Psychotherapy Game For Elderly: Observation Experiences Of Psychotherapy Sessions At Rumah Seri Kenangan

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Abstract: Realizing that pharmacological treatments for memory disorder patients are nonetheless costly but also accompanied by high adverse effects, a non-pharmacological treatment via game-based psychotherapy is deemed the safest choice. Game dependent therapy is claimed as a fairly recent, readily embraced, non-pharmacological treatment. To achieve this, a Neuro-therapy game is designed and developed and has been employed in series of psychotherapy sessions at Rumah Seri Kenangan, Bedong, Kedah involving 15 subjects among elderly. Psychotherapy sessions involved game demo, game training, game testing, and brain activity recording via EEG reader. Experiences during the sessions have been observed and recorded. Eight dimensions of observations are skills, gesture, passionate, tactical skills, facial expression, goal-oriented, and IT-literacy. The findings of this observation can be further expanded to design more game-based applications for elderly and consequently can reduce digital gap among elderly.
Keywords: Digital game, digital gap, elderly, memory disorder, psychotherapy

INTRODUCTION

Unequal access to information communications technologies (ICT) either by gender, territory or social class which due to the economic barriers that limit resources and prevent people from obtaining or using newer technologies is not a new issue. The issue always referred as digital divide (digital gap) which means 'the lack of access to communication technology by some people'(Baran & Davis, 2011). One of the factors is the difficulty for rural residents to switch from the traditional media such as television to newer technology such as social networking (Singh & Cullinane, 2010).It has been a convenient day to get a device and internet access, but everyone is moving across the digital gap is experiencing many problems.The key concern is the question of exposure to the mental obstacle, in particular the elderly (Rahaman & Rahaman, 2020). Restricted exposure and poor technology literacy are main factors for preventing older adults from complete participation in the modern environment (Ma & Chan, 2020). This circumstance can be seen in Malaysian community, especially those elderly that have less opportunity to interact with technology. With the elevated number of elderly and the risk of elderly diseases such as memory disorder, the opportunity for them to interact with technology is much lower.

In 2005, the figure of citizens with memory disorder in Malaysia, a high middle-income nation in the World Bank was reported at 63,000 with 20,100 cases of incidents each year. By 2020, it is expected to rise to 126 thousands with 39 thousands events annually (Akter et al., 2012). Additionally, by 2040, Malaysia has an ageing demographic of 15 per cent predicted

to be 65 years of age or older (Department of Statistics Malaysia, 2017). This age group has high probability of being associated with memory disorder issues. Dementia is among a popular problem that has been diagnosed for this age group. Dementia treatment encompasses both pharmacological and non-pharmacological interventions. The pharmacological treatments available are nonetheless costly but also accompanied by high adverse effects (Kavirajan & Schneider, 2007). Non-pharmacological, person-centered approaches is deemed the safest choice. Game dependent therapy is a fairly recent, readily embraced, non-pharmacological treatment (Zheng et al., 2017).

Elderly citizens are gradually embracing technology such as computers, the internet and mobile media, according to Duh (2010). Mobile apps are, thus, rapidly becoming personal objects for them (Duh et al., 2010). Hence, adding games on appropriate mobile devices would enable them on play games that will help develop their health - care and neurological reflexes. Rautenberg (2004) notes that film technology has beneficial impacts on human behaviour, such as: capacity to read, healthy social contact and healthcare (Chin et al., 2018; Rauterberg, 2004). A digital divide persists, given the improved convenience of utilizing electronic tools for older adults.

Recent decades have witnessed a dramatic growth in technological use in programs intended to enhance a variety of elderly-age roles. Digital games are used as an alternative to conventional therapy, since they are simple to access and convenient to communicate with patients (Benveniste et al., 2010). Another technical care approach is more compelling because of its ease of usage and usability, like a mobile computer (Cardullo et al., 2016; Costa et al., 2016; Xenakidis et al., 2014) since older people have poor comprehension and cognitive function (Pyae et al., 2016). Notwithstanding the effectiveness, one of the key problems of approaches is the ability of older adults to interact with the relevant technologies.

This papercovers the concept of psychotherapy game aimed at slowing the cognitive activity of older people, as well as evaluating the elderly 's perception of acceptability and awareness with digitized gaming technology.

RELATED WORKS

Digital games implemented in intervention for elderly-related diseases can be seen as an effort to close the digital divide as well as to provide opportunity for the elderly not to be left behind by the technology. At the same time, game-basedintervention have proven to have important benefits in enhancing care commitment and effectiveness in the areas of safety (Li, 2014). The versatility of immediate delivery, the broader spectrum of advantages and the importance of recovery indicate that game-based therapy is one of the most successful strategies for providing non-pharmacological care to people with memory-related disorders.There are several digital games that have been developed to encounter memory-related disorders issues including board games, video games and exergames.

With the advent of video games in the context of technology and acceptance of technology, models exist to help direct intervention linked to factors that affect the desire of older adults to use interactive game-based interventions (Boot et al., 2016). Cohen, Firth, Biddle, Lloyd Lewis and Simmens (2009)introduced game therapy *Making Memories Together*specifically for Alzheimer diseases (AD) patients that helps to facilitate contact with patients and caregivers or family members.It is observed that presence of family members or caregiver are

required as patients tend to agitate and feel discomfort while playing the game due to digital gap.

In 2011, Yamaguchi, Maki and Takahashi conducted experiments on online sports-games for patients with dementia including the upper limb and lower limb activity. This exergame allows patients to treat music and sensors and the experiments have been carried out for three months. (Yamaguchi et al., 2011). In the meantime, Venturelli and collaborators were working with another exergame relating ball games to the effect on patients developing dementia. Patients are told to throw and grab ball with their palms, strike and avoid ball with their feet. The results afterwards are convincing, and the experimental group shows major improvements in cognitive performance (Venturelli et al., 2012). However, both studies require vigorous physical movements which do not suits the elderly capabilities and receiving complaints from patients during the test.

Another experimentwhich combined two games (Jigsaw Puzzle and Flashcards) were administered for eight weeks showed a great progress in their remembrances with limited groups of participants, offering further degrees of difficulty to enhance cognitive flexibility, use tablet with wider display for clearer image, including guidance with sounds for better comprehension and use animation for more attractive and effective games(Hashim et al., 2015).The evaluation observation shows that the person seemed happy with the use of the smartphone and wanted to know how to do it. This work further indicates the individual was able to grasp how the program functions because of the application's user-friendly and error-free nature. Unfortunately, there is a concern with the mobile screen's limited scale, because the customer has a concern with her visual acuity.

A qualitative research conducted by Chin, Lim and Lee (2018) to analyze elderly people 's confidence and acceptance levels in mobile digital Bingo games shows an elderly friendly mobile game to motivate elderly mobile gaming engagement. Although, Bingo game is far less important to their daily activities and they had trouble understanding and relating the directions for completing the game(Chin et al., 2018).It is proposed that the game design will include material for reminiscence purposes related to the everyday events or life of the elderly.

NEURO-THERAPY GAME FOR EDERLY

A psychotherapy game has been specifically developed for elderly with memory disorder issues namely Neuro-Therapy. The specification of the game is based on the defined criteria by ChePa et al.(2020). This game is a customizable puzzle game which allow user to play from 2x2 puzzle up to 5x5 puzzle, which encourage player to memorize the picture with the aim to help in enhancing the player's memories. The game is also designed to have different theme of pictures which allow the user to choose their favorite picture to be played on and constantly engage with the game. The game is designed using simple interface that is easy for interaction with elderly as well as with good visual effect by utilizing tablet instead of mobile phone. Tablet has larger layout and ease to the eyes compared to mobile phone. The main objective of this Neuro-therapygame is to allow the elderly to enhance their memory with enjoyment, consequently can reduce the digital gap.

A simple interface of the game is specifically designed to match the target audience, who are the elderly. Elderly usuallyhave difficulty to discern the limits and borders of points on a surface, which lose their sense of distance. For contrast, elderly with vision loss sometimes

lack the ability to discern correctly the picture and context on which it is represented and find it extremely difficult to identify information when focusing at dark objects or locations (Sie-yi & Chepa, 2020). Thus, mono-color (green) setting is implemented in the interface of this game which is friendly towards elderly. Interfaces of Neuro-therapy game are illustrated in Figure 1.

(a) Bilingual simple interface (English and Malay version)

(b) Hint   (c) Rewards upon completion

Figure 1. Interfaces of Neuro-therapy game

In Neuro-therapy game, single interface is used where all the buttons and functions are easy to find. Another essential factor that could undermine consumer engagement is the usage of languages that users do not recognize (Sie-yi & Chepa, 2020). Thus, bilingual (English and Malay) that the subjects understand is used in the game as shown in figure 1(a). In addition to changing the font size, name patterns and symbols, responsiveness checks and trying to simplify activities such as inputting text or pressing virtual buttons can help to avoid game misunderstanding and minimize annoyance rates for older users(Chin et al., 2018).

Within the sense of task performance, people get nervous when one's ability becomes too small and a mission too challenging. When the job is too simple and the capacity is too small, then people get bored (Sie-yi & Chepa, 2020). For the possibility of playing game in recovery games for memory loss patients, participation in Neuro-Therapy game is complexity or competition choices to be expanded slowly and not at a large pace. This can be seen in the game interfaces (Figure 1) as there are four different level of puzzles (2x2, 3x3, 4 x4, and 5x5 puzzles).

Neuro-therapy game is incorporated with hint and rewards as shown in Figure 1(b) and Figure 1(c). For the game to be helpful, *Help* should be prompted consistently (Sie-yi &

Chepa, 2020) or hint should be provided when user experience difficultiesin order to keep them in the game. Meanwhile, provide bonuses when the player has reached one stage will improve their motivation(Lithoxoidou et al., 2018; Orji et al., 2017). Both elements which are essential to keep user engage in the game are provided in Neuro-therapy game.

METHODOLOGY

The whole study is aiming to investigate a game-based psychotherapy intervention model by employing neurofeedback approach.In the first phase, a psychotherapy game is designed and developed according to game criteria that suits the targeted user and named as a Neuro-therapy game(ChePa et al., 2020).Consequently, a game-based model is designed and developed. To evaluate the model, series of psychotherapy experimentsare conducted by utilizing the Neuro-therapy game and neurofeedback approach. This article will be focusing on the experiences of conducting psychotherapy sessions and the findings discovered through interview and observations during the experiments. Figure 2 shows the overall flow of the study by focusing on psychotherapy experiments that have been conducted aforementioned.
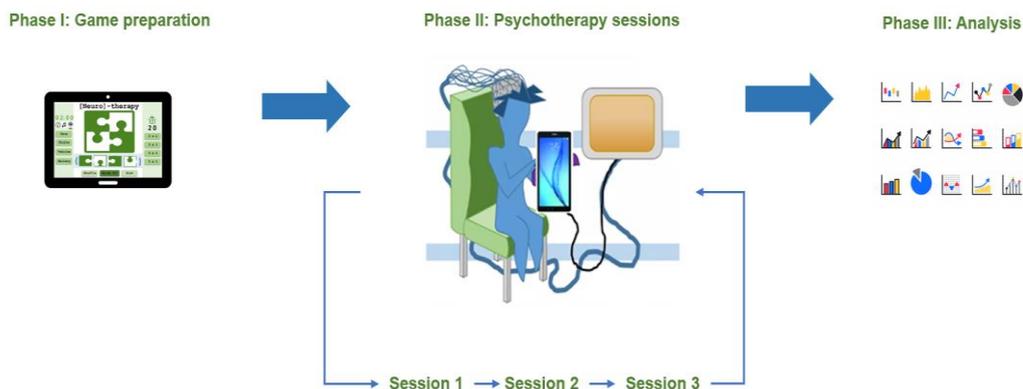

Figure 2. The setting of psychotherapy experiment

Experimental Subjects and Procedure

This is an experimental study conducted for three series of experiments from March 11 to June 17, 2020 at Rumah Seri Kenangan (RSK) Bedong, Kedah involving its residents. The criteria for selecting the participants include; aged more than 60, and showing early symptoms of memory disorder. For experiment purposes, 15 elderly fit the criteria and volunteered to participate in the experiments. All volunteers subsequently participated in the intervention of this group on the basis of our inclusion criteria, but five of them failed to complete the psychotherapy experiments because of the time commitment involved.The research was conducted with results by a final sample of 10 participants (five males, five females). The criteria for inclusion are to be age 60 years or above, have regular or corrected-to-standard vision and hearing, and be able to obey test directions.The subjects comprise of different races which are Malay, Chinese and Indian with different background and all of them are local resident who stayed in care-center of RSK.

Prior the experiment, subjects are required to put on EEG reader device to record the brain signal while playing Neuro-therapy game. The recorded brain signal data is then being analyzed to evaluate the proposed model. However, the analysis of the brain signal is beyond the coverage of this article. Testing and training took place in a set up room where all the subjects are gathered. A session of game demonstration has been conducted prior to the experiment. Four tablets with installed Neuro-Therapy were distributed to train all subjects on how to play the game. The pre-training sessions were then followed by training sessions where all the subjects are allowed to play with the games at leisurely in the room. Subjects are observed during the pre-training and training sessions to be compared during testing sessions. Testing sessions have been conducted three times within 14 weeks. The first testing session is conducted and observed one by one right after the last training. Figure 3 shows the momentsof psychotherapy experiment sessions.

(a)   (b)

(c)   (d)

Figure 3. Psychotherapy experiment sessions

During the sessions, subjects are requested to complete the task of intervention from the easiest level (2x2 puzzle) to the next level (3x3 puzzle) at minimum. Subjects are allowed to challenge themselves with harder level (4x4 puzzle and above) as per request. After the first testing session, subjects completed 12 weeks post-training session during Restriction of Movement Order (MCO) that had been announced on 16 March 2020 by Prime Minister of Malaysia due to outbreak of COVID-19 (Ministry of Foreign Affairs of Malaysia, 2020). Second testing session was conducted on week 13th, meanwhile the last testing session was

conducted on week 14th and all subjects are observed for each session while completing the task one by one.Their experiences of the game will be discussed in the next section.

RESULTS AND DISCUSSION

This article focuses on the observational study of elderly's acceptance towards digital technology during psychotherapy intervention that involved in the second phase of the study. The observed results are categorized into seven aspects; skills, gesture, passionate, tactical skills, facial expression, goal-oriented, and IT-literacyas shown in Figure 4.
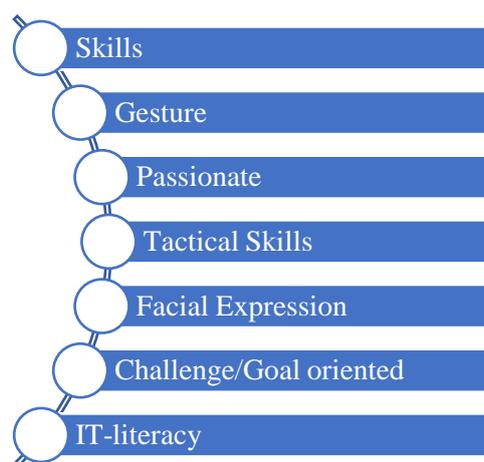
Skills

Gesture

Passionate

Tactical Skills

Facial Expression

Challenge/Goal oriented

IT-literacy

Figure 4. Observation Aspects

Skills and gesture

Subjects are mainly the elders whoresiding at the care-center who have less opportunity to access to technology devices. Most of them are still using old school phone which they are familiar with and some even do not possess any phone. The moment our team introduced the digitized game to them during pre-training sessions, they are showing resistance towards touching the tablet. Some subjects are afraid as they are inexperienced with the technology. Our member attended them by holding their hands in order to guide the subjects to handle the tablet with skills. Their hands are stiff, shaking and tend to touch the surface of the tablet with their palm instead of one fingertip during the first session as can be seen in figure 3(a). However, during the second and third sessions of testing, the subjects are able to handle the tablet smoothly even scrolling through the table on other applications. This observation implies that the skills and gesture of handling technology are improved.

Passions

Through observation, subjects show passions towards the psychotherapy intervention.During the second sessions of testing, subjects came earlier to the set up room and waited for our arrival. It is also observed that subjects requested for new pictures for the puzzle to be installed in the tablet. We have been informed that subjects have been playing the games for numerous of times. They are also excited to volunteer themselves to be the first in the experiment. Subjects are also exhibit strong perceived focus when playing the psychotherapy game as can be seen in Figure 3(b).

Tactical skills

During the sessions, it is observed that subjects tend to solve the puzzle by just simply put the pieces in any place to try out their luck at the first testing session. After post-training, subjects show significant improvement by solving the puzzle with tactic learnt during their leisure trainings. Subjects were first looking for the edge pieces and then look for the side pieces (Figure 3(c)). By this implementing this tactic, subjects are able to solve the puzzle within shorter time.

Facial expression

The game is designed by incorporating rewards when players can assemble the puzzle successfully. Subjects' happiness can be observed through their facial expression. It is observed that subjects smile whenever they correctly put a piece of puzzle. It is also can be seen that subjects frown when they took longer time to solve the puzzle. However, the moment subjects completed one puzzle, subjects laugh happily and cheer for their winning. Subjects also sharing their joy to our member by telling us they have successfully complete the task especially the hard level. This observation implies that the psychotherapy game is able to contribute to their emotional state in terms of enjoyment.

Challenge and goal oriented

From our observations, some subjects are goal-oriented. Task during the psychotherapy experiment is to complete the first two level (2x2 and 3x3 puzzle). However, it is observed that the subjectsare willing to challenge themselves with the hardest level (5x5) as can be seen in Figure 3(d). Another subject who shows higher motivation is observed to skip the easy level of the game and tend to start with the hard level.

IT literacy

This study provides opportunities to the subjects to access to the technology they never get the chance previously. Other elderly in RSK are welcomed to utilize the device (tablets) that have been provided by our team to RSK. According to the therapist at RSK, subjects and other elderlywent to the therapy room to play the game almost every day. They are willing to wait for their turn to play the Neuro-therapy game. It can be seen that this study contributed to the IT-literacy for the elders, and consequently the digital divide among elderly can be reduced.

CONCLUSION

Game-based psychotherapy sessionshave been successfully conducted at Rumah Seri Kenangan, Bedong Kedah. Although the main aim was to evaluate the proposed game-based psychotherapy model, but there are other interesting findings have been discovered during the sessions. Besides the acceptance of the proposed Neuro-therapy game, perceptions on the utilization of technology among elderly have been observed and recorded.

These experiences and discovery can be further expanded in creating more game-based applications for elderly with the aim to delay the process of losing memory and consequently can reduce the digital gap among elderly. This study justify future to focus more on the technology acceptance on elderly with other diseases in many ways that the technology will be able to aid the elderly as well as improve their quality of life.

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