Interactive MR Contents for Alternative Suggestions for Smartphone

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Abstract

IoT technology application has been part of modern people's everyday life. This technology makes people to depend on smart devices. 'Smartphone' is the most typical example. Despite the advantages given by this device, the bad side effects are also notable. This paper presents interactive content on the dependence of smartphone device. The research objective is to make individuals to reduce the use of smartphones by realizing their own problems of smartphone dependency. Research was progressed by analyzing aspects obtained from users participating in the self-developed interactive game contents. As a result of the analysis, approximately 68% of people were aware of the problem through this content. This indicates the potential of using convergence research in interactive contents with other fields furthermore.

1. INTRODUCTION

With the widespread application of IoT technology, the supply of smartphones has become common. Of course, we cannot deny the positive effects of smart devices providing users with a wide range of high-quality information. However, there are many side effects caused by this. Failure of controlling smartphone usage time, the difficulty of maintaining interpersonal relations due to excessive use of SNS, behavioral addiction that likes to play with a smartphone more than anything else could be an example [1].

Interactive contents are an element that responds instantly in a diversified form by receiving input from users. Interactive contents allow users to engage and immerse themselves independently in contents dynamically. The following content proposed in the paper was conceived by combining these advantages of interactive content with the problems of dependence on smartphones.

The content presented in this paper is aimed at alerting people to think about their own problem and improving independently. The research will be carried out through convergence content completed with participation of users, which is directly created using 3D modeling and Unity engine.

First of all, there has to be an investigation on why people use smart devices frequently. Therefore, information on current state of reliance on Smartphones should be obtained and the cause of this need to be analyzed. And it requires an understanding of the general symptoms or behavior patterns of people who are addicted to smartphones by certain causes. This content sets 'game' and 'SNS' as keywords among the over dependent factors. In addition, the keywords are set to "unconditionally" and "salience" among behavioral

patterns. Main content is needed to raise awareness about dependence on Smartphones based on the keywords above. Games and SNS are relatively easy-to-reach and addictive contents so it's suitable for carrying out this study [2].

2. CONSIDERATION

2.1   Smartphone Overdependence

2.1.1 Present Condition

According to '2017 Smartphone Overdependence Study' from the National Information Society Agency, the total number of potential and high-risk groups combined is constantly increasing every year. Teenagers are the most vulnerable of all ages and children group has been increasing by a large margin lately. In addition, studies have shown that children are also in danger group when parents are in danger group [3]. It can no longer be seen as just a juvenile problem, and the seriousness of the whole age is showing.
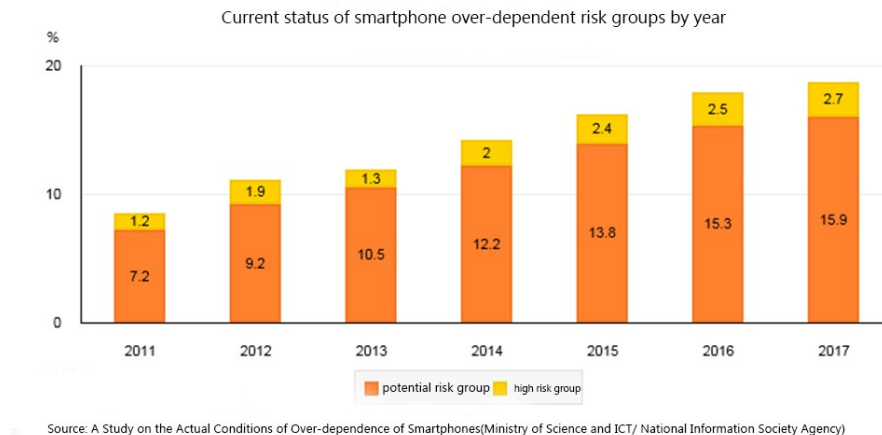

Current status of smartphone over-dependent risk groups by year

Source: A Study on the Actual Conditions of Over-dependence of Smartphones(Ministry of Science and ICT/ National Information Society Agency)

Figure 1. The yearly graph of present condition of smartphone overdependence

We looked if the level of smartphone overdependence matches the level of the individual's cognition to addiction. According to a study of teenagers who are most vulnerable to this problem, more than half of the people surveyed recognized themselves as not addicted. And the rest peoples' level of addiction and recognition matched only two-thirds [4]. As the Health Belief Model suggests, because the correct perception of an individual's problems directly or indirectly affects the positive behavior, it is important to have a good understanding of one's situation to get the desired results and to improve the problem (Becker etc., 1977, re-quotation).

2.1.2 Cause and Pattern

Mobility is the main cause of excessive dependence on Smartphones [5]. It refers to accessibility that can be accessed anytime, anywhere. For example, there is an environment where people can work with smartphones to some extent even if they don't use computers at their house. Second, there are enough interesting elements that can cause addiction by the application itself such as internet, game, SNS, etc.

Age groups excluding children experience the occurrence of smartphone use time 'control failures', 'salience' and 'problem consequences' as criteria for over-dependence. For teenagers, the level of academic achievement

dropped to 64% and for adults, to 67% the day when using smartphone excessively [3]. There is also the term 'Smartphone Zombie' or 'Smombie' to satirize pattern of people who walk with their heads down looking at their smartphones on the street.

2.2 A Leading Case

Guidelines for preventing and reducing smartphone addiction have been published in large quantities. Some books have reminded people of the seriousness of the problem by extending the cause of addiction and the application of solutions to childcare level [6]. It can be confirmed that it is no longer limited to certain age groups. And we can see that there is a growing awareness of the seriousness of the problem. For another example, programs and campaigns were also implemented to effectively apply preventive activities [7]. Also, the Seoul Metropolitan Government and the National Police Agency set up road safety signs in June 2016 that warn people that it is dangerous to use smartphones while walking [8].

Figure 2. Seoul, exhibition installation of safety sign [9]

3. EXPERIMENTS

3.1 Contents Planning

3.1.1 Workflow

Instead of being unilaterally trained, it has more advantage when being able to experience and think dynamically on our own. By suggesting contents that is completed when there is user's own interaction and making individuals to recognize problems on their own, we have created differentiation that was lacking in previous cases. We had to choose the current status, cause and behavior pattern of smartphones. It has been set to 'game' and 'SNS with communication tools' as the main cause of overdependence based on the numbers. And we chose 'salience', 'regulatory failure' and 'unconditionally' as the pattern of problem behavior.

3.1.2 Character Modeling

The necessary objects needed in the game are hand shapes, smartphone 1, smartphone 2, Text Message character, Kakao character, and other items related to the activities we can do other than smartphones.
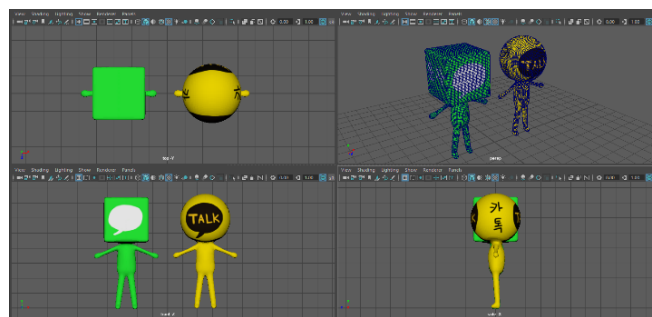

Figure 3. Character design

3.1.3 Contents Storytelling

Players control Text Message character by using the keyboard to prevent Kakao character from reaching the Smartphone 2. Because KakaoTalk is the biggest messenger app in Korea, naturally, the characters made from Kakao gained an immense amount of popularity. Now, there are numbers of Kakao Friends stores in Korea where you can buy their merchandise. Each character has its own behavioral patterns. The Kakao character unconditionally tries to pass the message from smartphone 1 to smartphone 2. No matter how much the character falls, it stands up over and over again delivering a message anyway. Conversely, a user-controlled Text Message character tries to stop the opponent.

Figure 4. Start of the game from Smartphone 1

3.1.4 Symbol

Kakao character is a symbol of users' who are dependent on smartphones and 'smartphone itself'. It symbolizes the people not only just checking messages but also a repetitive pattern of turning on a smartphone screen even if there is nothing to do with it. As a counter concept, Text Message character symbolizes efforts and unconsciousness to refrain from using smartphones. However, this character's direction is also fixed towards the smartphone2. And eventually, Kakao character's unconditional victory symbolizes the irony that lies in an inseparable relationship between a person and a smartphone.

3.2 Contents Making

3.2.1 Realization

Video production which tells the overall story of the game was made by using Adobe's Illustrator and After Effects. Character modeling was produced using a ZBrush tool and Unity program for making the whole game. The users can manipulate the keyboard to move the character. Kakao character is programmed to reach the destination point no matter how much the character is disturbed in the end. This signifies smartphone over dependent group's patterns of behavior such as unconditionally.

```
void circle_standup()
{
        interval += Time.deltaTime;
        if(interval >= 2 && interval < 2.5)
        {
                ani.Play("Circle_standup");
        }
        else
        {
                interval = 0;
                state = CircleState.Idle;
        }
}
void Idle()
{
        interval += Time.deltaTime;
        if(interval > 4)
        {
        state = CircleState.Run;
        interval = 0;
        }
}
```

Figure 5. The part of Kakao character coding

3.2.2 Sound Effect

It is composed to hear the relevant sound of an object in close contact such as DSLR, a book, an airplane, etc. during the game. Sound and music can be used to suit a particular scene, making a person concentrate effectively when harmonized [10]. This interaction causes users to wonder about sound and to think about what it means. It is designed to express artistic activities for ballet models and relaxation for potted plants and so on. This represents that there are many things we can do other than interacting with smartphones.

Table 1. Sound Effects

Object Name	Sound	Meaning
Airplane	**airplane.mp3**	Vacation
Apples	**apples.mp3**	Balanced nutrition
Baseball	**baseball.mp3**	Physical activity
Book	**book.mp3**	Reading
DSLR	**DSLR.mp3**	Photographing
Mug	**mug.mp3**	Relaxation

For the background ambient produced by a Kakao character, we actually recorded the necessary lines first. After that, the audio was modified with editing program to make sound suitable for the character. This was completed by manipulating the frequency domain. The player manipulates the Text Message character to prevent Kakao character from reaching smartphone2. When a user blocks an opposing character, that character collapses on the ground. Then it is programmed to rise again and again making sounds such as "You can't stop me".

3.2.3 UI Text

At the end of the experience, moving image containing both intuitive and ambiguous words that deliver the subject plays. Through a phrase that directly conveys the subject, the player can accurately understand the meaning of the contents.
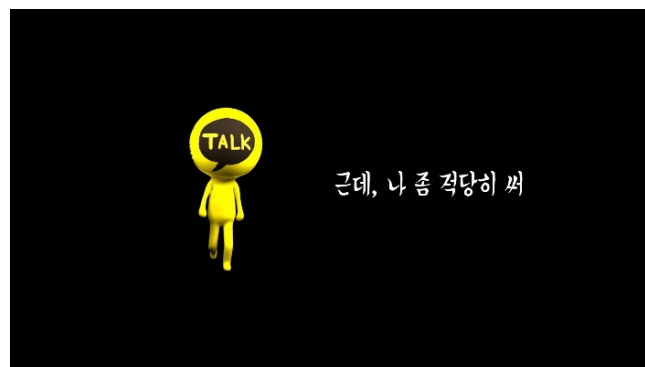
Figure 6. Moving picture UI text

The phrase 'I' shown in the moving picture refers to the application or contents for communication. In addition, it also means the user oneself who uses the smartphone. Studies have shown that hypocritical sentences and phrases in advertising effects create interest in people who see them. It is said that people get a little excitement when you get a multi-deterministic stimulus which is linked to positive emotion, and that you

can enjoy it as it goes away (Berlyne, 1971, re-quotation). The use of audio-visual materials in conjunction with the psychology of consumers of these contents can effectively communicate the subject [11].

After the UI text is finished, the game environments and objects that player encountered and interacted while playing game is shown using high angle views. It suggests that there are a variety of things that players have gone through to stop Kakao character and that there are many activities they can enjoy other than using smartphones through their own meanings.

Figure 7. Whole scene of the game

4. RESULTS AND DISCUSSION

41 people helped to experience and evaluate the content presented in the paper. They were not informed about the subject and purpose of the game before the experience. At first, people seemed confused about what the content wanted to propose, but gradually they understood what the purpose is. After fully participating in the contents, 13 out of 41 respondents answered, 'Very Likely' while 15 said, 'Likely' 8, 'normal' and the rest, 'Not Likely' to the survey question "Is it possible to identify the subject and recognize the problem?".

The content delivers the message through a non-complex experience based on the objects in the familiar environment for users. When people experienced the content, they showed a great deal of immersion in it. They were concentrated to interact directly with the content and to find out what meaning was implied. The incorporation of interactive content was enough and effective to attract users' interest.
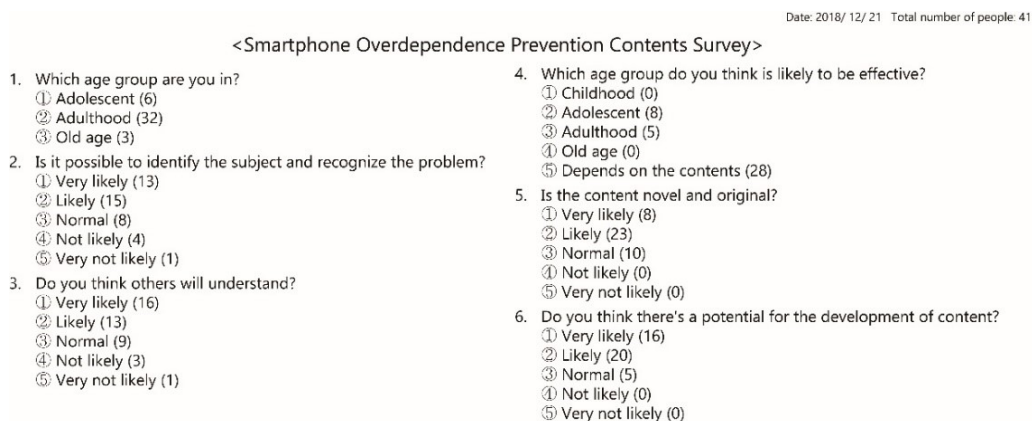

Date: 2018/ 12/ 21 Total number of people: 41

<Smartphone Overdependence Prevention Contents Survey>

1. Which age group are you in?
   ① Adolescent (6)
   ② Adulthood (32)
   ③ Old age (3)
2. Is it possible to identify the subject and recognize the problem?
   ① Very likely (13)
   ② Likely (15)
   ③ Normal (8)
   ④ Not likely (4)
   ⑤ Very not likely (1)
3. Do you think others will understand?
   ① Very likely (16)
   ② Likely (13)
   ③ Normal (9)
   ④ Not likely (3)
   ⑤ Very not likely (1)

4. Which age group do you think is likely to be effective?
   ① Childhood (0)
   ② Adolescent (8)
   ③ Adulthood (5)
   ④ Old age (0)
   ⑤ Depends on the contents (28)
5. Is the content novel and original?
   ① Very likely (8)
   ② Likely (23)
   ③ Normal (10)
   ④ Not likely (0)
   ⑤ Very not likely (0)
6. Do you think there's a potential for the development of content?
   ① Very likely (16)
   ② Likely (20)
   ③ Normal (5)
   ④ Not likely (0)
   ⑤ Very not likely (0)

Figure 8. Survey result

5. CONCLUSION

This study shows that interactive content has been enough to interest users and will help them recognize their problems to improve. Interactive contents effectively give users the advantage of engaging in contents not one-sided but independently finding problems. A diagnosis and recognition of individual problems is important. Based on the results of the survey, the more various contents are produced and distributed such as those presented in this paper, the more users will be able to experience it and recognize their problems related to smartphone overdependence.

In the future, more systematic methods will have to be applied to produce contents that are more reliable. Beyond the interactive content presented in this paper that simply aims to 'identifying a problem', the convergence with systematic teaching methods and so on may explore practical problem-solving methods. Interactive contents have the potential to make endless progress because it is easy to integrate with a variety of other fields. Therefore, promotion of practical applications is expected in the future.

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