

**A PROTOTYPE TO EVALUATE INFORMATION
SECURITY AWARENESS LEVEL FOR TEACHER AND STUDENT IN
SECONDARY SCHOOL**

NURUL HIDAYAH BT AB RAHMAN

UNIVERSITI TEKNOLOGI MALAYSIA

A PROTOTYPE TO EVALUATE INFORMATION
SECURITY AWARENESS LEVEL FOR TEACHER AND STUDENT IN
SECONDARY SCHOOL

NURUL HIDAYAH BT AB RAHMAN

A dissertation submitted in partial fulfillment of the
requirements for the award of the degree of
Master of Computer Science (Information Security)

Faculty of Computer Science and Information System
Universiti Teknologi Malaysia

NOV 2009

Dedicated to Nadim and Eti

ACKNOWLEDGEMENT

In preparing this thesis, I received guidance and encouragement from my supervisor, Dr Rabiah Ahmad, without whom I might not be able to complete this thesis.

I extended my appreciation to all of my family, colleagues and others who have provided assistance and support. To SMKTTDI staff and student who are willing to participate during user testing.

May Allah bless all of us.

ABSTRACT

This study attempted to develop a prototype to evaluate information security awareness level for teacher and student in secondary school. It identifies the information security awareness level by measure the level using an assessment model and automated tool. The assessment model for this study is Affect, Behavior, Cognitive (ABC) model from social cognitive theory where it equals with three dimensions which are attitude, behavior, and knowledge that have been used as measurement component for this study. The methodology for the whole study is System Development Life Cycle (SDLC) by applying waterfall model. The awareness level is evaluated based on the three dimensions from five focus areas for each teacher and student category. The user testing has been done among some teachers and students to test the prototype. As a result, all of the prototype function are working properly and able to produce the expected output. It shows that the prototype can be implemented in real world with some improvement for better result.

ABSTRAK

Kajian ini dilakukan untuk membina prototaip bagi menilai tahap kesedaran maklumat di kalangan guru dan pelajar sekolah menengah. Ia menilai tahap kesedaran keselamatan maklumat dengan mengukurnya menggunakan model penilaian. Model penilaian untuk kajian ini adalah ABC model, dari teori kognitif sosial. Model berkenaan bersamaan dengan tiga dimensi iaitu pengetahuan, kelakuan dan tingkah laku yang digunakan sebagai komponen pengukur untuk kajian ini. Metodologi untuk kajian ini adalah Kitar Hayat Pembangunan Sistem dengan mengaplikasikan model *waterfall*. Tahap kesedaran dinilai menggunakan tiga dimensi tersebut berpandukan lima topik utama untuk setiap kategori guru dan pelajar. Ujian pengguna telah dijalankan untuk mengenalpasti kebolehfungsian prototaip ini. Hasilnya, ia berjaya berfungsi seperti yang dirancang dan mengeluarkan output yang dikehendaki. Ini menunjukkan prototaip ini boleh dilaksanakan dengan sedikit penambahbaikan untuk menghasilkan produk dan keputusan yang lebih baik.

TABLE OF CONTENTS

CHAPTER	TITLE	PAGE
	DECLARATION	ii
	DEDICATION	iii
	ACKNOWLEDGEMENT	iv
	ABSTRACT	v
	ABSTRAK	vi
	TABLE OF CONTENT	vii
	LIST OF TABLES	x
	LIST OF FIGURES	xi
	LIST OF ABBREVIATIONS	xii
	LIST OF APPENDICES	xiii
1	INTRODUCTION	1
	1.1 Overview	1
	1.2 Problem Background	1
	1.3 Problem Statements	3
	1.4 Project Objectives	3
	1.5 Project Scope	4
	1.6 Project Summary	4
2	LITERATURE REVIEW	5
	2.1 Introduction	5
	2.2 Information Security	5
	2.3 Information Security Awareness	7
	2.4 Information Security Awareness for Student and Teacher	9
	2.5 Affect, Behavior, Cognitive (ABC) Model	12

	2.6	Automated Tool to Measure Information Security Awareness Level	13
	2.7	Summary	16
3		METHODOLOGY	18
	3.1	Introduction	18
	3.2	Methodology	18
	3.2.1	Feasibility Study	19
	3.2.2	Analysis	21
	3.2.3	Design	26
	3.2.4	Implementation	28
		3.2.4.1 Hardware Requirement	28
		3.2.4.2 Software Requirement	29
	3.2.5	Testing	29
	3.2.6	Maintenance	30
	3.3	Summary	30
4		INFORMATION SECURITY AWARENESS FOR TEACHER AND STUDENT TOOL (ISATS)	31
	4.1	Introduction	31
	4.2	Information Security Awareness For Teacher And Student Tool (ISATS)	31
	4.2.1	Admin Login	32
	4.2.2	Teacher Category Survey	34
	4.2.3	Student Category Survey	34
	4.2.4	Survey Result	35
	4.2.5	Overall Survey Result	37
	4.3	Summary	39
5		DISCUSSION	40
	5.1	Introduction	40
	5.2	Discussion of ISATS	40
	5.3	Summary	41
6		CONCLUSION	42
	6.1	Introduction	42
	6.2	Limitations	42
	6.3	Conclusion Remarks	43

6.4 Future Work	44
REFERENCES	45
APPENDICES A-H	49-86

LIST OF TABLES

TABLE NO.	TITLE	PAGE
3.1	The Five Focus Area	22
3.2	The Part of Questions for Password Protection and Management Focus Area (Teacher Category)	24
3.3	Weights Scale	25
3.4	Awareness Scale	26

LIST OF FIGURES

FIGURE NO.	TITLE	PAGE
2.1	ABC Model	13
2.2	Interface of Evaluation Mode	14
2.3	Interface of Online Information Security Awareness for Children	15
2.4	ASSET Interface	16
3.1	Waterfall Model	19
3.2	Top Internet Main Use (Student)	20
3.3	Top Internet Main Use (Teacher)	21
3.4	The Assessment Model	23
4.1	Login Form	32
4.2	Admin Access Menu	33
4.3	End User Access Menu	33
4.4	Teacher Category Survey	34
4.5	Student Category Survey	35
4.6	Survey Result	35
4.7	Retrieve Survey Result (Student Example)	36
4.8	Retrieve Result (Teacher Category Example)	37
4.9	Overall Survey Result	38

LIST OF ABBREVIATION

ABC	- Affect, Behavior, Cognitive
ICT	- Information and Communication technology
ISATS	- Information Security Awareness Level for Teacher and Student Tool
SDLC	- System Development Life Cycle (SDLC)
SMKTTDI	- Sekolah Menengah Kebangsaan Taman Tun Dr Ismail

LIST OF APPENDICES

APPENDIX	TITLE	PAGE
A	Gantt Chart	49
B	Survey Question	50
C	Top Internet Main Use Survey Questions	56
D	Entity Relationship Diagram	60
E	Context Diagram	61
F	Data Flow Diagram	62
G	Flowchart	63
H	ISATS Source Code	67

CHAPTER 1

INTRODUCTION

1.1 Overview

This study is to develop a prototype to evaluate information security awareness level for teacher and student in secondary school. The purpose of the prototype is to identify the level of information security awareness based on assessment model.

This chapter describes the problem background of this project, problem statements, objectives, scopes and plans for this project.

1.2 Problem Background

Information and Communication Technology (ICT) has rapidly evolved and impacted on all age level. Most youth are ICT literate nowadays and topic like Friendster, MySpace, e-mail, and chatting have become their daily conversation. In

addition, most school especially in urban area also provides computer facilities with Internet service provided.

Information security is the one of the concern when people use Internet. Particularly, secondary school students are gain exposure to the Internet technology but do they really aware on information security? Are they aware with the terms like Trojan horse, spyware, spamming and so on? Furthermore, do their teachers aware with information security issue? In fact, the level of security awareness among teachers must be addressed as well as they are suitable person to educate students.

There are three reasons for information security professional need to aware of people attitude towards information security. As described in Information Security Management Handbook (2007), the three reasons are:

- i) Behavior predictor – Attitude is a good predictor of behavior. That is the point where survey can be a tool to determine the behavior of target population toward information security issues. The information can be used to predict how secure the environment will be.
- ii) Target of change - Subtly or directly change someone attitude, consequently change behavior.
- iii) Source of risk -Extreme attitude toward someone or something can lead to irrational cognitive function and behavior.

According to above reasons, survey can be a tool to predict the security of an environment based on user behavior. In Malaysia, there is still no study to identify teacher and student information security awareness level.

Research findings by Chai, et.al. in 2006 suggest that students, who have strong self-efficacy toward Information Security on the Internet and have an exposure of information security from school, parents and media, are more likely to practice information security such as updating anti-virus software, not opening e-mails from unknown senders, and protecting personal information on the Internet. To motivate students' information security behavior, we need to provide more

information security education opportunities to students as well as chances for students to be exposed to information security issues.

1.3 Problem Statements

- a) There is no proper assessment model to evaluate the information security awareness level for teacher and student in secondary school.
- b) There is a need to identify teacher and student awareness level to have perception or give idea of their information security awareness level.

1.4 Project Objectives

The objectives of this project will be as follows:

- i) To develop an appropriate model of information security awareness to secondary teacher and student.
- ii) To develop a prototype to evaluate information security awareness level for teacher and student in secondary school.
- iii) To identify the level of information security awareness in secondary school teachers and students.

1.5 Project Scope

The prototype will focus on capture user input for questionnaire answer and generate the outputs as the survey result. The survey result will indicate the awareness level of user. Besides, the prototype will generate the average level of users according to their category. It will be evaluated from their knowledge, behavior, and attitude towards information security. The total of those three dimensions would be their total awareness level. The calculation and scale is based on reviewed previous study.

In addition, there is an administrator to monitor and maintain the prototype. Administrator will manage the data of the prototype and only administrator has access to view the overall survey result. The end user only can view their individual result only.

1.6 Summary

This project is carried out to develop an automated tool that can identify the information security awareness level so that it can be use to give input for more effective information security awareness program. This chapter highlights the problem background, project objective, problem statement, and project scope. Chapter 2 discusses the related secondary sources with this study like journal, article, and so on.