

CBT4Depression: A Therapeutic Game

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Abstract: *The purpose of this project is to increase awareness regarding depression among primary school students. Hence, a training module was developed and evaluated whether it can contribute to prove its acceptance level in helping students dealing with depression. At this digital age, game technology has proven could serve as assistive aid in mental health therapy. CBT4Depression is a therapeutic game that was designed and developed as a game based therapy aid that embedded Cognitive Behavior Therapy. The therapeutic game can be used by people who are suffering from mild to moderate depression. Other than that, the contents in CBT4Depression also could help in enhancing awareness regarding depression among primary school students. The RAPID methodology was employed to design and develop the therapeutic game application. CBT4Depression is a useful therapeutic game to increase awareness regarding depression among primary school students. This social innovation project involved 31 students of Year 6 from three schools from Kedah who experienced the CBT4Depression therapeutic game. Through the intervention of the therapeutic game application and its training module, the students are able to learn skills in handling their depression. The findings suggest that majority of the respondent agreed that the CBT4Depression therapeutic game application is usable and suitable in helping them to manage depression in a better way. This CBT4Depression and therapeutic game application is also beneficial for parents and counselors in helping students dealing with their depression.*

Keywords: CBT, Depression, Therapeutic Game

I. INTRODUCTION

Mental health problems among young people in Malaysia are worsening in each year. According to the National Mental Health Survey, the prevalence of mental health illness such as depression, peer problems, and anxiety, among young people aged five to 15 years old is 12.1 percent. The numbers also keep increasing in each year. Among these illnesses, depression is a common and serious illness that could negatively influence how we act, feel and think (Wan Norliza, 2018). Most of people think that only adults may have suffering from depression, but young people including children also have possibility to have depression as well. Hence, it is critical to provide the children relevant skills to manage depression as depression could start at early age (Doherty, Coyle, & Sharry, 2012).

CBT4Depression is a therapeutic game that is designed for young people to help them combat with depression. Through playing with CBT4Depression, young people will learn several important life skills such as problem solving skill, communication and social skill, decision-making skill, and relaxation skill.

These basic life skills is critical in managing the depression. A part of that, the CBT4Depression also could raise awareness among young people since most of them do not have sufficient knowledge about depression.

II. LITERATURE REVIEW

Depression in Children

In Malaysia, the prevalence of mental health problems among children age 5 to 15 was 12.1% as reported in the latest National Health and Morbidity Survey 2015 (Institute for Public Health, 2015). The report also stated that the number of children from rural area is higher compared with those from the urban area. It also indicated that children among Bumiputras' had shown highest prevalence of problems in mental health compared with other ethnic. Types of mental health problems in children include emotional problems, hyperactivity, anxiety, and depression (Wan Norliza, 2018). However, depression is the most-concerned mental health problem that keep rising and expected to be leading cause of disability around the world. In several recent researches, depression already becomes a common disability in children (Ebert et al., 2015)

Depression is different with sadness. The feelings of being down or sad are natural emotions of being a human, especially in children. Normally, the sadness is temporary and lessen with time. Depression is more than just being sad or feeling down, the negative emotions do not fade in short times but linger for weeks, months or maybe years (Poquiz & L.Frazer, 2016). According to Marcus, Yasamy, Ommeren, Chisholm, & Saxena, (2012), depression often started at a young age. In addition, this disorder could decrease people's functioning and often recurring. This is the main reason that make depression is the leading disability in around the world. Children who are experienced with depression could affect theirs' academic performance, physical activities, and peer relationship as well. Any untreated depression, could last for a very long time or may lead to suicide (Mccann, Lubman, & Clark, 2012). Therefore, it is a strong reason to help children with depression. Most of the children that are suffering from depression are not realize they are depressed. Hence, it is important for everyone including children to understand the early signs or symptoms of depression. It is also critical to raise awareness regarding depression and the available treatments to everyone especially children (Mccann et al., 2012). Moreover, it also found that most of the children who suffering from depression do not receive any proper treatment (Ebert et al., 2015).

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People with depression no matter what age group tends to feel guilty and despair, as they always have negative thoughts about themselves (Siaw Leng, Dameaty Hutagalung, & Poh Li, 2017). However, the symptoms of depression among children is quite difference compared to the adolescents and adults. The most common presentation of depression in children listed as follow (Rey, Bella-awusah, & Liu, 2015):

- i) Irritability (temper tantrums, non-compliance)
- ii) Affect is reactive but could be shortly in positive mood in response to positive events
- iii) Frequently comorbid with anxiety, behavior problems, and attention deficit hyperactivity disorder (ADHD)
- iv) Somatic complaints

Cognitive Behaviour Therapy

There are ranges of psychotherapies that are currently available for treating depression in children. However, the most popular therapeutic approach that being implemented by the psychotherapist in treating depression is Cognitive Behaviour Therapy (CBT). The approach is the most widely used and very effective in treating various mental problems such as anxiety, phobia, eating disorder and many more (Doherty, Coyle, & Sharry, 2012; Rennick-Egglestone et al., 2016; Spirito, Esposito-Smythers, Wolff, & Uhl, 2011). As mentioned earlier, people with depression often have negative thoughts and it could lead to the negative reactions or behaviors. CBT could help the individual to recognize his own pattern of negative thoughts, evaluate, and modify the negative thoughts to the more healthy and positive thinking style (Bhat, 2017). Figure 1 describes the process cycle that happen in CBT.

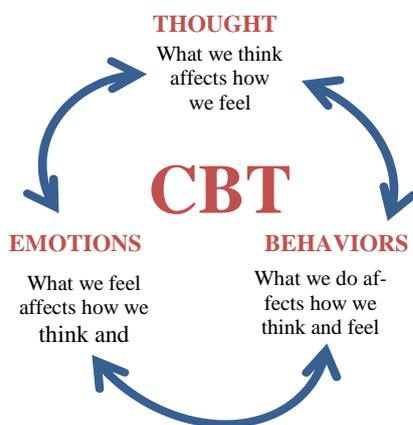


Fig. 1 Cognitive Behaviour Therapy

Although CBT is the most popular treatment for mental health illness including depression, it not quite effective when dealing with children. This is because, engagement to the treatment is the key to the successful outcome. Most of the therapists face difficulty to make children engage to the treatment and communication is the main barrier in this issue (Bennett, Le, Lindahl, Wharton, & Mak, 2017). In addition, children also struggle to express their feeling or thoughts to the therapist. They feel uncomfortable to talk with the strangers about their inner feelings or problems (Bratton, Ray, Rhine, & Jones, 2005).

Hence, that it was very hard for the therapist to gather information during the psychotherapy treatment. Aware with

these limitations, researchers start seeking new alternative to overcome this problem. The growing popularity of digital games in many areas has captured the interest of the researchers to use the technology in psychotherapy (Barnett, Cerin, & Baranowski, 2011; Coyle et al., 2005; Santamaria et al., 2011). Evidently, applying CBT into digital games for therapeutic purpose has shown its effectiveness as proven by Brezinka, (2014) and Merry et al., (2012). Further discussion on using games in psychotherapy were discussed in the following section.

Therapeutic Games in Depression

Nowadays, digital games have been used in various field such as education, simulation, and advertising (Yusof & Rias, 2014). Given the wide popularity of digital games, researchers in healthcare area also start growing interest to utilize the technology in the clinical setting to improve the effectiveness of the treatment (Fleming et al., 2017; Li, Theng, & Foo, 2014; Mader, Levieux, & Natkin, 2016; Yusof & Rias, 2015). The use of digital games not only for depression, but also other health problems such as bulimia nervosa (Fernandez-Aranda et al., 2015), obsessive-compulsive disorder (Brezinka, 2013), eating disorder (Fernández-Aranda et al., 2012) and many more. Hence, it is clearly can see that therapeutic games are very effective to treat various type of illness. It also found that digital game interventions could overcome the barrier in communication, access problems, and enhance engagement in the healthcare mainly for the young patients (Li et al., 2014). Most importantly, the use of digital games in mental health could promote behavior changes among the player (Fleming et al., 2017).

In addition, there also various benefits could be obtained through the digital game intervention in children therapy such as follows:

- i) Could help in building positive relationship between therapist and children (Szczena, Grudzinski, Grudzinski, Mikuszewski, & Debowski, 2011).
- ii) The children can feel more immersed and engaged into the treatment sessions that can facilitate the therapists (Coyle et al., 2005; Horne-Moyer, Moyer, Messer, & Messer, 2014).
- iii) Increased privacy, flexibility and greater convenience to the children (Brezinka, 2014; Stallard, Velleman, & Richardson, 2010).
- iv) Helps therapist to obtain reliable data easily through the game (Clough & Casey, 2011).

The use of therapeutic games in depression has proven it could reducing depression level and increase social support (Li et al., 2014). Psychologists believed that games could act as a new medium to reach and support people who need help in healthcare domain. Hence, children or players could fight depression during the playing and at the same time enjoying the game (Małgorzata & Joanna, 2015). This is how therapeutic game could be a great tool in enhancing engagement and establish therapeutic relationship with the therapist.

Table I show several examples of existing therapeutic games for depression categorized by therapeutic approach and target user.



Based on the table, it can be clearly see that most of the therapeutic games are adopting Cognitive Behaviour Therapy (CBT) as the therapeutic approach.

Hence, it is proven that CBT is the best approach to use in talk based psychotherapy and for developing a therapeutic game as well.

Therapeutic Game	Therapeutic Approach	Age Group	Authors
SPARX	Cognitive Behaviour Therapy	12 to 19	Kuosmanen, Fleming, Newell, & (Barry, 2017)
SPARX-Rainbow	Cognitive Behaviour Therapy	13 to 19	Lucassen et al., (2013)
AThe Journey	Cognitive Behaviour Therapy	13 to 18	Stasiak et al., (2012)
Elude	Psychoeducation	13 to 19	Rusch, (2012)
gNAT Island	Cognitive Behaviour Therapy	11 to 16	Coyle, McGlade, Doherty, & O'Reilly, (2011)
Think Feel Do	Cognitive Behaviour Therapy	11 to 16	(Stallard, Richardson, Velleman, & Attwood, (2011)
Treasure Hunt	Cognitive Behaviour Therapy	8 to 12	Brezinka, (2008)
Personal Investigator	Solution Focused Therapy	10 to 16	Coyle et al., (2005)

III. RESEARCH OBJECTIVE

The objectives of this research are:

- i. To develop a training module to increase awareness among primary school.
- ii. To evaluate the acceptance level of the developed module.
- iii. To increase awareness among primary school students
- iv. To measure the primary school student's level of depression before and after the intervention.

Outcome via CBT4Depressionmobile application and its training module

At the end of the workshop, the developed module could help in:

- i. Decreasing level of depression among the primary school students.
- ii. Increase awareness, knowledge, skill, and changes in the attitude when dealing with the depression.
- iii. Demonstrate a variety of problem solving techniques in dealing with the depression.

IV. RESEARCH METHODOLOGY

The purpose of this project is to assist the Year 6 students to improve their awareness regarding depression. In order to do that, a computer application called CBT4Depression was designed and developed using RPG MARKER as a therapeutic game to increase awareness regarding depression among primary school students especially Year 6 students. The RAPID methodology was employed to design and develop the CBT4Depression therapeutic game. In addition, a training module was also developed and series of workshop was conducted and evaluated whether it can contribute to improve their Year 6 students' awareness regarding depression.

CBT4Depression is a useful therapeutic game to increase awareness regarding depression among primary school students especially Year 6 students. Through the intervention of the therapeutic game and its training module, the students are able to increase their awareness regarding depression and it can motivate the students how to handle their depression well. The findings suggest that all of the respondents agreed CBT4Depression therapeutic game application is usable and suitable in helping them to increase awareness regarding depression.

This CBT4Depression therapeutic game is also beneficial to the to the parents and the counselor to help the students in dealing their depression.

Sample

This social innovation project involves 31 students of Year 6 from three schools from Kedah who experienced the CBT4Depression therapeutic game application. They are all 12 years old and they are homogenous in terms of educational background. They have no knowledge or experience in using the CBT4Depression therapeutic game application to handle depression.

Instruments

The participants were assigned to CBT4Depression therapeutic game application that is aimed to motivate the students to practice and improve their important life skills such as problem solving skill, communication and social skill, decision-making skill, and relaxation skill. The instruments used for this project were a pre-test and a posttest to measure the participants' depression. The test consists of 20 questions which are based on the inventory depression. The respondents were also given an opinion questionnaire after the intervention to evaluate the whether the workshop series has contributed to the objectives. The opinion questionnaire is to know whether the participants think that the CBT4Depression therapeutic game application is usable in helping them to manage the depression in a good way and also to know that CBT4Depression therapeutic game can influence them or not to think positive when they faced with depression.

Project Procedure

The project was conducted in three phases; (1) Requirement gathering, (2) User experience and (3) User evaluation and conclusion.

The first phase contributed to the events that involve planning and developing. The project members carried out literature reviews on the common therapeutic approach that are being implemented by the psychotherapist in treating depression. Consultation with the subject matter experts were also done to further understand the issue.

This then leads to the training module writing and the development of the therapeutic game.

The second phase was user experience session whereby the implementation of the workshops was done. The project was conducted in three workshop series, one for each school.

During the workshop, the students were trained to use the CBT4Depression therapeutic game application using the developed module. Then, the participants were given the pretest questions for fifteen minutes prior to the intervention. Then, they were assigned the CBT4Depression therapeutic game application individually, and they have used the CBT4Depression therapeutic game for one hour to experience the learning content.

Phase three involves user evaluation and conclusion. In this phase, the participants were given fifteen minutes to answer the post-test questions.

In addition, they were given an opinion questionnaire to evaluate whether the participants think that the CBT4Depression therapeutic game application is usable and suitable in helping them to manage the depression in a good way and also do they agree that, CBT4Depression therapeutic game can influence them to think positive when they faced with depression. The data that were collected were then analyzed statistically and the final report was generated. This phase also contributed to the writing of a research paper. Figure 2 illustrated the project procedures.

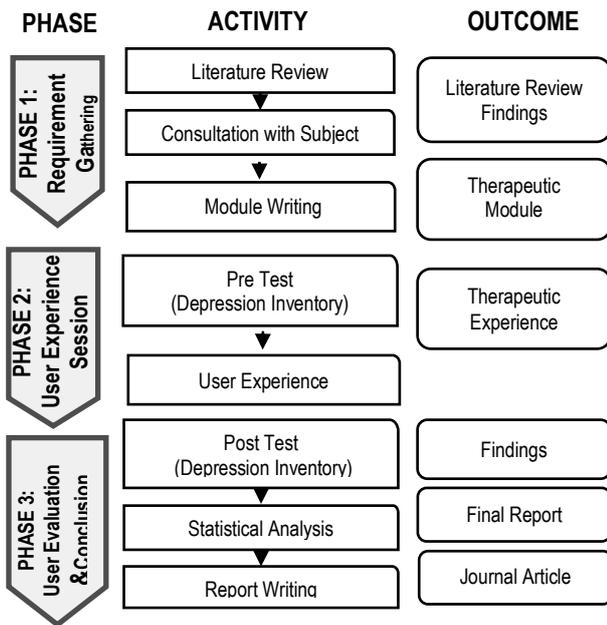


Fig 2. Project Procedure

V. RESULT AND FINDINGS

A sample of 31 students of Year 6 from three schools in Kedah was conveniently chosen to be the participants for this study. They are 12 years old. Table 1 illustrates the descriptive analysis of the respondents' demographic information. The analysis described that 15 female (51.6%) and 16 male (48.4%) students of age 12 were chosen as participants for this project (refer Table 1 and Figure 3). Majority of them are Malay students and only 1 student from Siamese as depicted on Figure 4.

Table. 1 Participants' demographic information

Information	Distribution	Percentage (%)
Gender	Male	16
	Female	15
		51.6
		48.4

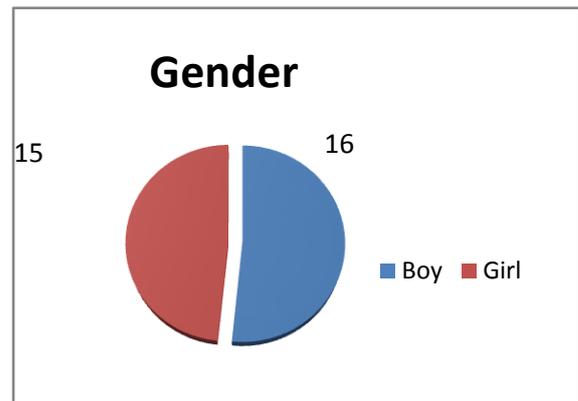


Fig. 3 Participants' demographic information (Gender)

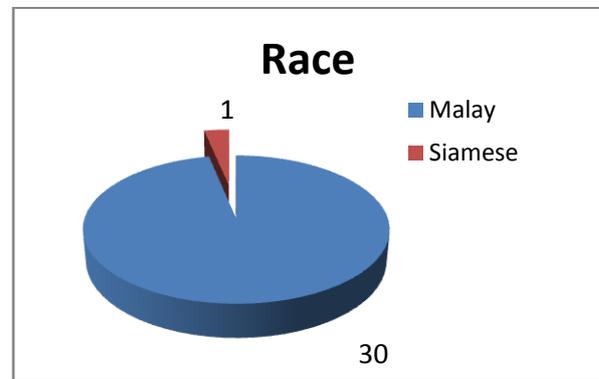


Fig. 4 Participants' demographic information (Race)

Before participants start playing the CBT4Depression therapeutic game application, they were given the pre-test prior to the intervention and the post-test after the intervention. The scores are obtained to measure the level of participant depression. The analyses of the data were carried out through descriptive statistical techniques as depicted in Figure 5.

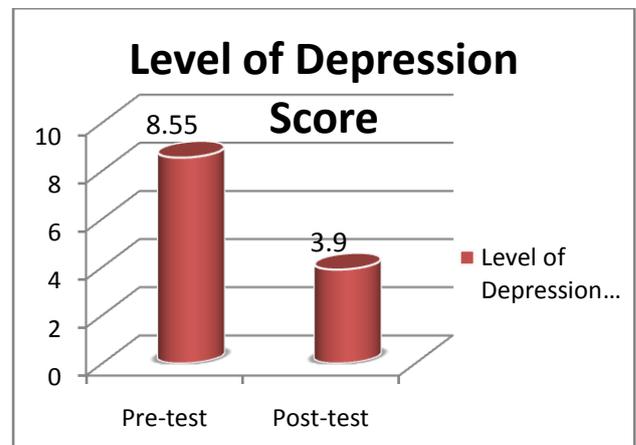


Fig. 5 Average of Pre-test and Post-test score

The findings of the descriptive analysis suggested that the average value for the pre-test scores is 8.55 and the average value for the post-test scores is 3.9 indicating that the students can reduce their stress better during the post-test which is after the CBT4Depression therapeutic game application intervention. It means that, most of the respondents can reduce their stress after playing CBT4Depression therapeutic game application.

After participants were done playing the CBT4Depression therapeutic game application, they were given with a set of questionnaire to be answered. The questionnaire consists of five dimension which are immersion, sensory, usability, challenge and overall engagement. The analyses of the data were carried out through descriptive statistical techniques as depicted in Figure 6.

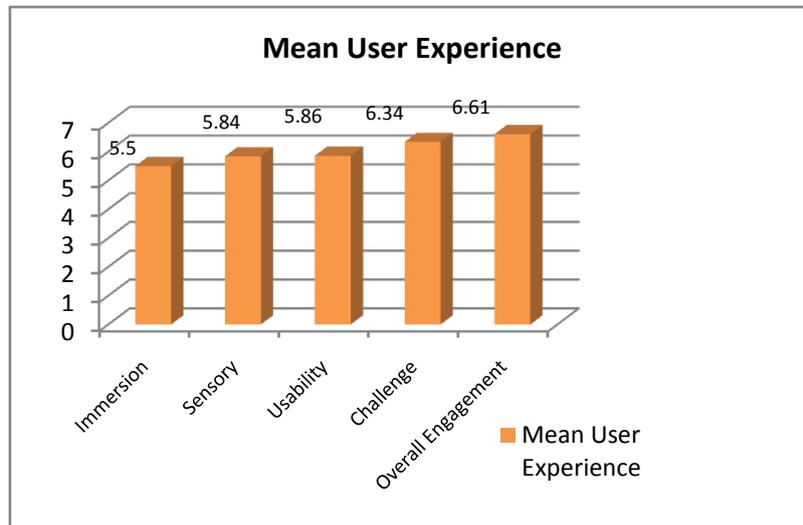


Fig. 6 Participants' mean user experience

The findings show that the mean value for immersion is 8.55, mean value for sensory is 5.84, mean value for usability is 5.86, mean value for challenge is 6.34 and mean value for overall engagement is 6.61 (refer Figure 6). It shows that the CBT4Depression therapeutic game application are interesting in order to help participants in reducing their stress.

This project also examined the user opinion regarding CBT4Depression therapeutic game application. All these aspects are evaluated with 2 scales; yes and no. Figure 7 and Figure 8 describes the descriptive analysis of the response of the participants.

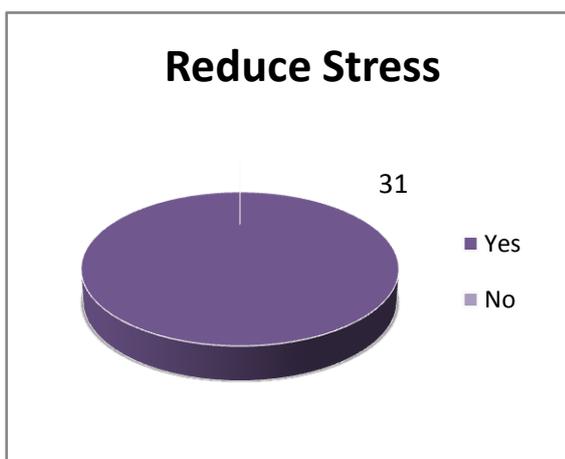


Fig. 7 CBT4Depression could help to reduce stress

From the result, it was found that 100% of participants (31 participants) agreed that CBT4Depression therapeutic game can help them to overcome their stress in an effective way (refer Figure 7).

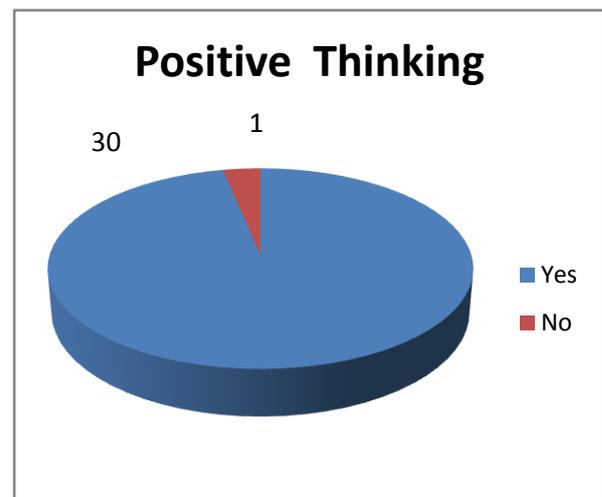


Fig. 8 CBT4Depression could help to think positive when face with depression

In addition, it was found that 96.77% participants (30 participants) also agree that the CBT4Depression therapeutic game could influence them to think positively when facing with the depression (see Figure 8). Moreover, only one participant does not agree with the statement.

Overall, it can be concluded that the participants agreed that after they have experienced the CBT4Depression therapeutic game, their stress were reduce. They have given positive feedback that CBT4Depression therapeutic game can reduce their stress and they were able to think positive when facing with depression. The workshop also has been positively successful in fulfilling the intended outcomes.

VI. CONCLUSION

As a conclusion, it can be concluded that CBT4Depression therapeutic bring benefit not only for Year 6 students but also beneficial to the parents and the counselor to help the students in dealing with their depression. The CBT4Depression therapeutic help participants to handle their depression well and CBT4Depression therapeutic game also influence participants to think positive when they are facing with depression. The CBT4Depression therapeutic game also has been successful in fulfilling the intended outcomes.

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