

INFORMATION SECURITY AWARENESS MODEL IN SOCIAL
NETWORKING FOR TEENAGERS

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Dedicated to my parents and siblings

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ABSTRACT

Social networking services such as Facebook, Twitter, Instagram and WeChat has become very popular among teenagers. Socialising through these services have become part of their everyday life. Teenagers have been sharing a lot of information about themselves in social networks. However, lack of information security awareness caused teenagers to be exposed to many kind of online threats, especially when teenagers are one of the most vulnerable group that are using the internet and they can be easily become a target. It is important to conduct a research on information security awareness among teenagers to find their understanding and attitude towards it, and find the best approach in improving this issue. In this study, qualitative approach is used to find the factor that could influence teenagers' information security awareness. A survey was distributed to 291 teenagers aged between 13 to 17 years old. The study have found four significant factors that affect teenagers' information security awareness, which are education, past experience, behaviour and roles of other party related to the teenagers. This model can be used by school, teachers and parents to assess and improve teenagers' information security awareness in using social networking services. And ultimately, high awareness will reduce online threat and privacy breach among teenagers in using social networking services. Further research could be made to cover more factors and larger populations.

ABSTRAK

Perkhidmatan media sosial seperti Facebook, Twitter, Instagram dan WeChat telah menjadi sangat popular di kalangan remaja. Bersosial melalui media sosial telah menjadi sebahagian daripada kehidupan seharian mereka. Remaja telah berkongsi banyak maklumat tentang diri mereka dalam rangkaian sosial. Walau bagaimanapun, kekurangan kesedaran keselamatan maklumat menyebabkan remaja terdedah kepada pelbagai jenis ancaman dalam talian, terutamanya apabila remaja adalah salah satu kumpulan yang paling mudah diserang semasa menggunakan internet dan mereka amat mudah menjadi sasaran. Adalah penting untuk menjalankan penyelidikan mengenai kesedaran keselamatan maklumat di kalangan remaja untuk mencari persefahaman dan sikap mereka ke arah itu, dan mencari pendekatan terbaik dalam menambahbaik masalah ini. Dalam kajian ini, pendekatan kualitatif digunakan untuk mencari faktor yang boleh mempengaruhi kesedaran keselamatan maklumat remaja. Satu kajian soal selidik telah diedarkan kepada 291 remaja berusia antara 13 hingga 17 tahun. Kajian ini telah mendapati empat faktor penting yang mempengaruhi kesedaran keselamatan maklumat remaja iaitu pendidikan, pengalaman masa lalu, tingkah laku dan peranan pihak lain yang berkaitan dengan remaja. Model ini boleh digunakan oleh pihak sekolah, guru-guru dan ibu bapa bagi mengukur dan meningkatkan kesedaran keselamatan maklumat remaja dalam penggunaan perkhidmatan media sosial. Peningkatan kesedaran ini akhirnya akan mengurangkan ancaman dalam talian dan pelanggaran privasi di kalangan remaja semasa menggunakan media sosial. Penyelidikan lanjut boleh dibuat untuk meliputi lebih banyak faktor dan populasi yang lebih besar.

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CHAPTER 1

INTRODUCTION

1.1 Overview

Social networking services are platforms to create social networks or social relations among its users. The activities involve sharing interests and activities, publishing backgrounds with virtual or real-life friends. Social networking services have revolutionised society to connect and communicate with friends and family in a very convenient way. In addition to the advent of smart mobile device, where it has become available to every members of the society including children, social networking interactions have become real-time interactions. These luxurious ways of communication and socialising have made social networking services so exciting and popular nowadays with millions of users logging in everyday.

1.2 Background of Problem

Social networking service is one of the most popular to socialise that is easily available these days. Boyd and Ellison (2007) define social networking services as web-based services that allow individuals to construct a public or semi-public profile within a bounded system, articulate a list of other users with whom they share a connection, and view and traverse their list of connections and those made by others within the system. In other words, social networking services allow its user to create

a profile with status updates, photos, videos, and other information to be shared to the public or listed users. Social networking services also allow other kinds of interaction such as instant messaging, discussion board, online trading and videoconferencing. Activity on social networking services can be very revealing and people will provide the most intimate and revealing details on their personal profiles (Qi and Edgar-Nevill, 2011).

There are many kinds of social networking services, which are served with different kind of purpose and activity. Few of the famous services are Facebook, Twitter, Instagram and, lately WeChat. And recently, WeChat has become one of the most popular mobile social app in places like Hong Kong, India, Indonesia and Malaysia across multiple smart mobile devices and already reaching 100 million international users by doubling its user within three months (Wee, 2013).

The popular usage of social networking services does not necessarily due to its feature which allows the users to meet new people, but rather allowing its user to express themselves and make their social network visible. The users primarily use social networking service to communicate with their existing peers whom they have already knew (Boyd and Ellison, 2007). Furthermore, social networking services also naturally extend internet applications that established relationship between users such as email and instant messaging (Fadzilah, Rabiah, and Mariana, 2013).

Despite the popular usage of social networking services, social issue and privacy concern has been raised since its inception. The excitement in socialising with online “friends”, user seems to be forgetting that they are revealing personal information to other people outside their circle of friend (Ikhsan, Ikmal, and Saadiah, 2013). Without realising threats and incidents such as identity theft, stalking, harassment (Strater and Richter, 2007), bully and various other cybercrimes have always been existed in the internet. These threats and incidents are actually caused by majority of users who have no trouble in disclosing their personal information (Gross and Acquisti, 2005).

In order to illustrate the severity of the problem, Table 1.1 shows the overall summary of the security incident that had been reported by Malaysia Computer Emergency Response Team (MyCERT) from 2010 to April, 2015. The report shows that cyber harassment which includes cyber bullying, cyber stalking, sexual harassment, religious harassment and racial harassment show a steady increase from 2010 to 2014. Incidents such as content related, malicious codes and spam contain virus are still a threat, however it could be filtered and clean by existing technology quite effectively. While, incident such as harassment, bullying and stalking are much depended on how information are being shared in the internet, especially in social networking services.

Table 1.1: Number of Security Incident Reported in Malaysia (MyCERT, 2015)

Incident	2010	2011	2012	2013	2014	April 2015
Content Related	39	59	20	54	35	11
Cyber Harassment	419	459	300	512	550	153
Malicious Codes	1199	1012	642	1751	716	103
Spam Contains Virus	1377	575	255	155	67	12
Total	3034	2105	1217	2472	1368	279

Furthermore, social networking services are also being used by teenagers and have become part of their everyday life. Social networking services have become a popular place for teenagers to socialise and share their concerns, without the fear of criticism and devaluation (Debatin *et al.*, 2009). Moreover, teenagers are also likely to share their own information in social networking services (Patchin and Hinduja, 2010).

The online threats and inappropriate content in social networking services that have been discussed are also exposed to young people, including the problem that caused by other people who used social networking as a tool to find their victims (Atkinson, Furnell, and Phippen, 2009). Especially, when teenagers is one of the groups that are most vulnerable on the internet (National Telecommunications and Information Administration, 2002) and very susceptible to cybercrime originating from privacy breach (S Chai, Lee, and Rao, 2006). This is due to teenagers being a

perfect targets for criminal activities, as they are usually trusting, naive, curious, adventuresome, and eager for attention and affection in cyberspace (Connelly, 2001).

Although social networking services provide privacy measures, however the security, access controls and privacy design are weak (Acquisti and Gross, 2006). Users are left with the choices either to use them or to leave them at default setting and for those who are unaware will likely leave privacy measures at default setting (Norshidah and Ili Hawa, 2012). Where unmanaged privacy control, can let the users face harassment-related threats and other forms of unwanted contact, and this includes some situations in which young people may be using technology itself to inflict harm upon each other (Atkinson, Furnell, and Phippen, 2009).

In Malaysia, social networking service have attracted majority of children and teenagers to use the social service to communicate with friends and to find new friends. Norni Mahadi (2013) in Borneo Post had reported 16.3 percent or about 2.17 million of 13.3 million Malaysian Facebook users are children below 18 years old. Shuhada Mansor (2013) in Harian Metro also reported that about 60 000 students between age of 12 to 18 years old in Malaysia spend their time at least four hours to use internet especially Facebook.

A preliminary study had been done to fourteen teenagers between 13-17 years old. The study shows all of the respondents at least use one social networking service and using it at least once a day. It also shows that only 21 percent are fully aware of information security awareness, but none of them really follow the guidelines. 79 percent of the respondents are aware of the privacy settings in social networking services, and claimed that they have been sharing information such as pictures, birth date, hometown location and school name to their “friends” list. Even though, 86 percent of them have accepted strangers in their “friend” list. Thus, immediately expose their personal information that supposedly could only be viewed by friends to strangers. Moreover, half of the respondents are willing to share at least their name and age to strangers. And two of them are willing to go out with. In addition, two of the respondents had been harassed by gays and another two of the respondents also had an issue where their pictures had been misused by others.

Therefore, the knowledge of information security is important to defend information asset to preserve confidentiality, integrity and availability or in social networking. In this case, information security is important in defending user's information from unintended readers. Where individuals who have higher concerns with their information privacy will likely use privacy measure in social networking services to protect their privacy (Norshidah and Ili Hawa, 2012).

1.3 Problem Statement

Social networking services become a very popular place to socialise among teenagers. As the usage of social networking services increase, information security awareness has become a necessity to protect teenagers' privacy and to protect them from the cyber threats. Since, teenagers are on of the most vulnerable group in the internet. Even though many studies had been done on information security awareness, unfortunately majority of the studies are more focus to organisational or corporate. Moreover, according to the preliminary study, teenagers have been sharing a lot of information concerning themselves in the social networking services and lack understanding in information security awareness. This scenario shows that teenagers are very much exposed to the cyber threat in using social networking services. Therefore, it is important to conduct further research into information security awareness among teenagers to find their understanding and attitude towards it, and find the best approach in improving this issue.

1.4 Research Significance

The research will provide valuable information on current level of information security awareness among teenagers by indentifying key factors that could help improve the methodologies of responsible parties such as parents, schools or government agencies and non-profit organisation in improving teenagers' knowledge while using social networking services.

The proposed model could also be used by the responsible parties such as parents, schools or government agencies and non-profit organisation in improving teenagers' information security awareness in using social networking services. Thus, reduce the risk of threat towards teenagers while socialising in cyberspace.

1.5 Research Objectives

The research objectives are:

1. To identify teenagers' information security awareness component in using social networking services.
2. To develop a model that can improve information security awareness among teenagers in using social networking services.
3. To evaluate the proposed model that can improve information security awareness among teenagers in using social networking services.

1.6 Research Questions

The research questions are:

1. What is the component of information security awareness among teenagers in using social networking services?
2. How to develop a model that can improve information security awareness among teenagers in using social networking services?
 - a. What is the relationship between education and information security awareness?
 - b. What is the relationship between interaction experience in using social networking services and information security awareness?
 - c. What is the relationship between behaviour and information security awareness?

- d. What is the relationship between external role and responsibility and information security awareness?
 - e. What is the relationship between guidelines and information security awareness?
3. How to evaluate the proposed model that can be used to improve information security awareness among teenagers in using social networking services?

1.7 Research Aim

The aim of this research is to assess knowledge, behaviour and attitude of teenagers in relation to their information security awareness in using social networking service. The result of the assessment then will be analysed to identify critical factors that will be used to develop a suitable information security awareness model for teenagers.

1.8 Research Scope

The study focus on the most popular social networking services among teenagers, which are Facebook, Twitter, Instagram and WeChat. The study also focusing in teenagers aged between 13 and 17 years old who are studying in secondary school in Lembah Keramat where two schools were selected as case study. During the study, 291 students had been selected as sample.

1.9 Summary

This chapter provide the overview on the research project. The problem statements, the significance of the research, objectives, aim, research questions and scope have been defined clearly. The issue of the teenagers' awareness in information security is the focal point in this research.

REFERENCES

- Acquisti, A., & Gross, R. (2006). Imagined Communities: Awareness, Information Sharing, and Privacy on the Facebook. In G. Danezis & P. Golle (Eds.), *Privacy Enhancing Technologies SE - 3* (Vol. 4258, pp. 36–58). Springer Berlin Heidelberg. doi:10.1007/11957454_3
- Atkinson, S., Furnell, S., & Phippen, A. (2009). Securing the next generation: enhancing e-safety awareness among young people. *Computer Fraud & Security, 2009*(7), 13–19. doi:S1361-3723(09)70088-0
- Baars, M. J. H., Henneman, L., & ten Kate, L. P. (2005). Deficiency of knowledge of genetics and genetic tests among general practitioners, gynecologists, and pediatricians: a global problem. *Genetics in Medicine, 7*(9), 605–610.
- Beyer, A., & Westendorf, C. (2010). How to Establish Security Awareness in Schools. In N. Pohlmann, H. Reimer, & W. Schneider (Eds.), *ISSE 2009 Securing Electronic Business Processes SE - 17* (pp. 177–186). Vieweg+Teubner. doi:10.1007/978-3-8348-9363-5_17
- Boyd, D. M., & Ellison, N. B. (2007). Social Network Sites: Definition, History, and Scholarship. *Journal of Computer-Mediated Communication, 13*(1), 210–230. doi:10.1111/j.1083-6101.2007.00393.x
- Bratcher, C. A. (1997). *Influence of Length of Gestation and Birth Weight*. Western Kentucky University.
- Carlson, N. (2010, March 5). At Last -- The Full Story Of How Facebook Was Founded. *Business Insider Inc*. Retrieved from <http://www.businessinsider.com/how-facebook-was-founded-2010-3>
- Chai, S., Bagchi-Sen, S., Morrell, C., Rao, H. R., & Upadhyaya, S. J. (2009). Internet and online information privacy: An exploratory study of preteens and early teens. *IEEE Transactions on Professional Communication, 52*(2), 167–182. doi:10.1109/TPC.2009.2017985
- Chai, S., Lee, J., & Rao, H. R. (2006). Managing private information safety in blogs. In *The Second Secure Knowledge Management Workshop*. Brooklyn, New York.

- Connelly, H. (2001). *Internet Crimes Against Children*. Washington, DC: US Department of Justice.
- Da Veiga, A. (2008). *Cultivating and assessing information security culture*. University of Pretoria.
- Debatin, B., Lovejoy, J. P., Horn, A.-K., & Hughes, B. N. (2009). Facebook and Online Privacy: Attitudes, Behaviors, and Unintended Consequences. *Journal of Computer-Mediated Communication*, 15(1), 83–108. doi:10.1111/j.1083-6101.2009.01494.x
- Department of Statistics Malaysia. (2013). *Population by states and age, MALAYSIA, 2013*.
- Educational Planning and Research Division. (2013). *Malaysia Educational Statistics Quick Facts 2013*.
- European Commission. (2009). *Safer social networking principles for the EU*. European Commission. Brussels.
- Facebook. (2013a). Products. *facebook.com*. Retrieved from <http://newsroom.fb.com/Products>
- Facebook. (2013b). Timeline. *facebook.com*. Retrieved from <https://newsroom.fb.com/Timeline>
- Fakeh, S. K. W., Zulhemay, M. N., Shahibi, M. S., Ali, J., & Zaini, M. K. (2012). Information Security Awareness Amongst Academic Librarians. *Journal of Applied Sciences Research*, 8(3), 1723–1735.
- Fauzi Hussin, Jamal Ali, & Mohd Saifoul Zamzuri Noor. (2014). *Kaedah Penyelidikan & Analisis Data SPSS*. Sintok: UUM Press.
- Frommer, D. (2010, November 1). Here's How To Use Instagram. *Business Insider Inc*. Retrieved from <http://http://www.businessinsider.com/instagram-2010-11>
- Gross, R., & Acquisti, A. (2005). Information Revelation and Privacy in Online Social Networks (The Facebook case). In *Proceedings of the 2005 ACM workshop on Privacy in the electronic society (WPES '05)* (pp. 71–80). New York, USA: ACM Press.
- Haslina Sahar. (2012). *A Security Awareness Model for The Establishment of a Human Firewall in Taxation Agency*. University Technology Malaysia.
- Hundley, H. L., & Shyles, L. (2010). US teenagers' perceptions and awareness of digital technology: a focus group approach. *New Media & Society*, 12(3), 417–433. doi:10.1177/1461444809342558
- Instagram. (2013). Press News. *Instagram*. Retrieved from <http://instagram.com/press/#>

- McDaniel, G. (1994). *IBM dictionary of computing*. New York, USA: McGraw-Hill.
- Mohd. Ikhsan Md. Raus, Ikmal Hisham Md Tah, & Saadiah Yahya. (2013). Personal Information Disclosure in Facebook: The Awareness of UiTM Pahang Students. *International Journal of Future Computer and Communication*, 2(3), 258–262. doi:10.7763/IJFCC.2013.V2.163
- MyCERT. (2015). MyCERT Incident Statistics. Retrieved May 15, 2015, from <https://www.mycert.org.my/statistics/2015.php>
- National Telecommunications and Information Administration. (2002). A NATION ONLINE : How Americans Are Expanding Their Use of the Internet. *Population (English Edition)*, (February), 92.
- Noor Hafizah Hassan, & Zuraini Ismail. (2012). A Conceptual Model for Investigating Factors Influencing Information Security Culture in Healthcare Environment. *Procedia - Social and Behavioral Sciences*, 65(0), 1007–1012. doi:j.sbspro.2012.11.234
- Norni Mahadi. (2013, June 16). 13.3 million M'sians are Facebook users. *The BorneoPost Online*. Miri. Retrieved from <http://www.theborneopost.com/2013/06/16/13-3-million-msians-are-facebook-users/>
- Norshidah Mohamed, & Ili Hawa Ahmad. (2012). Information privacy concerns, antecedents and privacy measure use in social networking sites: Evidence from Malaysia. *Computers in Human Behavior*, 28(6), 2366–2375. doi:j.chb.2012.07.008
- Nur Fadzilah Othman, Rabiah Ahmad, & Mariana Yusoff. (2013). Information Security and Privacy Awareness in Online Social Networks among UTeM Undergraduate Students. *Journal of Human Capital Development*, 6(1), 101–110.
- Offer, D. (1987). IN defense of adolescents. *JAMA*, 257(24), 3407–3408. doi:10.1001/jama.1987.03390240113036
- Ong, L., & Chong, C. (2014). Information Security Awareness: An Application of Psychological Factors--A Study in Malaysia. In *2014 International Conference on Computer, Communications and Information Technology (CCIT 2014)*.
- Patchin, J. W., & Hinduja, S. (2010). Trends in online social networking: adolescent use of MySpace over time. *New Media & Society*, 12(2), 197–216. doi:10.1177/1461444809341857
- Peltier, T. R. (2001). *Information Security Policies, Procedures, and Standards: guidelines for effective information security management*. CRC Press.
- Qi, M., & Edgar-Nevill, D. (2011). Social networking searching and privacy issues. *Information Security Technical Report*, 16(2), 74–78. doi:j.istr.2011.09.005

- Shaw, R. S., Chen, C. C., Harris, A. L., & Huang, H.-J. (2009). The impact of information richness on information security awareness training effectiveness. *Computers & Education*, 52(1), 92–100. doi:j.compedu.2008.06.011
- Shuhada Mansor. (2013, June 7). Taasub laman sosial. *Harian Metro*. Retrieved from <http://www.hmetro.com.my/articles/Taasublamansosial/Article/>
- Siponen, M. T. (2000). A conceptual foundation for organizational information security awareness. *Information Management & Computer Security*, 8(1), 31 – 41. doi:10.1108/09685220010371394#sthash.3OSNMhcu.dpuf
- Sönmez, S. F., & Graefe, A. R. (1998). Determining future travel behavior from past travel experience and perceptions of risk and safety. *Journal of Travel Research*, 37(2), 171–177.
- Strater, K., & Richter, H. (2007). Examining privacy and disclosure in a social networking community. In *Proceedings of the 3rd symposium on Usable privacy and security - SOUPS '07* (pp. 157–158). New York, USA: ACM Press. doi:10.1145/1280680.1280706
- teenager. (2013). In *Merriam-Webster.com*. Oxford University Press. Retrieved from <http://www.merriam-webster.com/dictionary/teenage>
- Tencent Inc. (2013). WeChat. *Tencent Inc*. Retrieved from <http://www.wechat.com/en/>
- Twitter. (2013). New user FAQs. *Twitter.com*. Retrieved from <https://support.twitter.com/groups/50-welcome-to-twitter/topics/203-faqs/articles/13920-new-user-faqs#>
- UNICEF Malaysia Communications. (2008). *Young People and Family Planning: Teenage Pregnancy*.
- Von Solms, B., & von Solms, R. (2004). The 10 deadly sins of information security management. *Computers & Security*, 23(5), 371–376. doi:j.cose.2004.05.002
- Wee, J. (2013, August 15). WeChat's international user growth doubles over 3 months, now at 100M. *e27.co*. Retrieved from <http://e27.co/wechat-international-user-growth-doubles-over-3-months-now-at-100m/>
- Wulgaert, T. (2005). *Security Awareness: Best Practices to Secure Your Enterprise*. IL, USA: ISACA.
- Zakaria, N. H., & Katuk, N. (2013). Towards designing effective security messages: Persuasive password guidelines. In *Research and Innovation in Information Systems (ICRIIS), 2013 International Conference on* (pp. 129–134). doi:10.1109/ICRIIS.2013.6716697