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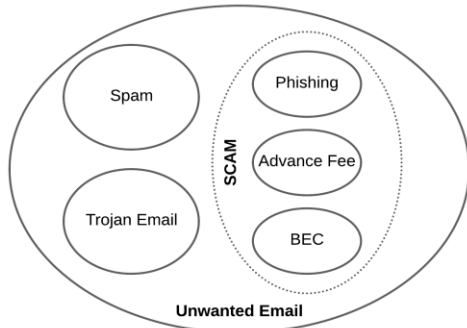
Introduction

1. User education about scam emails is often used as a security tool by large organizations. Currently, there is no work comparing this user education to the genuine scam emails that users in such an organization face.
2. We collected a dataset of reported scam emails from Penn State and compared it to user education at 16 Big Ten Conference Universities to answer three questions:

- Which scam types does the user education address?

- Does it differentiate between scam, spam, and legitimate emails?

- Does it address university-targeted scam emails?



Markus Jakobsson. *Understanding social engineering based scams*. Springer, 2016.

Discussion

1. There is a divide between the types of scam emails in the OIS dataset and universities' user education. Gift card scam emails are underrepresented in scam education; job offer scam emails are overrepresented.
2. This work observes a gap between the types of scam emails represented in scam education resources and those in user's inboxes.
3. This gap suggests that changes to these resources may provide a more accurate representation of email users' experiences with email scams.

Penn State Office of Information Security (OIS) Dataset

- Time range: 2020/8/12 to 2020/11/11
- Included in each record: report time, subject line, and annotation tag(s)

Right: The 10 most frequent tags and their frequency and percentage of the OIS dataset

Below: The 10 most frequent tags in the OIS dataset, with descriptions

Tag	Frequency	Percent
Phishing-Gift-Card	486	23.20%
Phishing-General	483	23.10%
Phishing-No-Response	223	10.70%
Phishing-Ube	220	10.50%
Phishing-Malware	217	10.40%
Phishing-General-Scam-Extortion	148	8.10%
Phishing-Legit-Email	112	5.40%
Phishing-Job-Offer	96	4.60%
Phishing-Request-Resend	34	1.60%
Phishing-Ms-Quarantine	23	1.10%

Tag	Description
Phishing-Gift-card	An email that asks the recipient to purchase a gift card
Phishing-General	A phishing email that does not fit another category
Phishing-No-Response	An email that OIS will not respond to
Phishing-Ube	An unsolicited bulk email (UBE)
Phishing-Malware	An email containing malware or a link to a site hosting malware
Phishing-General-Scam-Extortion	An email using threats to obtain information
Phishing-Legit-Email	A legitimate email mistakenly identified as a scam by the person forwarding the email
Phishing-Job-Offer	A scam email containing a false job offer
Phishing-Request-Resend	An email that OIS requests the receiver to resubmit as an attachment
Phishing-Ms-Quarantine	A legitimate email from Office 365 notifying the user about a quarantined malware email

Big Ten Universities' Scam Email User Education

University Name	Legitimate vs. Scam	Spam vs. Scam	University-Targeted Email
Indiana University	•		•
University of Maryland	•		•
University of Michigan	•		•
Michigan State University	•		
Ohio State University	•		•
Pennsylvania State University	•	•	•
Rutgers University	•		
University of Illinois	•		•
University of Iowa	•	•	•
University of Minnesota	•	•	•
University of Nebraska	•	•	•
Northwestern University	•	•	•
Purdue University	•	•	•
University of Wisconsin	•	•	•
Johns Hopkins University	•	•	•
University of Notre Dame	•		

- Only eight universities note differences between scam and spam emails
- 13/16 universities choose university-targeted scam emails as examples

Left: topics in Big Ten Universities' scam email user education