



Phishing Awareness and Susceptibility of System Users

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Abstract

The significant rise in the occurrences of phishing events or attacks is very disturbance from the society view point as it extends varied sects of people each year. With an enormous amount of money lost to online crimes, security on the web becomes increasingly important. Security experts need to understand the ways by which individual's interaction with phishing attacks and their way of behavior. There is a need for a deeper understanding of people Attitude, Intentions, Behavior, in order to protect them from falling into the clutches of the cybercriminals. This research work has attempted in order to understand potential risks of information security posed by computer system users as they are the weakest link in the information security range of defense. The study examines the awareness of users to decrease the risk of e-mail phishing by studying the awareness of phishing among Computer System users.

Keywords: Information Security; Cyber Defense; Cyber Behavior; Phishing

1. Introduction

The advent of Internet Technology, has made remarkably technological changes in the life of mankind. It had opened various avenues of novel and arousing chances to Internet user. As the Internet Users become more reliant on networks, their Computer system and Internet usage will only continue to grow.

Internet Technology acts like a double edged sword. It is beneficial to its users, as well as for the cyber criminals, who by exploring the vulnerabilities in the system, try to lure the users as victims and exploit them. The Internet has also put forth an opportunity- fertile environ for fraudsters and persons with vicious intention to exploit system users who are not prepared to safeguard themselves from the ever so growing amount of online cyber frauds or crimes.

Increasingly, organizations and individuals rely upon technologies and networks more and more. Likewise, these environments are infested with more dangers, which could be avoided if computer users were to follow general security guidelines or procedures.

The significant rise in the occurrences of phishing events or attacks is very disturbance from the society view point as it extends varied sects of people each year. Despite the ever-increasing threat, little research has addressed or explained why individuals purposefully engage in behaviors that make them more vulnerable to these threats, rather than avoiding or protecting themselves from such threats.

This research work has attempted in order to understand potential risks of information security posed by computer system users as they are the weakest link in the information security range of defence. The study examines the awareness of users to decrease the risk of e-mail phishing by studying the awareness of phishing among System users.

The losses which the users incur, may be financial losses, mental agony due to phishing will leave a negative impact on continuous usage of online. The users must be made to recognize and believe that they can mitigate the threat of phishing with appropriate Internet security behaviour and proper counter measures.

The results of this study provide new insights into the motivations behind the purposeful enactment of behaviours that increase one's vulnerability to technological threats and risks.

2. Awareness and Susceptibility

This research work elaborates on about studying the system users Awareness on Phishing attack and the impact due to Phishing Susceptibility. The sub-objectives that support the research study are formulated as follows:

- To study the Awareness of computer system users on protecting them against phishing attacks
- To study the impact of phishing awareness, computer self-efficacy, email load, gender, age on susceptibility to phishing in the computer system users.

The demographic factor, age plays an important role in identifying phishing victims. Most phishing studies found that age correlates with the likelihood to fall for phishing deception. Among internet users who are meant to be computer literate, older ones were less likely to fall prey for phishing; while younger users particularly between the age of 18-25 or younger, were consistently more vulnerable to phishing attacks. (Sheng et al., 2010; Kumaraguru et al., 2010).

Subjects' age linearly predicts their susceptibility to phishing; users in the age group from 18-25 were at the higher risk and are the most vulnerable for falling prey for phishing. In this study, subjects were educated about phishing and as an impact of this

users' tendency to enter information into a phishing web page reduced by 40%. (Sheng et al., 2010).

The users from the age group of 18-25 fell for the phishing email. The younger users are more vulnerable to phishing attacks. (Kumaraguru et al., 2010).

The highly researched factor of susceptibility in phishing attacks is gender differences. The research work by Busch, 1995, reported that, Male are generally considered more experienced in computer usage than Female, reason being, women would have been discouraged from using modern technologies. Also the research work by Martin et al.,(2001); Sherman et al., (2000); Shaw et al., (2002), reports that this difference is expected to decrease, due to wide spread of technology through varied means.

Research works done by Jagatic et al., (2007); Kumaraguru et al., (2009); Sheng et al., (2010), showed that female are more likely to be victimized by phishing attacks than male.

A higher ratio of female students, 77% fell for the spear phishing attacks, while among the male it was 65%. Furthermore, the attack was more successful if the spoofed message appeared to be sent by a person of the opposite gender. This was true for both males and females, but the effect was more noticeable for males (68% if the message was from a female versus 53% if from another male) (Jagatic et al., 2007).

Research work by Colley et al., (2008), states that the Internet phishing strongly affects more on women than men. The phishers could gain benefit from women easily than men. Colley concluded that women are easily phished than women.

The users who admitted to habitual media (Internet) use, coupled with high email load, were more likely to automatically respond to relevant looking emails thus increasing the odds of response to phishing emails. Technological self-efficacy and prior experience proved to have no effect on phishing susceptibility, implying that the phishing victims fall for phishing attacks not because their lack of ability but because of the lack of cognitive involvement. The urgency cues, email load and Internet use have positive effect on phishing susceptibility, while computer self-efficacy has none on susceptibility to phishing. Computer self-efficacy did not have any effect on phishing susceptibility (Vishwanath et al., 2011).

The students of computer science, informatics, etc. i.e. students with technology as majors were least susceptible to phishing attack (Jagatic et al., 2007).

This finding suggests that very high computer self-efficacy can have an impact on vulnerability to phishing that contradicts with the work of Vishwanath et al., (2011).

The evident discrepancy in observations made by, Jagatic et al., (2007); Vishwanath et al., (2011), is the reason that this study will also research the impact of self-efficacy on phishing vulnerability.

3. Research Questions and Hypotheses

Do Age factor have an impact on Phishing Awareness?

H01: There is no significant difference among different Age groups and their Phishing awareness

Does Gender have an impact on Phishing Awareness?

H02: There is no significant difference between Gender and their Phishing awareness

Does Internet Usage have an impact on Phishing Awareness?

H03: There is no significant difference between Heavy Internet Users and Light Internet Users with respect to their Phishing awareness

Does Income factor have an impact on Phishing Awareness?

H04: There is no significant difference among different Income groups and their Phishing awareness

Does Computer Skills have an impact on Phishing Awareness?

H05: There is no significant difference among users with different Computer Skills and their Phishing awareness

Does Years of experience in working with computer have an impact on Phishing

Awareness?

H06: There is no significant difference among users with Years of Experience in Working Computer and Phishing awareness

Does level of Education have an impact on Phishing Awareness?

H07: There is no significant difference of users Education level and their Phishing awareness

Will phishing awareness have an impact on phishing vulnerability?

H08: Phishing awareness has no effect on phishing vulnerability

Will Computer self-efficacy have an impact on phishing vulnerability?

H09: Self-efficacy has no effect on phishing vulnerability

Will E-mail load have an impact on phishing susceptibility?

H010: Email load has no effect on phishing susceptibility

Will Age have an effect on phishing susceptibility?

H011: Age has no effect on phishing susceptibility

Will Gender have an effect on phishing susceptibility?

H012: Gender has no effect on phishing susceptibility

4. Research Findings & Discussions

The study findings regarding Age and Phishing Awareness resulted that, "There is significant difference among different Age groups with respect to their Phishing awareness"

The demographic factor, Age plays a vital role in identifying phishing victims. Most phishing studies found that age correlates with the likelihood to fall for phishing deception. Among internet users who are meant to be computer literate, older ones were less likely to fall prey for phishing; while younger users particularly between the age of 18-25 or younger, were consistently more vulnerable to phishing attacks (Sheng et al.,2010; Kumaraguru et al., 2010).The study also compliments to the prior research works and it was found that there seems to be an impact of Age on Phishing Awareness.

The study findings regarding Gender and Phishing Awareness resulted that, "There is significant difference between Male and Female with respect to their Phishing awareness."

Female is much aware about phishing than Male.

The research work by Busch (1995) reported that, male are generally considered more experienced in computer usage than female, reason being, women might have been discouraged from using modern technologies.

The Internet phishing strongly affects more on women than men. That is, phishers could gain benefit from women easily than men. The researchers concluded that women are easily phished than women.

There is significant difference between Heavy Internet Users and Light Internet Users with respect to their Phishing awareness. Light Internet Users are much aware about phishing than Heavy Internet Users.

“Users who admitted to habitual Internet use, were more likely to automatically respond to relevant looking emails thus increasing the odds of response to phishing emails” Vishwanath et al., (2011).

System Users with Income Less than 40000 were found to be more aware than that of others. The reason being they may be very cautious about their spending patterns.

There is significant difference among users with different Computer Skills and their Phishing awareness. Beginners were found to more aware than others.

There is significant difference among Years of Experience in Working Computer and Phishing awareness. Users with less than a year of computer experience were found to more aware than others.

There is significant difference of users Education level and their Phishing awareness. Technological expertise and prior experience proved to have no effect on phishing awareness, implying that the phishing victims fall for phishing attacks not because their lack of ability but because of the lack of cognitive involvement. (Vishwanath et al., 2011). The study findings regarding Phishing Awareness and Income, Education, Computer Skills, Years of Computer experience, is parallel with the findings of Vishwanath et al., (2011).

Phishing awareness will have an effect or impact on phishing susceptibility. The study results contradict the prior research by Vishwanath et al., that Phishing awareness does not impact vulnerability. The reason is that the users' knowledge about phishing is more, it is less likely for them to fall for a phishing attack.

The computer users were least susceptible to phishing attack. This might suggest that self-efficacy can indeed have an effect on susceptibility to phishing. (Jagatic et al., 2007).

Computer self-efficacy did not have any effect on phishing susceptibility. (Vishwanath et al., 2011). The study's findings compliments Vishwanath et al., (2011) findings. Users prey victimised for phishing, because of the lack of involvement and not due to their lack of ability.

Users receiving more than 30 emails are more susceptible. The reasoning being that, the more daily emails a person receives the more likely it is he will take less time to view an email, possibly missing cues about the authenticity of the email (Vishwanath et al., 2011). This reasoning is in line with prior findings.

There is no significant difference among different Age groups with respect to their Phishing susceptibility and Age.

The study result shows that, user age and gender do not have effect on Phishing susceptibility. These findings are in line with the study findings of Dhamija et al. (2006)

5. Conclusion

The Age factor has its impact on the Phishing awareness of the system users. The Users in the age group of 31 to 40 years were found to be much phishing aware and the users in the age group between 20 to 30 years were found to be the least aware. With

respect to gender, the study results that, Female is much aware about phishing than Male comparatively.

Regarding the Internet Usage, the Light Internet Users are much aware about phishing than Heavy Internet Users. With respect to the Income level, the System Users with Income Less than 40000 were found to be more aware than that of others. The Beginners with less computer expertise were found to more phishing aware than others. The Users with less than a year of computer experience were found to more phishing aware than others. With regard to education level, the Diploma Holders were found to more phishing aware than others.

The users Phishing awareness will have an effect or impact on phishing susceptibility. When the users know about phishing the probability for them to fall for a phishing attack is less likely. Self-Efficacy has no impact on phishing vulnerability, Users prey victimised to phishing, because of lack of involvement and not due to their lack of ability. Users receiving more than 30 emails are more susceptible to phishing attacks, because when a person receives more mails daily, he is in possession of minimal time to go through an email, possibly neglecting cues about the genuineness of it. Gender and age seems to have no impact on Phishing susceptibility.

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