Assessing The Students' Awareness In Information Security Threats In E-Learning : A Case Study

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ABSTRACT

Many higher institutions used e-learning to improve their learning and teaching process. Users often use services of e-learning with great confidence on its security. The increasing number of universities in Malaysia contributes the increasing number of e-learning system as alternative to face-to-face lecture. As e-learning use a network, it is exposed to threats. Threats become the problem since network and sharing technologies were first used [1]. Many attacks were made on the users. This is why it is crucial to raise awareness in the computer security. The aim of this study is to see the awareness of students towards the e-learning system because today most students use e-learning system. In addition we also explained the importance of awareness in e-learning system. The result shows that most of participants have positive attitude towards the e-learning security. The strength of positive attitude is slightly different within male and female students. Findings of this study provide an enriched understanding about e-learning users and the security awareness of the system.

Key words : e-learning, awareness, security, computer threats, students

1 INTRODUCTION

Process of learning and teaching by using all sorts of electronically enabled technologies to enhance the teaching and learning is called e-Learning [2]**.** Parts of e-Learning including web based learning, computer based learning, virtual classroom and network enabled transfer skills and knowledge [3]. Since the e-learning system runs under internet environment, therefore it is exposed to computer threats and vulnerabilities of internet [4]. To ensure that e-learning system is effective, users must have enough confidence on the level of privacy and security for the system. The crucial task for learning service is to secure of learners data and learning environment [5] . According to [4], services provided by e-learning system such as learning resources, examination or assessment questions, students' results, user profile, forum contents, students' assignment and announcement in the e-learning system. If users believe that the safeguarding measure is effective, inexpensive and confidence using it, they will be motivated to avoid the threats if threatened [6]. [7] conclude that the response from students are very important to see whether the implementation of e-learning successful since they are the biggest users.

I-Learn system is an e-learning education web site used widely by UiTM's students. There are four users of e-learning in UiTM, they are : system administrator, course creator, instructor and learner. Learner is the delegate of the system

which has controlled access privileges. Eventually his/her knowledge improvement and sophisticated usage is the main goal of e-learning system **.** The risk of being effectively attacked by the threats is related to the awareness of the target [1]**.** The aim of this study is to investigate the level of awareness of users towards e-learning system, specifically I-Learn. [8] revealed that even though the best technological solutions to information technology were in place, human behavior sometimes contribute to information security. In this paper will discuss the awareness of students about computer security toward I-learn system. This research limited to degree students in UiTM Melaka who have experienced with I-Learn.

2 METHOD

A survey has been conducted to understand the awareness of students on computer security toward I-Learn system. The targeted respondents are students who have experienced with I-Learn system. The sample size is 145 students. A questionnaire survey was used in collecting data since this study is to investigate the students' awareness towards the computer security. The appropriate tool for self reported beliefs or behavior is survey as cited in [2]**.** The questionnaire was adopted from literature review from the previous research. A pilot study of the questionnaire was carried out and based on the feedback received, necessary modification were made.
The students are from different parts and courses. The survey was conducted in small groups and they can ask if they have any questions about the questionnaire.

The respondents were asked to state their level of agreement related to the statements.
Five level Likert scale was used as their level of agreement according to the statements.

(1) Strongly Disagree (2) Disagree (3) Fairly Agree (4) Agree
(5) Strongly Agree

The data collection then were analyzed using SPSS software.

3 RESEARCH FINDINGS

Out of 145 respondents in our study, 39 male and 106 female students involved in the survey. Their percentage were 26.9% and 73.1% respectively. Simply speaking, female students more than male students in this study since most of degree students in UiTM Melaka are female.

From 145 students, 43 students or 29.7% were business students, 25 students or 17.2% were administrative policy students and 77 students or 53.1% were accountancy students.

To condense the results, we created tables and included all the items pertaining to students awareness towards e-learning.

Table 1. Awareness measure

	Strongly Disagree	Disagree	Fairly Agree	Agree	Strongly Agree	Missing
Q1	91 (62.8%)	43 (29.7%)	6 (4.1%)	4 (2.8%)	1 (0.7%)	-
Q2	83 (57.2%)	51 (35.2%)	6 (4.1%)	4 (2.8%)	1 (0.7%)	-
Q3	32 (22.1%)	55 (37.9%)	37 (25.5%)	15 (10.3%)	6 (4.1%)	-
Q4	9 (6.2%)	9 (6.2%)	16 (11%)	62 (42.8%)	49 (33.8%)	-
Q5	8 (5.5%)	8 (5.5%)	32 (22.1%)	51 (35.2%)	46 (31.7%)	-
Q6	11 (7.6%)	14 (9.7%)	38 26.2%)	55 (37.9%)	27 (18.6%)	-
Q7	9 (6.2%)	10 (6.9%)	14 9.7%)	57 (39.3%)	54 (37.2%)	1 (0.7%)

where
Q1 - I share my login id and password with other people
Q2 - I let my friend using my id to enter I-Learn system
Q3 - I change my password at least once a year
Q4 - My computer is installed with anti-virus software
Q5 - I scan my pen-drive before using it at other computer
Q6 - I back-up my important data
Q7 - I logout the I-Learn system every times I do not want to use it.

Table 2 . Q1*gender crosstabulation

		Male	Female	Total
Strongly Disagree	Count	24	67	91
	% within gender	61.5%	63.2%	62.8%
Disagree	Count	11	32	43
	% within gender	28.2%	30.2%	29.7%
Fairly Agree	Count	2	4	6
	% within gender	5.1%	3.8%	4.1%
Agree	Count	1	3	4
	% within gender	2.6%	2.8%	2.8%
Strongly Agree	Count	1	0	1
	% within gender	2.6%	0.0%	0.7%

Table 3. Q2*gender crosstabulation

		Male	Female	Total
Strongly Disagree	Count	19	64	83
	% within gender	48.7%	60.4%	57.2%
Disagree	Count	17	34	51
	% within gender	43.6%	32.1%	35.2%
Fairly Agree	Count	1	5	6
	% within gender	2.6%	4.7%	4.1%
Agree	Count	1	3	4
	% within gender	2.6%	2.8%	2.8%
Strongly Agree	Count	1	0	1
	% within gender	2.6%	0.0%	0.7%

Table 4. Q3*gender crosstabulation

		Male	Female	Total
Strongly Disagree	Count	12	20	32
	% within gender	30.8%	18.9%	22.1%
Disagree	Count	11	44	55
	% within gender	28.2%	41.5%	37.9%
Fairly Agree	Count	11	26	37
	% within gender	28.2%	24.5%	25.5%
Agree	Count	2	13	15
	% within gender	5.1%	12.3%	10.3%
Strongly Agree	Count	3	3	6
	% within gender	7.7%	2.8%	4.1%

Table 5. Q4*gender crosstabulation

		Male	Female	Total
Strongly Disagree	Count	6	3	9
	% within gender	15.4%	2.8%	6.2%
Disagree	Count	2	7	9
	% within gender	5.1%	6.6%	6.2%
Fairly Agree	Count	5	11	16
	% within gender	12.8%	10.4%	11.0%
Agree	Count	10	52	62
	% within gender	25.6%	49.1%	42.8%
Strongly Agree	Count	16	33	49
	% within gender	41.0%	31.1%	33.8%

Table 6. Q5*gender crosstabulation

		Male	Female	Total
Strongly Disagree	Count	5	3	8
	% within gender	12.8%	2.8%	5.5%
Disagree	Count	3	5	8
	% within gender	7.7%	4.7%	5.5%
Fairly Agree	Count	5	27	32
	% within gender	12.8%	25.5%	22.1%
Agree	Count	11	40	51
	% within gender	28.2%	37.7%	35.2%
Strongly Agree	Count	15	31	46
	% within gender	38.5%	29.2%	31.7%

Table 7. Q6*gender crosstabulation

		Male	Female	Total
Strongly Disagree	Count	5	6	11
	% within gender	12.8%	5.7%	7.6%
Disagree	Count	3	11	14
	% within gender	7.7%	10.4%	9.7%
Fairly Agree	Count	12	26	38
	% within gender	30.8%	24.5%	26.2%
Agree	Count	10	45	55
	% within gender	25.6%	42.5%	37.9%
Strongly Agree	Count	9	18	27
	% within gender	23.1%	17.0%	18.6%

Table 8. Q7*gender crosstabulation

		Male	Female	Total
Strongly Disagree	Count	5	4	9
	% within gender	12.8%	3.8%	6.2%
Disagree	Count	3	7	10
	% within gender	7.7%	6.7%	6.9%
Fairly Agree	Count	2	12	14
	% within gender	5.1%	11.4%	9.7%
Agree	Count	12	45	57
	% within gender	30.8%	42.9%	39.6%
Strongly Agree	Count	17	37	54
	% within gender	43.6%	35.2%	37.5%

3.1 Sharing The ID And Password

Responses to this question, 92.5% (strongly disagree and disagree) will not share their login id and password generally, 4.1% fairly agree and 3.5% (strongly agree and agree) don't mind to share their id and password. If we make comparison this item based on gender, 35 male students or 89.7% of male students and 99 female students or 93.4% of female students did not share their id and password. 2 male students or 5.1% and 4 female students or 3.8% fairly agree.

2 male students or 5.2% shared their id and password compare to 3 female students or 2.8%. For this group of participants, gender not influence whether they want to share their id or not.

3.2 Letting Their Friends To Use Their ID To Enter I-Learn System

The response to this question agree with question 1 which they did not let their friends used their id to enter I-Learn system. The response was 92.4% strongly disagree and disagree.

To refine the result, 92.3% male students of total male students and 92.5% female students of total female students choose strongly disagree and disagree. Out of 92.5% female students, 60.4% choose strongly disagree and 32.1% disagree while for male students, out of 92.3% only 48.7% choose strongly disagree and 43.6% choose disagree. For this item looks like female students are more firm not to let their friends use their id.

3.3 Change The Password At Least Once A Year.

Only 40% will change their password at least once a year. 60% (strongly disagree and disagree) maintain their password for at least a year. It is advisable to change the password regularly in order to prevent encroachment.

By comparing the gender, 60.4% female students did not change their password at least once a year compare to 59% male students. But, 15.1% female students (agree and strongly agree) changed their password at least once a year comparing to only 12.8% male students. It may give a hint that female students are more concern about security of the system.

3.4 Computer Installed With Anti Virus

87.6% installed their computer with anti- virus. This is a good practice to make sure the computer at least have prevention from viruses.

The response to this item support the previous items, where only 66.6% male students installed their computer with anti-virus in comparison to 80.2% female students who installed their computer with anti virus.

3.5 Scanning The Pen-Drive

66.9% (strongly agree and agree) to scan their pen-drive before using it at other computer. 22.1% fairly agree to scan their pen-drive. This group may scan their pen-drive depend on situation but not every time when using computer. 11% not scan their pen-drive before using it at other computer. 20.5% male students not scan their pen-drive compare to only 7.5% female students. Percentage male and female students who scan their pen-drive almost the same that are 66.7% and 66.9% respectively.

3.6 Back-Up The Important Data

It is good to back-up the important data in case something bad happen in the computer. From the survey only 56.5% (agree and strongly agree) will back-up their important data. 26.4% fairly agree and 17.3% will not back-up their data (strongly disagree and disagree). Only 48.7% male students back up their data compare to 59.5% female students. 20.5% male students not back up their data compare to 16.1% female students.

3.7 Log Out From The I-Learn

76.5% (agree and strongly agree) will logout from the system every time they don't use it, 9.7% fairly agree and 13.1% (strongly disagree and disagree) not logout after use it.

78.1% female students logged out the system after use it compare to 74.4% male students .

20.5% male students not logged out while only 10.5% female students did not do it. The rest fairly agree to log out the system.

4 DISCUSSION AND CONCLUSION

From dictionary the word awareness means having knowledge or condition of being aware. This study investigated the awareness of the students for the e-learning threats. It is important to aware about the threats so that users and e-learning administrators can cooperate to reduce the possibility of being attack from e-learning threats.

[4] shows that the e-learning system assets are exposed to threats on availability, integrity and confidentiality. The aim of this study is to understand and explore the awareness among students who use e-learning system. The findings from this study generally shows that most of students are positively aware about security in the system. If we refine the results, it seems that female students more concerned and aware about the security of the system. But, we can't conclude that since number of female students has big different with number of male students. Another research should be conducted to see whether female students more concern than male students towards information security .

However, an effort to raise awareness of safe use of e-learning system still needs to be done.
E-learning system users should have the awareness of computer security. They should not share user ID and password with others. If they share their ID and password, there is a possibility that their friend will misuse and expose their privacy to threats. To ensure the security of the system, users should be encouraged to change their password regularly. This is to ensure that users of e-learning system will not be easily compromised by irresponsible people. From this study shows that most of the participants are not aware the importance of changing their password regularly. [8] stated that password must be change periodically and shouldn't allowed to be used by other persons as part of system security.
To reduce the possibility of exposure to the threats, users should install their computer with the latest anti-virus, always scan their pen-drive and back up the data.

The findings from this study have practical value to help I-Learn users to pay attention to increase their awareness towards the system. To conclude, the study has contributed to the studies on learning.

Although this study provided valuable insight, it has some limitations that could be improved for further research. Since the data were collected at a single point in time, they depend on their best memories while answering the questionnaire. The sample could expand to those who use other e-learning system instead of I-Learn system only.

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References

1. Sawyer, J., Aimeur, E. : Preventing Computer Threats Using a Secure E-Learning Framework. In: 5th International Conference on Signal Image Technology and Internet Based System, pp. 369-376, IEEE (2009)

2. Najwa,H., Ip-Shing, F., : Users' Perception In Information Security Threats In E-Learning. In: Proc. 2009 ICERI , pp. 2345-2352, IATED, Spain (2009)

3. Ahmed, S., Buragga, K., Ramani, A., : Security Issues Concern For E-Learning by Saudi Universities. In: 13th International Conference on Advanced Communication Technology, pp. 1579-1582, (2011)

4. Zamzuri, Z.F, Manaf, M., Ahmad, A.,Yunus, Y.: Computer Security Threats Towards The E-Learning System Assets. Software Engineering and Computer Systems, vol. 180, pp. 335-345 (2011)

5. May, M., Fessakis, G., Dimitracopoulou, A., George, S.: User's Perception in E-Learning Security and Privacy Issues. In: Proc. 2012 IEEE 12th International Conference on Advanced Learning Technologies, pp. 88-89,(2012)

6. Liang, H.: Understanding Security Behaviors in Personal Computer Usage: A Threat Avoidance Perspective. In: Journal of the Association for Information Systems, vol.11, no.7, pp. 394-413, (2010)

7. Zamzuri, Z.F., Manaf, M., Yunus, Y.: Student Perception on Security Requirement of E-Learning Services, In: 6th International Conference on University Learning and Teaching INCULT,(2012)

8. Rupere, T., Mary, M., Zanamwe, N.: Towards Minimizing Human Factors in End-User Information Security, In: International Journal of Computer Science and Network Security, vol.12, no.12, pp. 159-167, (2012)