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# The Development of Interactive Content for a No-smoking Campaign

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**Abstract**
In accordance with the government 's recommendation to design a participatory campaign to promote the spread of smoking cessation culture and improve awareness, this study developed interactive content that can increase curiosity and participation in no-smoking campaigns for those aged 10–20. A term of interaction refers to various physical and psychological exchanges between people, people and content, and people and systems. As the interaction between people and digital systems becomes more varied and frequent, users' experiences become richer. For this reason, interactive content is widely used not only in general education, but also in health, environmental education, and campaigns. Content that uses the interaction between the user and digital system can enhance the user's curiosity and participation in the anti-smoking campaign because this facilitates experiential education through the interaction. The research problem set for this study is how to develop the interactive content for a no-smoking campaign for the 10–20-year-old age group. For this, the content development methodology was derived from precedent research. Based on this content development methodology, we developed interactive content. In addition, I revised and supplemented the content through observation research which is the user participation analysis method. The content development methodology was derived from precedent research, and the perceived responsiveness and perceived sense of reality were selected as the participation types. The contents were designed in five sections: participation inducement, participation start, interaction waiting, interaction execution, and mission completion and reward. Based on this, a mission to touch the screen to eliminate the smoke in the screen and to rescue the child is given to the user. When the user touches the screen, the video image of the cigarette smoke being absorbed into the point of the finger takes place, so that the effect of the smoke disappearing into the hand is created. In addition, the process is reverse if the user releases touch, having the effect of the smoke filling in the screen again. After the user participation method analysis the time required for the cigarette smoke to be absorbed into the hand was cut in half so that the users can promptly recognize the change in the screen. Moreover, the user direction message was divided into two, so that the message "Touch the screen with two fingers" appears before touching, and the message "Do not remove your fingers until all the cigarette smoke disappears" appears while touching. In this study, the content was modified and supplemented through observing only the interaction, because it is a study on content production. However, since the observation research is not sufficient for the user evaluation of the overall contents, qualitative and quantitative follow-up studies on the quality of the satisfaction, interest, and the method of use should be conducted.

**Keywords:** Interactive Content, Digital Interactive Campaign, No-smoking Campaign, User Experience Campaign

## INTRODUCTION

### Background and Objectives

The Ministry of Health and Welfare established a nationwide smoking cessation center in 2015 and has implemented large-scale smoking cessation policies by establishing a smoking-related budget (KRW 11.3 billion in 2014, KRW 147.5 billion in 2015, and KRW 131.5 billion in 2016).[1] The smoking cessation policies are implemented using various methods that fit specific targets, from infants to elderly people. The purpose of this study is to develop the content of a no-smoking campaign targeting teenagers and young adults in their 20s. This content is designed using the symbol of two bound fingers—the index and middle fingers—that was used in a no-smoking campaign that started from 2015. The Ministry of Health and Welfare has been planning to launch a full-fledged no-smoking campaign since 2015 and recommends planning participatory campaigns.[2] Therefore, this study aims to develop interactive content that can increase the curiosity and participation in the no-smoking campaign in the 10–20-year-old age group. Interaction, which means reciprocal action, is a combination of the words *inter* and *action*. It refers to various physical and psychological exchanges between people, people and content, and people and systems.[3]

The interaction between a person and a digital system can involve many more different forms and methods than those between people or between a person and content. As the interaction between people and digital systems becomes more varied and frequent, users' experiences become richer.[4] For this reason, interactive content is widely used not only in general education, but also in health, environmental education, and campaigns. Interactive media also creates entertainment through interaction between media and users.[5] Content that uses the interaction between the user and digital system can enhance the user's curiosity and participation because this facilitates experiential education through the interaction. In addition, since this interactive content enhances the learning effect by facilitating experiential education,[6] this can increase the user's curiosity and participation in the no-smoking campaign.

**Research Question and Methods**

The research question set for this study is how to develop the interactive content for a no-smoking campaign for the 10–20-year-old age group. The study procedure is as shown in Table 1, and the method is as follows. First, I examined the interactive contents used in social or corporate campaigns through precedent studies and extracted the content development methodology from them. Second, based on this content development methodology, I developed interactive content for publicizing smoking cessation. Third, I revised and supplemented the content through the user participation analysis method. This analysis method was conducted by installing the content developed through this study at a college campus in the metropolitan area in September 2016 and observing the way 21 users interacted with it. According to Ha, B. (2013), observation research can be described as follows:

It is a method of investigation in which the investigator directly observes the behavior or appearance of the research subjects and records the contents in person by using the machine rather than asking questions to the subjects. This is a method that can objectively investigate the user engagement method of this study because it obtains information of the consumer which is difficult to get through questions by measuring unconscious behaviors. On the other hand, the disadvantage of using the direct observation method is that it is difficult for the observer to record all the contents thoroughly and that the observer's subjective judgment may make an error.[7]

Therefore, in this study, I supplemented this problem by conducting both direct and indirect observations of the video files of the subjects.

**Table 1:** Research Procedure

| | |
|---|---|
| Investigation of the interactive content for campaign and extraction of content development methodology through precedent research | |
| ▼ | |
| Development | Overall Plan and Scenario |
| | Video Source |
| | Interaction and Hardware |
| ▼ | |
| Investigation and Analysis of Users' Participation Method | |
| ▼ | |
| Revision and Supplementation | |

## LITERATURE REVIEW

**The Concept of Participatory Interactive Content**

There is no precise definition or common classification method for participatory interactive content for campaigns in academia or industry. However, in research related to advertising (Um, J. 2013; Lee, K., 2014), digital information media that incorporates various IT technologies, such as digital technology, network technology, and interactive technology, as outdoor advertisement media is referred to as *digital signage*. Therefore, the participatory interactive content in this study, which utilizes digital technology and interactive sensors, also falls under this category. Unlike traditional campaign media, interactive media leads to the users' direct participation, which can create new experiences. In addition, this can maximize the communication and engagement effects.[8] To maximize these effects, the interactivity between the campaign media and the participant should be active. Interactivity is a concept that measures how active the interaction from both directions is.[9] Lee, S. and Cho, C. (2011) classify the participation of such interactivity into the following types: perceived controllability, perceived responsiveness, perceived personalization, and perceived sense of reality. They explain them as follows: Perceived controllability is the degree to which consumers can choose the content or sequence of interactive advertising; perceived responsiveness is the degree to which interactive advertising responds to consumer input; perceived personalization is the degree to which the interactive advertising is adjusted to each consumer's personal information or individual desire; and perceived sense of reality is the degree to which the virtual space, objects, and events of interactive advertising feel real.[10]

**Case Study of Participatory Interactive Content for Campaign**

Interactive content is also used in various social campaigns, such as health, environment, and education campaigns. Among them, Volkswagen's Bottle Bank Arcade, shown in Figure 1, is a fun idea designed to encourage more people to recycle bottles, in which bottles are placed in the recycling bin to collect points. About 100 people put bottles in this recycling bin. Considering that only two people put bottles in another recycling bin nearby during the same time period, it was 50 times more effective. This campaign is very high in perceived responsiveness (the interactive content provides quick feedback based on the participant's input), since the participants can collect points immediately after they put the bottles in.


**Figure 1:** Bottle Bank Arcade by Volkswagen.
Source: YouTube

The Social Swipe is an Interactive Charity Donation Billboard by Misereor. As shown in Figure 2, it consists of a dual-screen billboard; a credit card swipe reader runs through the middle, which instantly turns credit card donation swipes into a synced video on the screens. This is a way to get people to engage by to donating €2 to help people.[11] After the donor donates €2, the donor receives their credit card bill. Over €3,000 was raised from single donations in just one month. There was also a 23% year-on-year increase in donors making three or more subsequent donations.[12] This delivers the message that a donation is not hard and anyone can easily participate by showing an interactive image of bread representing the donation being cut as the participant swipes the card between

the screens. In addition, the donation money is paid as soon as the credit card is swiped, which means that perceived response, among the types described above, was applied here. Moreover, perceived personalization, which means the advertisement being adjusted to each customer through personal information, was also applied, since the donation is made with the participant's credit card.


**Figure 2:** The Social Swipe by Misereor.
Source: YouTube

The Dancing Traffic Light, shown in Figure 3, is a traffic safety campaign that makes the pedestrian's experience of waiting for a signal more entertaining by making the human symbol in the signal light dance. When people enter and dance in a booth installed across the street, the camera converts the dancing movements into a traffic-light LED symbol and transmits it in real time. Due to this campaign, over 81% of pedestrians observed the signal. The application rate of perceived responsiveness (the degree to which the advertisement responds to the content input by the consumer) was high, since the participant's behavior is directly motion-captured and displayed in real time by the LED symbol of the traffic light. The application rate of perceived controllability (the degree to which the consumer chooses the content or sequence of the advertisement) and that of perceived personalization (the degree of correspondence to the individual desire of each participant) were also high, since the symbol in the traffic light moves as the individual participant moves. Therefore, the application rate of perceived controllability (the degree to which the consumer chooses the content or sequence of the advertisement) and the perceived personalization (the degree of correspondence to the individuated desire of each participant[13]) were high.


**Figure 3:** The Dancing Traffic Light by Smart.
Source: YouTube

## RESEARCH RESULTS

### Plan

First, content section design. As shown in Table 2, the content of this participatory interactive content was designed with five sections: participation inducement, participation start, interaction waiting, interaction execution, and mission completion and reward. The participation inducement section induces outside viewers to access the content by attracting their interest with looping image and sound. In the participation start section, the content starts when a viewer stands in front of the content which motivates the viewers to engage in the interaction by increasing their curiosity. In the interaction waiting section, a message about how to engage in the interaction is displayed and the content waits for viewers in standby mode until they engage in the interaction. In the interaction execution section, the viewer performs the action to interact with the content. In the mission completion and reward section, the reward is obtained by completing the interaction.

**Table 2:** Content Section Design

| Participation inducement | Participation start | Interaction waiting | Interaction execution | Mission completion and reward |
|---|---|---|---|---|

Second, interaction involvement type design. The participatory interactive content to be developed in this study aims to enhance favorability for and participation in the no-smoking campaign in an on-the-ground campaign for the 10–20-year-old age group. Therefore, the participant should be able to understand the campaign message intuitively and choose a method to engage in immediate interaction when participating in the campaign. It is also necessary to make the viewer grasp the necessity of non-smoking by increasing the realism of the images related to smoking. Therefore, among the participation types examined above through precedent research, perceived responsiveness (the degree to which interactive advertising responds to consumer input) and perceived sense of reality (the degree to which the virtual spaces, objects, and events feel real) were chosen as the main interaction participation types in planning the content.

Third, content production preconditions. This study is based on the smoking cessation campaign plan for the 10–20-year-old age group in the second half of 2016 by the Ministry of Health and Welfare, so the preconditions for the production of this interactive content are as follows. The campaign should maintain continuity by making use of the symbol of the two bound fingers, which was used in the government's previous smoking cessation campaign for the 10–20-year-old age group. In addition, when the mission of the interaction content is performed, the no-smoking-related souvenir should be awarded so that the non-participant's willingness to participate is raised and the promotion continues even after the participation. Moreover, the content should not use any disgusting images related to smoking-related diseases and should assign the user the mission to rescue a model suffering from cigarette smoke.

Forth, content hardware configuration. The hardware of this content is largely divided into three parts (shown in Figure 4): an 85-inch touchscreen, a computer that controls it, and a vending machine hardware device that provides souvenirs. In addition, it consists of a vending machine slot for picking out souvenirs and an infrared distance sensor for the automatic execution of content.

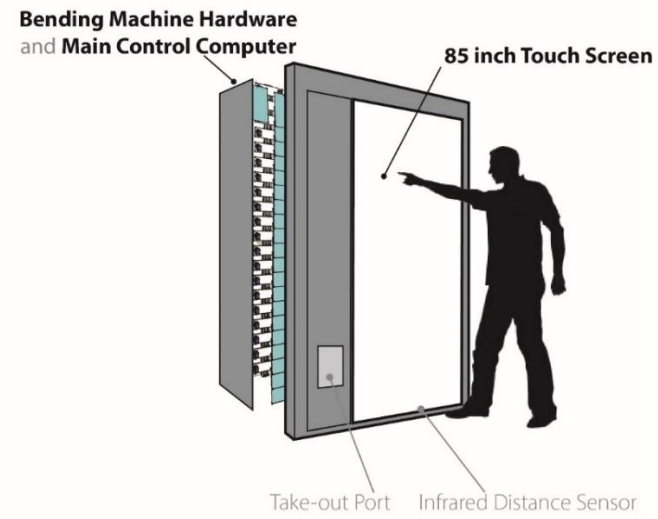



**Figure 4:** Content hardware configuration

**Production of Video Source**

First, to increase the above-mentioned perceived sense of reality, which is the degree to which the virtue space, things, and events seem real, I used a real model, not an animation character, and filmed with a high resolution of 4K, as shown in Figure 5. I also showed the model on the 85-inch screen with her actual height so that the users can feel as if a real person is being shown on the screen. In addition, to motivate the users to perform the mission by feeling sympathy for the model suffering from cigarette smoke, the video was filmed at the high speed of 120 frames per second. Through the slow motion realized by high-speed cinematography, I allowed the users to closely observe the cigarette smoke and the model's facial expression and behavior. Second, I emphasized the message about secondhand smoking by including the computer-generated imagery of a monster representing cigarette light, as shown in Figure 5 (b). Third, filming was conducted according to the content planning section in Table 3. Fourth, to enhance the special effects of 3D tobacco smoke, the tone and style, such as lighting and costumes, were set to achromatic colors, as shown in Figure 5 (a).

a) Filming Source b) After composite of cigarette smoke

**Figure 5:** Filming source and composite of smoke

**Interaction Design**

Table 3 shows the allocation time according to the content section, and Figure 6 shows the flow chart design of the interaction and representative components of each section.

**Table 3:** Images and text according to content section

| Section | Dur | Image | Text |
|---|---|---|---|
| Participation inducement | Looping |  | |
| Participation start | 32 sec |  | Rescue the girl from smoke |
| Interaction waiting | Looping |  | Touch the screen with two fingers as shown by the symbol until smoke is absorbed |
| Interaction execution | 12 sec |  | Touch the screen with two fingers as shown by the symbol until smoke is absorbed |
| Mission complete and reward | 11 sec |  | Successful rescue |

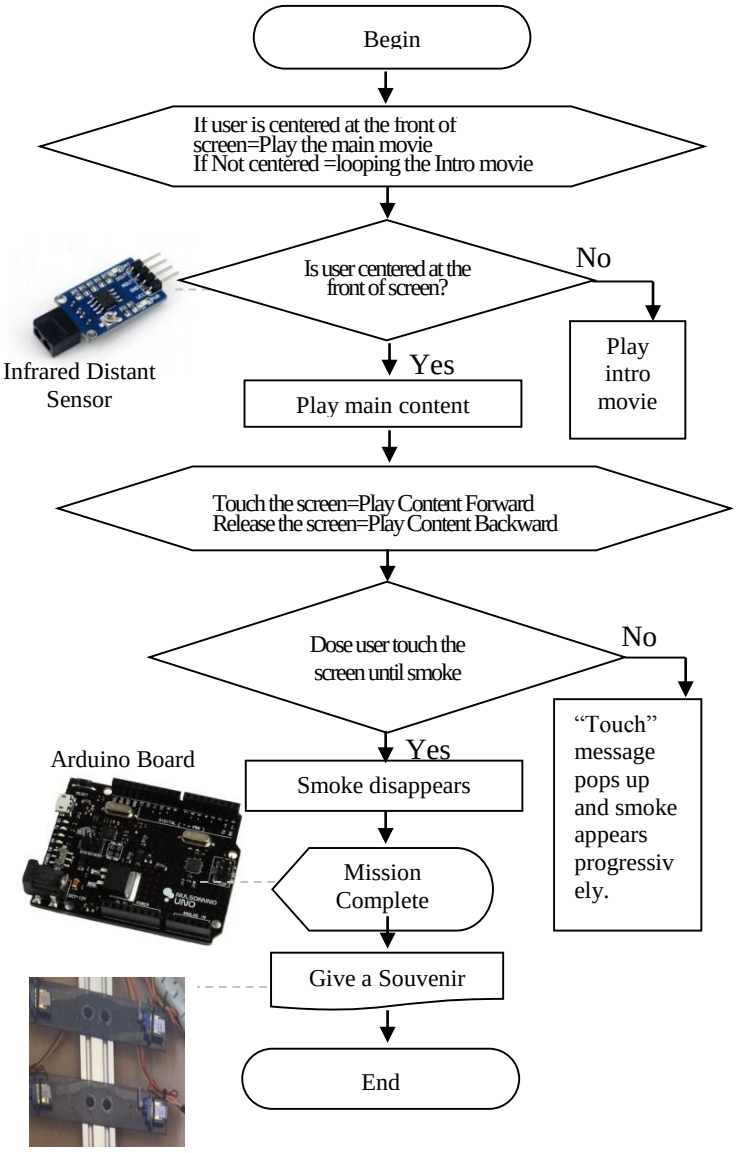



**Figure 6:** The flow chart design

First, participation inducement section. The video image, in which the model is made uncomfortable by the cigarette smoke, is shown. The infrared distance sensor checks whether the participant is standing in front of the screen, and if no user is detected, the image is repeated without proceeding to the participation start section.

Second, participation start section. When the user stands in front of the touch screen, the infrared distance sensor detects this, and the image of the participation inducement section is terminated and the image of the participation start section (the image in which the model suffers from cigarette smoke) is shown. The message "Touch the screen to rescue the model" appears in the middle of the video.

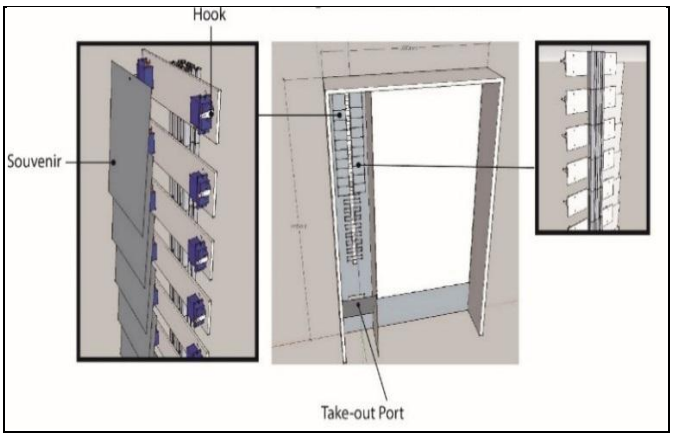
Third, interaction waiting. Depending on the user, the time it takes to touch the screen to perform the interaction varies. Therefore, until the user touches the screen, the screen filled with smoke is repeated on loop.

Forth, interaction execution. I designed the interaction in a single motion so that the respondents could intuitively understand the campaign message and to direct the immediate interaction of the participants. It guides the user to adopt the bound finger gesture and touch the screen to complete the mission. The images of smoke disappearing or being produced are generated with computer graphics. When the user touches the screen with their hand, the images of the cigarette smoke being absorbed at the point the finger touches are played so that the effect of the smoke disappearing into the hand is created. Additionally, the images will be played in reverse sequence if the user releases their hand, giving the effect of smoke filling the screen again. This section lasts for 12 seconds in total, and a total of 360 cigarette smoke image sequences at 30 frames per second are shown. As shown in Table 4, the images are played in sequence according to when the user touches the screen and are played in reverse sequence according to the image sequences played so far. Unlike other sections, in the interaction execution section the cigarette smoke was not synthesized in the image and was processed as layers so that the image and cigarette smoke could be separately controlled. The cigarette smoke and the model sequences were synchronized so that the facial expression of the model becomes increasingly more cheerful as the smoke gradually disappears.

**Table 4:** An example of sequence replay

| |
|---|
| Touch the screen for 2 seconds, and then stop touching the screen for 1.5 seconds<br>=Play 60 frames in sequence, and then play 45 frames in reverse sequence<br>=Go to Sequence #1 to #60, and then go to Sequence #60 to #15 |

Fifth, mission completion. When the interaction mission is completed, a message of successful rescue will appear and the souvenir will be dispensed from the vending machine. Behind the touch screen, as shown in Figure 7, I installed vending machine hardware of about 28cm x 140cm. As soon as the mission is completed, one of the hooks hanging the souvenir drops and the souvenir falls down.



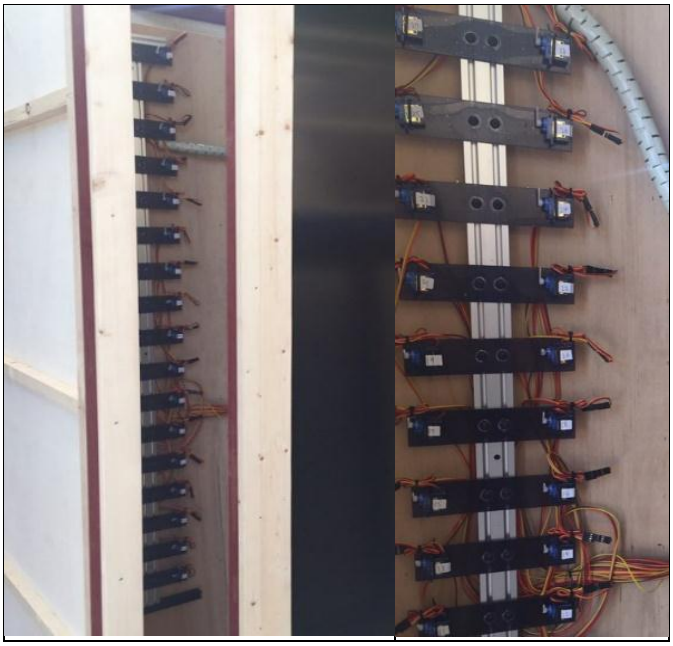


**Figure 6**: Image of inner hardware

A total of 34 souvenirs can be installed. Nineteen rings move downwards, and when there are five souvenirs left, a symbol appears indicating that the souvenirs are out of stock so that the campaign staff can supply more souvenirs as shown in Figure 8.


**Figure 7:** Image of inner hardware configuration and out-of-stock symbol

**Analysis of User Participation Method and Supplementation**

A total of 21 participants (62% female, 38% male) were observed; they voluntarily experienced the interactive contents installed in the outdoors. As mentioned above, since this content requires a method of immediate interaction between the participant and the content, perceived responsiveness was selected as the interaction participation type in planning the content. To do this, we surveyed the users to see if there were any problems with the content manipulation order and methods. The results are as follows.

First, in the participation start and interaction waiting sections, 67% of the participants watched the content play and performed interaction according to the messages on the screen. The remaining 33% did not wait until the interaction message appeared and tried to find out the method of interaction on their own, touching the screen in the middle of the video. Thus, we revised the interval from the start of participation until the interaction message from 32 seconds to 16 seconds to reduce the boredom of the users and enable them to focus on the image of the child suffering from smoke in the video.

Second, in the interaction execution section, 52% of users do not follow the direction, "Touch the screen with two fingers as the symbol shows till smoke is absorbed", and just tapped on the screen, so the campaign host had to tell them how to do it. Thus, the time it took for the image of the cigarette smoke being absorbed into the hand while pressing the screen was reduced from 12 seconds to 6 seconds so that users can quickly recognize the change in the screen. Moreover, the user direction message was divided into two, as shown in Figure 9, so that the message "Touch the screen with two fingers" appears before touching, and the message "Do not remove your fingers until all the cigarette smoke disappears" appears while touching.

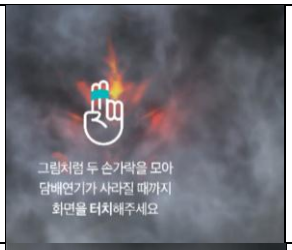
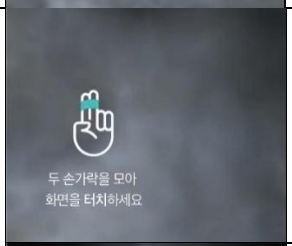
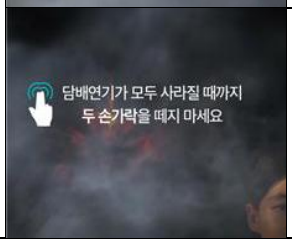
| | | |
|---|---|---|
| Before |   | Touch the screen with two fingers like the symbol till smoke is absorbed |
| After |   | #1 Touch the screen with two fingers |
| |   | #2 Do not remove your two fingers until all the cigarette smoke disappears. |

**Figure 8:** Comparison of the messages before and after revision

## CONCLUSIONS

In accordance with the government 's recommendation to design a participatory campaign to promote the spread of smoking cessation culture and improve awareness, this study developed interactive content that can increase curiosity and participation in no-smoking campaigns for those aged 10–20.

The content development methodology was derived from precedent research, and the perceived responsiveness and perceived sense of reality were selected as the participation types. The contents were designed in five sections: participation inducement, participation start, interaction waiting, interaction execution, and mission completion and reward. Based on this, a mission to touch the screen to eliminate the smoke in the screen and to rescue the child is given to the user. When the user touches the screen, the video image of the cigarette smoke being absorbed into the point of the finger takes place, so that the effect of the smoke disappearing into the hand is created. In addition, the process is reverse if the user releases touch, having the effect of the smoke filling in the screen again.

After the system was devised, the contents were supplemented by analyzing user participation method findings based on a participant observation survey. As a result of the survey, 67% of the participants waited for the interaction message between the participation start section and interaction waiting section; the remaining 33% did not wait and watch the video until the interaction message appears. Thus, the time of the interacting waiting section was cut in half to reduce the boredom of users and to have them focus on the image of the child who is suffering from cigarette smoke in the image. In the interaction execution section, 52% of the users did not follow the direction and removed their hands, leaving the interaction mission incomplete. Thus, the time required for the cigarette smoke to be absorbed into the hand was cut in half so that the users can promptly recognize the change in the screen. Moreover, the user direction message was divided into two, so that the message "Touch the screen with two fingers" appears before touching, and the message "Do not remove your fingers until all the cigarette smoke disappears" appears while touching.
Since participatory interactive content for no-smoking campaigns in Korea is at an early research and implementation stage, this content has played a leading role in healthcare campaigns. In addition, the content was revised and supplemented by analyzing the user participation method based on participant observation survey. In this study, the content was modified and supplemented through observing only the interaction, because it is a study on content production. However, since the observation research is not sufficient for the user evaluation of the overall contents, qualitative and quantitative follow-up studies on the quality of the satisfaction, interest, and the method of use should be conducted.

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