Chapter 21
Information Security Awareness
On–Line Materials Design with Knowledge Maps

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ABSTRACT
Information Security Awareness, though known as a primary and important issue in the domain of Information Security, CSI computer crime and security survey showed poor security awareness training in public and private sectors. In many studies, the authors have found that the usage of knowledge maps helps the process of learning and conception building. Therefore, the authors have tried to figure out if the implementation of knowledge maps on the training materials of Information Security Awareness will improve the learning performance. Based on the e-learning materials for E-Mail Information Security Awareness, the authors designed them in the format of knowledge maps and compared the learning performance with common browsing-based materials. The results showed the knowledge map-based materials lead to higher learning performance than browse-based ones.

INTRODUCTION
According to the survey of information security by Datapro Research Corporation, 50% of information security events were occurred due to human carelessness/negligence. In corporations, employees are vulnerable to threats of information security. Since they might not be aware of threats and unable to react or handle them instantly, their companies would thus suffer a great loss. CSI computer crime and security survey shows poor
security awareness training in public and private sectors (Collins, 2010). 43.4% respondents stated that less than 1% of their security budget was allocated to awareness training. Of course it’s reasonable to consider that effective awareness training is inherently less expensive than the arsenal of security technology that most enterprises use to employ defense-in-depth. Nevertheless, 55% respondents stated that the investment made in awareness training was inadequate (CSI, 2009).

Increasing the awareness and response to Information Security has been a top issue. Many e-learning courses and materials about Information security have been supplied, for example, AOEMA.org, noticebored.com and honeytech.com, etc. Most of them are shown in multimedia and in the basis of hierarchical list or click to browse, but the correlations between both units and concepts are seldom revealed.

We have learned that knowledge maps have great impact on the learning performance, procedure of teaching and learning, conception building and correlating (O’Donnell, Dansereau, & Hall, 2002). For this reason, we manipulated Knowledge Maps as an auxiliary tool for designing e-learning materials for Information Security Awareness and expected to enhance the performance for the behavior of learning.

In the paper, we tried to discuss if the implementation of knowledge maps in designing Information security e-learning materials lead to a higher learning performance than that of browse-based ones. Taking the weakness and threat of E-Mail security awareness, with great losses reported, as an example, we built a knowledge map-based structure for the e-learning materials and further discussed if the learning performance would be increased in the way. The purpose of the study is to construct a knowledge map for e-learning materials of Information Security Awareness to be accessed on-line and verify if it can improve the learning performance effectively. We expected to compare the performance of knowledge map-based and browse-based materials under the same contents (in the case, Information Security Awareness) and thus to see if either one of them can help strengthen the awareness of information security and lower the frequency of related events.

LITERATURE REVIEW

Information Security Awareness

Information awareness training is meaning that creates the sensitivity to threats and vulnerabilities of computer systems and recognition of the need to protect data, information, and the means of processing them (NIST, 1989). Awareness is defined in NIST Special Publication 800-16 as follows: the purpose of awareness presentations is simply to focus attention on security. Awareness presentations are intended to allow individuals to recognize information security concerns and respond accordingly. In awareness activities, the learner is the recipient of information, whereas the learner in a training environment has a more active role. Awareness relies on reaching broad audiences with attractive packaging techniques. Training is more formal, having a goal of building knowledge and skills to facilitate the job performance” (NIST, 2003).

The awareness of information security lets learners aware the importance of IT security and learn the simple steps to solve the security events when occurred. In the teaching process, learners are regarded as passive receivers; some attractive technology must be used to increase the awareness.

Currently, most learning materials of Information Security Awareness are revealed in multimedia, designed in chapter-based, hierarchical lists or click-to-browse methods. We called it browse-based e-learning materials. They are represented with HTML web pages with topics listed in left frame of a web page. When a learner clicks on one of the topics, the learning contents will be displayed in the right frame of the web page with texts, graphics, or multimedia. Learners can
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