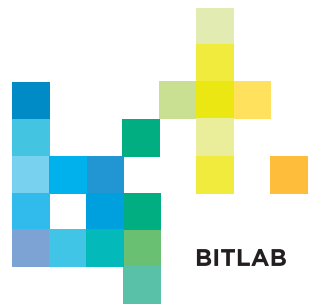
FULL STORY At the beginning of the survey, you entered this brief summary of a story, you remembered being told or reading about, related to a computer security threat or problem. Below, please write the story as if you were telling it to a friend. Use as much detail as you can, including any thoughts or recollections you might have had about what happened as you were filling out the survey.



More Stories

#328: My family was going to visit my grandparents and when we arrived, my grandpa told us about how their computer had been acting funny and not working as well. Within the couples days before we came to visit, it had even stopped powering completely up or down when they would go to use it. On the day we went to visit it was determined it had somehow got a virus and was no longer good to use."

#391: My friend had randomly been selected by the hacker who hacked his school email account. and was sending out viruses to every person in his email address. The person was also trying to send a serious virus to the school that would crash the entire system. The school eventually shut down his email account and gave him a new one hoping that the attempt did not happen again they also never found the hacker.



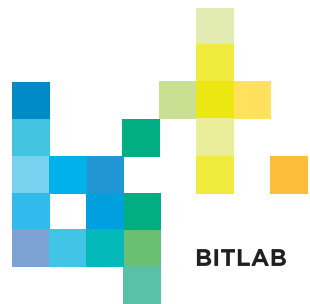
Survey Questions (excerpt)

SOURCE CONTEXT Where were you when you heard or read the story?

- Don't remember 11
- At a coffee shop 1
- At a friend or relative's house 37
- At home 174
- At work 10
- In a computer lab 2
- In class 42
- In the library 6
- NA's 18

SOURCE From what source did you hear or read the story?

- Family member 79
- Friend 113
- Acquaintance 7
- Coworker or Boss 3
- IT or Computer Repair Person 5
- Stranger 8
- News Institution 34
- Don't Remember 14
- Other 37
- NA's 1



Survey Questions (excerpt)

CONTENT SUCCESS In general, was the story about something you should ALWAYS do (e.g., wash your hands after using the bathroom), or something you should NEVER do (e.g., stick your tongue to a frozen flagpole)?

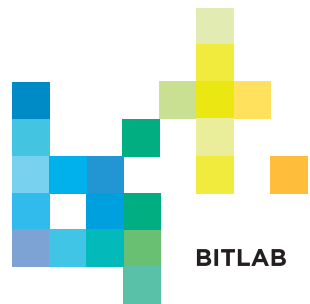
- Always do 56
- Never do 121
- Both 41
- Neither 82
- NA's 1

CONTENT MORAL What did you learn from this story?

REACT CHANGE Did you start doing anything differently to try to protect yourself from computer security threats or problems after hearing this story?

- Yes 154
- No 145
- NA's 2

REACT CHANGE HOW Please describe one thing you started doing differently after hearing this story:



More Behavior Changes

#127: Stopped browsing for free samples online

#4: I withdrew as much of my info from my AOL account as was possible while still remaining a user

#150: I made sure I was never on websites that I wasn't supposed to be on.

#371: We downloaded Norton antivirus software. It helped make the computer secure and make everybody feel better.

#270: Deleting emails that I knew were totally false and potentially dangerous to the safety of my computer.

#408: I watch my account very well and I also made sure my credit card companies are watching my account for any unusual activity.

