Computer Ethics Education based on ARCS Strategy for Students with Mild Intellectual Disabilities

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Abstract: Because of dysfunction of information-oriented society such as hacking, cyber violence, Internet addiction, and online game addiction, Korean Government is emphasizing computer ethics education for students. However, students with mild intellectual disabilities in integration education have difficulties at understanding and learning due to their cognitive abilities. So, It is necessary to special computer ethics education considering their characteristics. For successful computer ethics education to students with mild intellectual disabilities, students' motivation is needed. Therefore, the purpose of this paper is to develop the instructional strategy using Keller's 10 steps in ARCS motivational design process.

Keywords: Computer Ethic, Intellectual disabilities, ARCS model

Introduction

Students with intellectual disabilities have low mental age than general students but, along with increase of chronological age, they have same emotions and needs like general students [1]. Thus they are using Internet that is concern of friends even if it is hard something to use computer perfectly. In this process, the wrong actions, such as abuses on the internet board and online game addiction are often generated and to control the time of a using computer is very difficult. So, parent and teachers raise the necessity of computer ethics education.

However, students with intellectual disabilities have difficulties at understanding and learning because of their general characteristics from low intelligence. Also they have difficulties to motivate and maintain. Therefore, we have to consider their low abilities and try to make strategies that can motivate the education constantly and interest them in the education from the first time. If we do so, we will be able to educate computer ethics for them effectively.

In this paper, we are using ARCS strategies for computer ethics education for students with intellectual disabilities.

1. Literature Review

1.1 ARCS Model

Keller [2] argued that there was a close link between the effect of instruction and learner motivation. He claimed that it's needed to take a systematic and specific approach toward learning motivation to maximize the effect of instruction, and he presented an ARCS model that involved four factors (Table 1).

Table 1: ARCS Model Categories, Definitions

Attention	Capturing the interest of learners; stimulating the curiosity to learn
Relevance	Meeting the personal needs/goals of the learner to effect a positive attitude
Confidence	Helping the learners believe/feel that they will succeed and control their success
Satisfaction	Reinforcing accomplishment with rewards(internal and external)

Each of the four categories also has subcategories based on the major motivational variables subsumed by the categories. The subcategories are useful in diagnosing learners' motivational profiles and in creating motivational tactics that are appropriate for the specific problems that are identified.

1.2 Motivation of Students with intellectual disabilities and Possibility of ARCS Model

Switzky [3] mentions that the attitude or motivation affects the detective reason of the result of education more than the physical flaw or intelligent lethargy affects. Moreover, Zigler [4] emphasizes that whether proper and successful motivation in the process of teaching can generate the most important reason why two groups, such as general students and students with intellectual disabilities, have gaps between them. Moreover, he mentions that the basic condition for the students who actually are possible to have education is motivation. Therefore, we need the educational strategy in the class for them that we choose the subject that they realize they can experience not failure but success with a little bit of their effort. After all, in terms of computer ethics education for them, the main idea is that we have to lead educational motivation so that the learners themselves can understand the seriousness of problem and organize internet culture and its values.

1.3 Computer ethics(CE)

The CE can be defined as a yardstick that can be used to handle ethical issues in information-oriented societies; It defines the basic moral standards-right and wrong, good and evil, and moral and immoral-to attain the most desirable behavior while living in and information-oriented society as well as handling computer and communication devices [5]. The scope and contents of the computer ethics education is classified into four categories. These are the fundamental principles we need to consider when making ethical decisions in an abstract and complex information society [6].

Table 2: Four basic principles of the CE and the corresponding technical definitions

Principles	Fundamental concept
Moderation	Considering current situation, properly control one's behavior based on the decision criteria – what's right and wrong, and what's good and bad.
Respect	Value and admire others as well as oneself; regard others as human beings with dignity by caring for their identity and cherishing their self-esteem.
Responsibility	Predict the outcome of one's behavior onto others and be liable for possible loss and/or sanctions from it.
Participation	As an independent information user, offer help to others while abiding by the responsibility and eager participation. Also create / present valuable information and vigorously contribute to various cyber activities.

Moderation indicates controlling something to an appropriate level. For example, it's about managing the degree of addiction to online gaming, chatting, shopping, and obscene and aggressive media. Also, one can specifically set up his / her own rules in the usage of the Internet and try to stick to them.

Respect has two aspects, self-respect and respect for others. Overly immersing oneself into the Internet and thereby failing to care for one's health is violating the self-respect. Also, admitting other's privacy, thoughts, and identity is an example of the latter. In other words, respect is to treat yourself and others as the same and precious human being.

Responsibility is to carefully consider one's role as both information provider and user before taking any action. For example, should someone suffer from or experience loss as a result of one's behavior, one should take all the blame for that and also need to offer corresponding reward / apology.

Participation is to contribute to various cyber activities in a positive and energetic manner such as producing useful information, earnestly answering questions from others, complimenting others for their good works, etc.

2. Methodology

2.1 Computer Ethics Education using ARCS Model

We used Keller's 10 steps in ARCS motivational design processs [2] as shown Table 3 for instructional design in order to consider the characteristics of students with intellectual disabilities.

Table 3: Steps in the ARCS Motivational Design Process

	Steps
Define	1. Obtain course information
	2. Obtain audience information
	3. Analyze audience motivation
	4. Analyze existing materials and conditions
Design	5. List objectives and assessments
	6. List potential tactics
	7. Select and design tactics
	8. Integrate with instruction
Develop	9. Select and develop materials
Pilot	10. Evaluate and revise

Step 1. Obtain course Information : The selection and development of motivational tactics that are appropriate for a given course depend on many factors that include, but are not limited to, characteristics of the learners and their goals. To ensure that the tactics are appropriate for the situation, it is necessary to collect background information about the course that is to be offered and about the audience.

Step 2. Obtain audience information : The information in this step, together with the preceding one, provides the foundation for the audience analysis to be conducted in Step 3. This step focuses on several factors that have a strong bearing on the initial motivation of students and how they are likely to respond to the content and instructional strategies of the course.

Step 3. Analyze Audience : The purpose of this step is to estimate what the motivational profile is for the whole class or for selected subgroups or individuals in the class. One of the challenges in solving motivational problems is that the initial motivation of the learners can be too high as well as too low. By analyzing the audience to determine specifically what types of motivational problems exist, it is possible to select tactics that solve these specific problems.

Step 4. Analyze existing materials and conditions : The purpose of this step is for you to analyze your current instructional material, which could be a unit, a module, an entire course, or whatever segment of instruction you with to motivationally enhance, to identify their motivational strengths and deficiencies.

Step 5. List objectives and assessments : In this step, we write motivational design objectives and assessments. In objectives, describe the motivational behaviors that you wish to observe in the learners.

Step 6. List potential tactics : This step is a preliminary selection phase in which you prepare a list of possible motivational tactics, or solutions, that pertain to the specific objectives and to the general situation as described in the worksheets for Steps1 through 5.

Through such 6 stpes process, we chose final strategy.

3. Results

Proper motivation is the most important to increase educational effect when teaching computer ethics education to students with mild intellectual disabilities. Therefore, we have developed instructional strategy using Keller's 10 steps in ARCS motivational design process. "Select and design tactics" as final strategy in step 7 are as follows Table 4.

The next step is to integrate motivational tactics into the instructional lesson plan. After this process, we can expect to modify some of tactics so they are smoothly combined with the learning activities.

Table 4: Worksheet 7 Final Design: Computer Ethics Education

Computer Ethics Education: Worksheet 7:
Final Design

Throughout
- Provide learning contents in various ways. (A)
- Exchange glances with students and observe their facial expressions. (C, S)
- Compliment that gives positive influence on self-respect when students achieved assignment successfully. (C, S)
- Sympathize with even if students say wrong answer and encourage closer to answer. (C, S)
- Use individual language to feel in talking personally. (R, S)

Beginning
- Use examples from everyday life, like news articles. (A, R)
- Inform students of what they can do after this instruction. (R, C, S)
- Explain the importance of learning content to students. (R)
- Show examples of previous instruction. (C, S)
- Supplement if students misunderstand. (C)
- Tell with positive and ardent words that students are able to achieve the objectives of lesson. (C, S)
- Offer positive words and behaviors when students try to settle problems. (C, S)

- Tell students several times gently about subjects discuss in the lesson that it is not difficult. (C)

During
- Provide opportunities to query about learning contents. (A, R, C)
- Offer problems about real life issues and provide challenges as per individual ability. (R, C, S)
- Cause the spirit of inquiry through concrete problems. (A, R)
- Compliment for giving positive influence on self-respect if students achieved assignment successfully. (C, S)
- Provide consistent feedback about satisfactory response of students. (C, S)
- Provide opportunities to set learning goal according to individual ability of students. (C, S)

End
- Have some kind of presentation and special event, such as a "fair" to allow students to demonstrate their work and see what the others have done. Make it fun, not evaluative or competitive. (S)
- Provide a summary of objectives the learner accomplished during the training course. (C, S)
- Provide positive feedback for course completion. (S)

Later, this study will be applied to students with intellectual disabilities in the special class of high school, and will verify the result with statistical verification and observation of actual action.

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