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Studying an Edutainment Applying Information Security Damage Cases for Adolescents

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Abstract. According to the advance of information technology, adolescents navigate the internet or communicate with their friends through SNS (Social Network System). However, there are some side effects that are necessarily involved like various cyber-crimes. So, to prevent information security damages, an information security education becomes important. In this paper, we propose an approach that enables the information security education through an edutainment, based on situation setting. We describe the edutainment, which simulates actual information security damage cases, to bring up the information security cognition of adolescents.

Keywords Information security damage, Information security education, Edutainment, Situation setting, Adolescents

1 Introduction

As our society develops into information society, adolescents use also a movie or music service on the internet, and communicate with their friends through SNS. The advance of information technology gets an advantage that can share information easily and quickly. On the contrary, it entails some side effects that commit a cyber-crime such as hacking, virus circulation, and spam mail transmission.

Currently, in spite of emphasizing the importance and necessity of computer security education due to the leaking of private information, the information security education in community or school is still unsatisfactory. Because there has not been a systematic education for students in school, the students have little knowledge about information security and information security consciousness. Thus, we need to provide a specific and systematic computer security education to the students in adolescence in order to do the education effectively. To cognize the necessity of information security education and acquire the necessary knowledge about information security, we present some information damage instances of real life and suggest a way to do the information security education through problem solving. As a result, we expect to boost the information security awareness.

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2 Related Work

Information security that is controlled in computer means administrative and technical method for protecting damage, falsification, and leakage of information during collection, processing, saving, retrieval, transmission, and receipt of information. Protection of information puts the purpose that is nipping the problem in the bud through logical and physical device in the supply side that operates information and user side.

Computer security education is a field that studies computer security in general, such as technology of information security, cryptographic technique, hacking and information security, computer virus, system security, network security, e-commerce security, web and e-mail security.

In the questionnaire that investigates the thinking of students about personal information leakage, 40% of students respond indifferently, such as 'not interesting', 'no problem', 'and so on', so we come to a conclusion to need a necessity of information security education and an education system that arouses student's interest. Also, the result of the questionnaire that asks "Do you think your information can be leaked?" shows 35% of students think 'it can be leaked'. However, 24% of students think easefully as 'it cannot be leaked'. Also, 24% of students think personal information is safety, so they respond as 'it must not be leaked'. The rest 17% of students respond as 'I didn't think about it' indifferently. Through this result, we can know that student's security consciousness level about personal information is low, and we should need to recognize about necessity of information security [1].

There is a reason why the necessity of information security education is important in school because many cyber criminals are adolescent. By Korea cyber-crime statistics, students garner a 13.3%, and also by aging statistics, teenager garners a 13.4%. An age bracket that is interested to computer and study knowledge from computer is mainly young generation beside short history of the introduction of computer. Also, there is a problem that is difficult to guide about information education at home, so it is magnified the necessity of school education. To solve this problem situation and raise standards of student's security consciousness, proper computer security education needs at the time of youth [3].

Othello game that is one of the board game has simple rules compared to other games and is enjoyed an 8x8 as the limitary space. This game is in progress by placing black and white marbles on the 8x8 board in turn. The game is usually designed as an artificial intelligence, but we can know "it spends too much processing time because an existing algorithm explores every case that occurs later, or it is not efficient to handle new situation."

To supplement these weaknesses, we propose the game introduce CBR (Case-based Reasoning) algorithm that is one of artificial intelligence. A CBR algorithm means that looks into similar problem that exists before to solve given problem, and the method that proposes appropriate solution. By applying CBR algorithm to the Othello game, it can be processed next step fast, only manage new situation effectively when the existing cases are enough, also suppose system that user makes more difficult the Othello game [2].

Learning game is an education that utilizes functional game to study various topics, such as geography, mathematics, animal, and science. This game applies learning

items with advances that have existing game as interest and fun. Through the game, learner can cooperate and compete with other people in strategic context, and improve higher mental processes such as problem-solving capability. Also, learners can perform self-conviction about future career fields as being background of occupational choice. Thus, multiple thinking abilities of learners are improved, construct strategic plan, and have self-regulated learning through educational computer game when the learner solves problems. The learner also gets confidence by doing self-directed learning, and playing game experience has a positive effect on self-efficacy improvement. Thus a game that utilizes computer is suitable for an education because the game can improve cognitive and affective abilities of learner [5].

Recently, the necessity of information security education is increasing by causing various problems that occur in online. So, information education strengthens in educational spots, but the specific learning material that makes in spot of education lacks. Thus, elementary and middle schools improve unplugged activity to learn class easily to learner. The developed unplugged activity is designed by applying integrative ethical model of Lickona and unplugged activity design pattern of Nishida, and is appreciated usefulness for middle school student after pilot test through reviewing specialist. The evaluation result presents students are interested about the activity and have high understanding, and bring positive change in their attitude. Thus, we have to provide unplugged activity that can be taught from instructor by using more various topics for information security education [6].

3 Designing an Edutainment

3. 1 Edutainment Development Tools

This study uses ‘game maker’ program that a beginner also can learn and control easily, related on ‘game’ element that can be interesting to students [4]. The sprite function of this development tools generates all images that present main character and enemy on the screen, Background creates a game image and an atmosphere, and object selects its character, has jurisdiction how to act the character, and apply to attack skills. Room is like a map, and is that objects can act. By using these game development tool’s function, we design educational RPG game that player would be the main character of a role in the situation, and solves problem.

3. 2 Game Scenario & Story Composition

The overall game story is as follows. Story To learn within a story and process the game, there is five problems, and items such as supplement physical strength or some weapons that can beat black devil. The problem is designed on the basis of cases that people face with it easily in daily life. We implement learners can solve the problem situation by themselves and progress the story. In this time, there is a study about security through problem solving. The game presents a message about the learner’s

security consciousness level if the learner achieves final goal by solving problems well, and the game ends if the learner faces the dark devil with item that is acquired from the game.

The game story composition is that the devil invades the 'security country' that has a lot of information to steal information of people. To protect information from the devil, the learner should repulse the devil by solving the problem and obstacles.

In the game, there is given five problems through various methods of the personal information leakage that people can be experience easily in daily life, such as spam mail checking, free event participation, video program download, message, and internet chat.

3. 3 HP, Items, and Compensation Composition

User character gets some problem when the user meets a character, and the user solves the given problem. When the user meets monsters in the game, user's HP is reducing. When the user selects choice that is low consciousness about security in each problem, the character gets item that can reduce the character's HP according to given number, such as 10 or 20. And when the user chooses high consciousness choice, the character also gets an item that can supply HP like a vaccine or a weapon that can attack a devil.

4 Conclusion

In this study, we suggest to enhance the security consciousness of learners by presenting information damage cases of real life as a problem situation. By producing this game, we try to get better educational effects with interest to learners. Current information security education doesn't work well, and there are also little educational contents. Using this study, we expect information security education will be revved up, and the edutainment will be used as educational contents.

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References

1. Kyeong, M.Y.: The Current Status and Teaching Plans of Computer Security Education for Middle School Students. Master's Degree Thesis, Graduate School of Education, Dongguk University (2009)
2. Song, E.J.: A Study on the Image Search System using Mobile Internet. Journal of Digital Contents Society, vol. 12, no. 2 (2011)

3. Shin, S.Y.: A Study for Middle School Information Communication Ethics Education. Master's Degree Thesis, Graduate School of Education, Konkuk University (2008)
4. Park, J.M.: An effect on Programming Class and Self-directed Learning Method by Using Game Maker in Vocational High School Education. Master's Degree Thesis, Korea University (2012)
5. Kim, N.Y., Kim, S.W.: Effects of Learning Strategy Game-Based Instruction on Self-Regulated Learning Ability. Journal of Korea Society of Computer and Information, vol. 20, no. 2 (2012)
6. Jang, Y.J., Kim, D.H., Kim, H.S., Lee, W.K., Kim, H.C.: Development of Unplugged Activity and its Evaluation of Usability for Information Security Education. Journal of Korean Association of Computer Education, vol. 14, no. 1 (2011)

