Understanding Non-Experts’ Security- and Privacy-Related Questions on a Q&A Site

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Research Questions

Q&A sites are source of advice for security and privacy issues

RQ1:
What topics do non-expert users ask about on Q&A sites?

RQ2:
Which topics do non-expert users perceive as more serious or sensitive?
Data Collection

• Q&A site: Yahoo! Chiebukuro
  – Japanese ver. of Yahoo! Answers

• Total 445 question posts
  – Subset – 1: Questions posted in security-related categories
  – Subset – 2: Questions containing “security” and/or “privacy”
  – Subset – 3: Questions containing relevant words (e.g., “fraud”, “app”, and “account”)
Data Analysis

• Question topics
  – Two coders labeled themes and sub-themes

• Question seriousness
  – (1) Coder-rated seriousness (5-point Likert scale)
    • Higher rating when askers linguistically expressed urgency, anxiety, or a call for help
  – (2) Whether askers offered rewards

• Question sensitivity
  – Whether askers posted questions anonymously
<table>
<thead>
<tr>
<th>Theme</th>
<th>Freq.</th>
<th>Sub-theme (examples)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cyberattack</td>
<td>40.7%</td>
<td>Is this malicious? / Have I been hacked?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>How to handle this?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Is there any possibility of being hacked?</td>
</tr>
<tr>
<td>Authentication</td>
<td>16.2%</td>
<td>How to handle this?</td>
</tr>
<tr>
<td>Security software</td>
<td>13.0%</td>
<td>How to use it?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Which product do you recommend?</td>
</tr>
<tr>
<td>Privacy abuse</td>
<td>7.9%</td>
<td>How to escape from surveillance?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Am I under surveillance?</td>
</tr>
<tr>
<td>Account and device management</td>
<td>7.0%</td>
<td>How to handle this?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>What should I (not) do?</td>
</tr>
<tr>
<td>Secure connection</td>
<td>6.5%</td>
<td>How to use it?</td>
</tr>
<tr>
<td>Privacy setting</td>
<td>5.6%</td>
<td>How to set it?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Are my data disclosed?</td>
</tr>
</tbody>
</table>
Examples: Questions About Cyberattacks

- Sub-theme: Is this malicious? / Have I been hacked?
  
  *I received a warning that my computer has been infected with Trojan Horse. Is this a fraud or has my computer actually been infected?*

  *Was my device already infected with a virus at the moment I accessed the suspicious URL?*

- Sub-theme: Is there any possibility of being hacked?

  *Are smartwatches also at risk of being infected by viruses?*
Examples: Questions About Authentication

- Sub-theme: How to handle this?

1. I can’t log in to my <service’s name>’s account, where I set up a two-factor authentication with my phone number. Some days ago, I changed my phone number. How do I log in to the account again?

2. I can’t log in to <service’s name>. I can’t find the contact form on the website, so I can’t contact them. How do I get my account back?
Examples: Questions About Security Software

- Sub-theme: How to use it?

  How can I stop being blocked from legitimate access?

  Does this result screen mean that a Trojan Horse has been detected on my device?

- Sub-theme: Is it necessary/effective/trustworthy?

  I use this computer only for creating documents and surfing popular websites. Please tell me why I should use anti-virus software.
Examples: Questions About Privacy Abuse

- Sub-theme: How to escape from surveillance?
  
  My ex-husband seems to be logging into my <service’s name> account. Please tell me how to remove his surveillance.

- Sub-theme: How to surveil a target?
  
  I want to know about the features of <spyware app’s name>. Is it possible to track targets even when they turn off the GPS on their smartphone? How about in airplane mode?
Examples: Account and Device Management

- Sub-theme: How to handle this?
  
  I want to delete my account. But I couldn’t find the delete option on my profile page. Can someone please tell me how to delete my account?

- Sub-theme: What should I (not) do?

  What should I do when I change my smartphone?
Examples: Secure Connection

- Sub-theme: How to use it?

  > Which Wi-Fi security mode should I choose among WEP, WPA, WPA2, PSK, and 802.1X/EAP?

- Sub-theme: Is it necessary/effective/trustworthy?

  > Is VPN effective in making public Wi-Fi secure?
Examples: Privacy Setting

- Sub-theme: How to set it?
  
  *I mistakenly accepted cookies. Is it possible to change it to deny permission?*

- Sub-theme: Are my data disclosed?

  *I browsed a certain company’s websites with my location information turned on. Is my location information disclosed to the company?*
## Results: Seriousness and Sensitivity

<table>
<thead>
<tr>
<th>Theme</th>
<th>Freq.</th>
<th>Seriousness</th>
<th>Sensitivity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Ave. Rating</td>
<td>% Reward</td>
</tr>
<tr>
<td>Cyberattack</td>
<td>40.7%</td>
<td>3.6</td>
<td>29.3</td>
</tr>
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<td>Authentication</td>
<td>16.2%</td>
<td>3.6</td>
<td>29.2</td>
</tr>
<tr>
<td>Security software</td>
<td>13.0%</td>
<td>3.1</td>
<td>41.4</td>
</tr>
<tr>
<td>Privacy abuse</td>
<td>7.9%</td>
<td>4.0</td>
<td>25.7</td>
</tr>
<tr>
<td>Account and device management</td>
<td>7.0%</td>
<td>3.9</td>
<td>45.2</td>
</tr>
<tr>
<td>Secure connection</td>
<td>6.5%</td>
<td>3.2</td>
<td>27.6</td>
</tr>
<tr>
<td>Privacy setting</td>
<td>5.6%</td>
<td>3.7</td>
<td>36.0</td>
</tr>
</tbody>
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Askers were likely to either appeal linguistically or offer rewards as a strategy.
Findings and Implications

Findings

- Users struggled to determine if they were victims of cyberattacks
- Users had difficulty explaining their issues
- Highly privacy-sensitive questions were posted (theme: privacy abuse)
- Some issues have not been sufficiently addressed in previous studies

Implications for Q&A site providers

- Provide a knowledge base system that asks for missing information and presents a solution
- Refer users facing serious privacy abuse to professionals

Implications for researchers

- Regularly extract and clarify user concerns from Q&A sites
Future Work and Contributions

Future Work
- assess the quality of answers given for the security- and privacy-related questions on Q&A sites for non-expert users

Contributions
- demonstrated that a Q&A-site analysis can provide insights into non-expert users’ concerns about security and privacy
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THANK YOU!