PROTOTYPE DESIGN OF ALLEVIATING CHILDREN’S NIGHTTIME FEARS USING DIGITAL GAME

Ching-Chih Hsu and Wen-Huei Chou  
National Yunlin University of Science and Technology  
Graduate School in Digital Media Design, Taiwan

ABSTRACT

Nighttime fears are a type of childhood fear, which, under normal circumstances, reduce as children grow older. However, in instances where nighttime fears persist, there may be negative physical and psychological effects on the child. In addition to serving as an entertainment medium, researchers have used digital games as a method for training children to handle and alleviate their fears. This study aimed to investigate nighttime fears among children in Taiwan and to use the collected data to design a conceptual digital game for mobile devices that may assist children to face and alleviate their nighttime fears. A focus group with seven parents was organized to collect data on children’s nighttime fears. The Koala Fear Questionnaire (KFQ) was subsequently used as a survey instrument, conducted among 35 children, aged between 7 and 10 years old. Finally, a conceptual digital game design was proposed based on the analysis results of the focus group and survey.

KEYWORDS

Nighttime Fears, Childhood Fears, Digital Game Design, Adventure Game

1. INTRODUCTION

Fear comes in many forms, and the loci of that fear for children vary with changes in cognitive ability during each phase of growth (Gordon et al., 2007). According to a study conducted among children aged between 4 and 12 years old, 73.3% had nighttime fears. It was thus concluded that nighttime fears are common among children (Muris et al., 2001). The most common features of nighttime fears include the inability to fall asleep alone and reduced sleep quality. As a result, affected children may be unable to concentrate during the day and face an increase in their anxiety (Kushnir & Sadeh, 2011; Lewis et al., 2015). Hence, although nighttime fears are quite common among children, chronic nighttime fears are likely to have a long-term negative impact on children. In response to many current issues, there has been a focus on digital games. With improved technology, the game media have increased. It has been demonstrated that playing games is a valid method of alleviating negative emotions in children (Mandryk et al., 2017). Researchers in Taiwan have demonstrated this by using digital games to help alleviate children’s fears of medical care (Lin et al., 2017). On that basis, the present study intended to explore how digital games can be designed to alleviate the anxiety and uneasiness children face when suffering nighttime fears.

The game proposed in this study aims to alleviate children’s negative emotions, promote self-confidence, and provide training in mechanisms for dealing with fear. The purposes of this research are as follows:

1) to develop a study of the methods used to alleviate childhood fears.
2) to collect and compile relevant data on nighttime fears as references for in-depth investigation in future studies.
3) to design digital game that assists children in alleviating their fears.

2. BACKGROUND STUDY

2.1 Nighttime Fears among Children

Studies have suggested that childhood fears are affected by external information, where fears are generated due to receiving negative information (Muris et al., 2011; Ooi et al., 2016). The causes of childhood fears are
correlated to the stages of cognitive development as well as the negative information to which they are exposed (Gordon et al., 2007; Muris et al., 2001).

In terms of the association between age group and children’s nighttime fears, the survey conducted by Gordon et al., (2007) among children and adolescents aged between 8 and 16 years showed that 79.4% of the investigated children had nighttime fears, while only 48.8% of the adolescents reported nighttime fears. Stewart and Gordon (2014) revealed that children aged from 6 to 10 years had the most severe cases of nighttime fears. Hence, when compared to adolescents, younger children are more prone to nighttime fears.

In terms of specific fears that may be encountered, Gordon et al. (2007) conducted a study to investigate what children and adolescents (aged from 8 to 16) feared, using the nighttime fear categories proposed by Mooney (1985) and Muris et al. (2001). The results showed that the fears of children aged between 8 and 12 years were related mostly to personal security, followed by an environmental threat. It can thus be deduced that children have varied nighttime fears, which differ across age groups. Things that children fear have been demonstrated to include intruders/home invasions (such as thieves and kidnappers), imaginary creatures (such as ghosts, monsters, and witches), frightening dreams (nightmares), environmental threats (such as darkness, storms, and strange sounds), insects and animals (such as spiders), and frightening thoughts (such as threats to one’s life or a threat of the death of a parent) (Gorden et al., 2007; Mooney et al., 1985; Muris et al., 2001; Rafihi-Ferreira et al., 2018).

In addition to emotional instability, confidence may be lost, and behaviors may manifest that affect the quality of children’s lives (such as inability to go to the bathroom alone at night or the need for the company from a family member to fall asleep). Nighttime fears may also lead to a reduction in sleep quality, which may indirectly affect their quality of life (Ducasse & Denis, 2015; Kushnir & Sadeh, 2011).

Some researchers have used methods such as bibliotherapy alongside communication aids, such as toys, to alleviate children’s night fears (Rafihi-Ferreira et al., 2018). Specifically, story books and a kangaroo stuffed toy have been introduced to train children to sleep alone. The research demonstrated that, among children aged from 4 to 8 years, such techniques may reduce insomnia and co-sleeping time. The method adopted in the present study attempts an approach by indirectly assisting children to face their fears. The story-telling method adopted allows for children to immerse themselves in a situation so as to avoid excessive fear.

### 2.2 The Impact of Digital Games on Children’s Emotion

Although the emotion of fear is a kind of defense mechanism (Tzeng, 2000). Excessive fear may cause negative influence on the quality of life or mental health (Friedl, 2003). In addition to the medical care of children or cases of children’s nighttime fear mentioned in the introduction and background review, some game elements were more or less added to divert children’s attention. Therefore, this chapter will organize the impact on association of games on children.

Children are able to develop and gain experience and learn life skills, through games without special training. Hence, playing games is an innate ability that all children have, and doing so may help to teach them how to effectively control their emotions and behaviors (Kao & Chen, 2011). Chiu et al. (2010) pointed out that, when playing games, children tend to rely on their own natural logic to uncover the most beneficial behaviors of the game world. In other words, games stimulate critical thinking and the ability to adapt to new environments. Therefore, the influence of digital games on children are not necessarily sweepingly negative; in some contexts, digital games can provide children with a medium for learning and interaction. On the other hand, Martins et al. (2014) found that the touchscreen functionality is easier to understand than using a mouse. Correspondingly, Couse and Chen (2010) discovered that, by using tablet computers and digital pens, it was easier for children to communicate and to share creative ideas with peers. In addition, tablet computers increase the probability of diverse interactions between children. For those reasons, digital games for mobile devices (such as tablet computers and cellular phones) are a viable media for alleviating children’s fears.

### 2.3 Section Summary

Nighttime fears are common in childhood and occur in many children and adolescents. When the fears worsen or become chronic, there may be adverse physical and psychological effects on children as well as those surrounding the children, impacting life quality. According to the findings of the Background study, structured guidance in handling fear can help children to face and handle their fears independently. The adoption of a
reward mechanism facilitates children’s participation in the process; story-telling and role-playing encourage children to approach their fears from an alternative angle; and auxiliary instruments divert their attention from their negative emotions. The development and property of digital games have subsequently been found to have positive effects on children. Given the plasticity and attractiveness of digital games, they can be designed for various media and devices. If games can transform children’s fears into other emotions or help them approach their sources of fear from a different perspective, digital games can be useful tools for nighttime fear interventions.

3. RESEARCH DESIGN

The goal of this study was to design a digital game that alleviates children’s nighttime fears. In order to achieve this goal, questions such as “Do Taiwanese children aged between 7 to 10 years have nighttime fears?” and “What are the things that they fear the most?” were firstly investigated. The study was thus conducted in two stages. In the first stage, a focus group and the Koala Fear Questionnaire (KFQ) were used to collect information related to nighttime fears among children. The collected data were compiled and analyzed. In the second stage, a game was planned and designed based on the information acquired during the first stage.

3.1 Focus Group

The focus group targeted parents with children aged between 7 and 10 years. A preliminary request was sent through social media to explore willingness to participate. Next, detailed information of the focus group and an outline of the topics to be discussed were provided to the parents who were willing to participate. Eventually, seven parents (with children aged between 6 to 10 years) were recruited, among which, one was male and six were female.

Gordon et al. (2007) adopted the interview questions used by Muris et al. (1997, 2001) to investigate the frequency of nighttime fears, severity of anxiety, and things that children fear the most. The questions developed to be used in the focus group, with parent participation, were based on the aforementioned research and the studies of Mooney (1985) and Pincus et al. (2012).

The purpose of the focus group was to collect information related to children’s nighttime fears. Therefore, the questions were divided into five dimensions, including children’s sleeping habits, the frequency of nighttime fears, the most prominent loci of fear, their anxiety levels, and how parents handle such nighttime fears. A verbatim transcription of the focus group was used for data categorization and analysis.

3.2 The Koala Fear Questionnaire (KFQ)

The Koala Fear Questionnaire (KFQ) is an instrument used to assess fears among children aged between 4 and 12 years old. By visualizing different types of fears and the severity of the fear, through corresponding images, the KFQ is a more appropriate aid for young children, when compared to surveys that only contain text, such as the Fear Survey Schedule for Children (FSSC-R) (Muris et al., 2003). Many studies have used the KFQ to investigate children’s nighttime fears (Lewis et al., 2015; Kushnir et al., 2014; Zisenwine et al., 2012). Therefore, in addition to the focus group, the present author adopted the KFQ to further investigate nighttime fears, such as the specific loci of fear.

The participants of the KFQ were 44 lower and middle-grade primary school students (aged approximately between 8 to 10 years). Specifically, the questionnaires were distributed in Chongwen Elementary School, Chiayi City, and 28 students participated in the survey on the day of distribution. Thereafter, with the assistance of the schoolteachers, more students were included in the survey.

The items used in the KFQ were designed based on the fear categories proposed in past studies and the results of Hung’s (2011) survey among lower-grade primary school students in Beichen Elementary School. Each item was presented as an image and the children were asked to rate how they feel toward each item. In addition, an example was included at the beginning of the questionnaire to facilitate children’s understanding of how to answer the questions.
To understand the fears of the participants, the following categories were included in the questionnaire: intruders/home invasion, imaginary creatures, frightening dreams, environmental threats, insects and animals, and other frightening thoughts. In order to ensure that the items included in the survey were familiar to the primary school students in Taiwan, additional items were included such as cockroaches, dogs (insects and animals), zombies, vampires, and human skeletons (imaginary creatures). The fear level was rated on a 3-point scale using a koala face (happy face = no fear, face with a little fear = some fear, and face with a lot of fear = a lot of fear). The participants’ age and gender were also collected. The last item of the questionnaire was an open-ended question, which aimed to investigate any loci of fear that was not already covered in the questionnaire, the reasons for their fear, and how they handle the fear.

3.3 Analysis Results

The KFQ survey yielded 35 valid responses; 13 of the respondents were male and 22 were female. Moreover, one child was seven years old, 4 children were eight years old, 22 children were nine years old, and 8 were ten years old. The analysis results of the focus group and the KFQ survey are presented in the following paragraphs.

In terms of sleeping habits, some parents reported that their children required specific external environment stimuli (such as a night light or the company of a family member) to fall asleep. These findings were in line with the findings of Kushnir and Sadeh (2011) on the sleeping patterns of children with nighttime fears and parents respond to such fears. It was found that not all of the children of the participating parents had nighttime fears. Nevertheless, the two parents who had not encountered nighttime fears among their children still provided suggestions in terms of how to handle such fears. Given that they lacked corresponding experience, they did not answer the question related to the frequency of occurrence.

According to the participants, nighttime fears made the children feel uneasy. This reduced their ability to sleep by themselves and increased the requirement of an accompanying family member or pet. The children generally openly expressed their fears with an expectation of a calming and reassuring response. Sometimes, the children were unable to complete tasks that they were able to usually accomplish independently (such as going to the toilet in the evening). Requests, such as the company of a family member or a stuffed toy and a talk before sleep, generated a sense of security and distracted them from their feelings of fear. In terms of handling methods, the participating parents reported that accompanying their children to sleep was most effective, while other methods were less commonly utilized. Particularly, if the parents were with their children, they were unlikely to adopt other methods (such as attempting to create a safer feeling in the environment). In addition, comparisons between peers were found to be beneficial to improving sleep habits.

In terms of the frequency of nighttime fears, some participants claimed that due to their efforts to avoid the occurrence of nighttime fears, there was limited incidences; two participants reported that they occurred once per day, and one participant reported that they occurred once every two to three days. The differences in the frequencies may be due to the children’s personality (such as timidity). According to the parents, the loci that generated the most fear included imaginary creatures such as the “tiger aunt” and possessed toys (Tkuta Phee), and environmental threats such as stressful events and external stimuli. The participants believed that the reasons behind the fear could be age and incomplete information absorption.

The total ratings provided by the participants for each item were used to identify the items that were the most feared by the children. Differences in the feared items by gender and age were also examined. The results showed that the participants feared kidnappers the most (84%), followed by death and zombies (82%), and burglars (81%), which covered the fear categories of intruders/home invasion, frightening thoughts, and imaginary creatures. These findings echo the survey results of Gordon et al. (2007), in which fear of intruders/home invasion ranked as the second fear of children and adolescents.

Moreover, the differences in fears by gender and age were also similar to the results of the study of Muris, et al. (2001) among children aged between 4 and 12 years old. Specifically, the top two categories of fears were intruders/home invasion and imaginary creatures. Additionally, the fear of imaginary creatures tended to reduce as they grew older, while the fear of intruders/home invasion tended to increase with age. It can be concluded that, concurrent with literature, cognitive development may affect both the type and loci of children’s fear.

In terms of the sources of fear, dead people, ghosts, and earthquakes were the most mentioned items in addition to those listed in the questionnaire. Fearing dead people and demons belonged to the category of imaginary creatures, which likely originate from imagination, perceptive associations, and negative information received from their social environments. Fearing earthquakes belonged to the category of
environmental threats, which could originate from uneasiness due to past experiences of sudden environmental changes.

The findings from the focus group and questionnaire survey shed light on nighttime fears among Taiwanese children and facilitate understanding of the current situation and the specific foci of fear. The results of the focus group and the survey were similar; the majority of nighttime fears originated from children’s imagination and associations, negative information stimuli, and natural disasters. In addition, due to differences in cognitive development stages, children from different age groups tended to have different fears. The majority of the children were found to cope with fears by seeking the company of a family member. It is worth noting that both parents and children preferred the combination of an enhanced sense of security and a distraction from the fear (Table 1.).

Table 1. Coping solutions of nighttime fears reported by children

<table>
<thead>
<tr>
<th>Coping solutions</th>
<th>Total (n =35) (percentage)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Distract attention from doing things</td>
<td>3 (8.6%)</td>
</tr>
<tr>
<td>2. Seeking the company of a family member</td>
<td>13 (37.1%)</td>
</tr>
<tr>
<td>3. Hide</td>
<td>9 (25.7%)</td>
</tr>
<tr>
<td>4. Dependent items</td>
<td>2 (5.7%)</td>
</tr>
<tr>
<td>5. Escape from fear</td>
<td>1 (2.9%)</td>
</tr>
<tr>
<td>6. Scream</td>
<td>3 (8.6%)</td>
</tr>
<tr>
<td>7. Sleep</td>
<td>2 (5.7%)</td>
</tr>
<tr>
<td>8. Hit people</td>
<td>1 (2.9%)</td>
</tr>
<tr>
<td>9. Do nothing</td>
<td>1 (2.9%)</td>
</tr>
</tbody>
</table>

4. DESIGN PRACTICE

Based on the findings from the focus group and questionnaire survey, the second stage of this research focused on the game design. First, the design principles were defined, and the overall plan was drafted prior to execution. The following sub-sections introduce the game design process.

4.1 Design Principles

4.1.1 Defining the Story and Plots

According to the findings of the background study, bibliotherapy and picture book stories can be used to alleviate fear by immersing the children in the stories and using that immersion to alter their perceptions. Hence, a similar approach should be adopted in the game design. In addition, the KFQ demonstrates that visually illustrated information is easier for children to understand than written information; hence, the storyline and plots of the game should be presented through images. Therefore, the foci of fear, collected from the focus group and survey, should be introduced at the beginning of the game and the story should be developed accordingly to focus the theme of the game and to help the player explore the cause-and-effect relationships through gameplay.

4.1.2 Defining the Characters

According to the findings of the focus group and survey, the majority of parents and children relied on the company of a family member as a coping mechanism. However, training children to go to bed and cope with their fears independently is more conducive to their overall sleep quality and quality of life. In order for children to learn to cope with their nighttime fears through playing the game, the main character (operated by the player) should have a similar age and background to the player (in this case, the survey participants).

4.1.3 Defining the Challenges and Obstacles

In order to alleviate their nighttime fears, the challenge faced by the players should be the loci of fear (in this case, the loci defined by the focus group and survey). According to research and investigations, it was determined that the fear children experience at night involves, most commonly, separation from parents, death,
and the fear of intruders and fictional creatures. The game aims to extend the emotional reaction to such loci from anxiety and negative thoughts to more positive outcomes by allowing the player to examine these fears from a different perspective, using positive mindset behaviors to alter the child’s negative thoughts. The idea is that, through overcoming the challenges within the game, when encountering fears in real life, they will have developed new coping mechanisms from the gameplay.

4.1.4 Defining the Gameplay

The results of the focus group and survey showed that parents and children applied a range of methods to cope with nighttime fears, and such methods were generally helpful in eliminating the fears. Therefore, when designing the gameplay processes, the previously collected coping mechanisms should be introduced so that players are able to indirectly learn new mechanisms, and subsequently apply the methods from the game in real life. For example, in the gameplay, player can try using the method of hiding and distracting the enemies in the game (Figure 1).

![Defence and Attack](image1.png)

Figure 1. Obstacles and solutions in the game

4.2 Game Design

Similar to the other game elements, the storyline of the game was developed based on the findings of the focus group and survey. To promote a sense of connection between the player and the character, the main character in the game was a child that was of a similar age as the participants in the survey. The storyline was as follows: After reading a scary story book, the protagonist (a 9-year-old girl) found that many monsters in the story had suddenly appeared in her house and abducted her family members. In order to save her family, she embarked on an adventure, fighting against the monsters. The plots of the story were presented through images (Figure 2), and children’s feelings were considered when designing the overall style of the images so as to avoid creating a frightening experience.

![Image 2](image2.png)

Figure 2. One of the images for game story

The game was a horizontal-scrolling action adventure composed of three levels. Each level had obstacles and a “boss,” each of which represented a locus of fear. The bosses for levels one to three were arranged based on the ratings of the KFQ survey (from less feared to most feared) (Figure 3). At each level, the player is expected to obtain a key that unlocks the next level and then defeat the “boss” of that level. Successfully obtaining all the keys and defeating all the bosses, the player could find their parents and claim victory. However, if the enemies and bosses touched the protagonist, her “energy level” would decrease. When the “energy level” reaches 0 or the protagonist falls into a “trap,” the game ends and the player has to restart from the beginning of the corresponding level.
Regarding gameplay, the protagonist has limited abilities when fighting enemies and removing obstacles; as such, they need to use the tools provided in level. Specific tools can be acquired by exploring the map. Given that nighttime fears may originate from distorted perceptions and negative thoughts, the game encourages the player to assess the loci of fear from an alternative perspective, revealing their true appearance by applying positive fear coping solutions to avoid attacks and remove obstacles. For example, in the game design, enemies will disappear happily from the map, as soon as the player find the item enemies wanted.

The interface of the game was designed in a way that facilitated rapid mastery gameplay. In addition to incorporating a brief introduction to the gameplay requirements, the design of the interface was designed to be intuitive and clear on what is expected of the player. For example, referring to the method used in the KFQ to indicate the level of fear, in the game, smiling, neutral, and sad faces were used to indicate the player’s remaining energy level (Figure 4).

In order to reward the player for overcoming the obstacles, in addition to finding their parents at the end of the game, a medal is given to the player as they pass each level, to indicate that the protagonist has overcome the fears presented in the corresponding level. It is expected that, by overcoming the fears alongside the protagonist, the player is able to actively engage with and overcome their fears. The final game purpose is to alleviate children’s nighttime fears. Thus, in addition to enhanced motivation to play the game, the player is able to gain a sense of personal accomplishment.

5. CONCLUSIONS

Based on the background study and follow-up research, it was found that children’s nighttime fears are common in the daily lives of children and adolescents, regardless of location. Given that Taiwanese studies on the subject were limited when compared to the range of diverse research conducted around the world, it was deemed necessary to conduct an in-depth exploration of the nighttime fears experienced by Taiwanese children. Using the information collected from the background study and research, the present author designed a game to help children alleviate their nighttime fears, from the perspectives of plot, character, level development, and gameplay interface. The game embedded children’s nighttime fears into the story so that players may learn to overcome them through gameplay. It should be noted that, although the conceptual design of the game was developed for the present study, the game itself is yet to be developed. When the game is developed, a further study will be conducted to test its fear-alleviating effects. It is expected that the findings of this study could serve as a useful source of information for future investigations on children’s nighttime fears.
REFERENCES


Tzu-min Hung, 2011. The Research of Fear Images in Picture Books—An Example from Illustrators’ And Low-grade Students’ Sensation. Department of Visual Arts and Design Master Thesis. Data from: https://hdl.handle.net/11296/vfkjkq


179