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The Impact of Music Games on the Social Interaction of Elderly Occupants in the Communal Room of a Nursing Home

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Abstract

Being elderly is a stage of life characterized by physiological, psychological and social maturity, and degradation. Initial observation has revealed that the elderly rarely interact with other elderly people in communal rooms and activities. Furthermore, they tend to enjoy activities related to music the most. The presence of a stimulus based on hobbies in a communal room through a music game was expected to revitalize spatial function and increase the elderly's life quality. The purpose of this study was to analyze the impact of a music game and identify the elements thereof, which can influence the elderly's social interaction in a communal room. A quasi experiment was employed and the results were analyzed using Wilcoxon Signed Rank statistics test. The results revealed that communal rooms can function as social space by implementing a music game. Music has an impact on the elderly's social interaction in relation to the time they wish to play, their willingness to invite other elderly people, the type of social contact, duration of interaction, and the number of participants. The choice of a video clip game is an element of a music game, which had a dominant effect on their social interaction in comparison to the choice of singers' pictures and lyrics of notes games.

Pengaruh Music Game terhadap Interaksi Sosial Penghuni Lanjut Usia di Ruang Berkumpul Panti Jompo

Abstrak

Lansia merupakan tahap dimana seseorang telah mengalami kematangan dan kemunduran dari aspek fisiologis, psikologis, dan sosial. Berdasarkan observasi awal diketahui bahwa lansia jarang berinteraksi dengan lansia lainnya di ruang berkumpul dan kegiatan yang paling disenangi oleh lansia adalah kegiatan terkait dengan musik. Kehadiran stimulus yang didasari oleh hobi di ruang berkumpul melalui music game diharapkan dapat menghidupkan kembali fungsi ruang dan meningkatkan kualitas hidup lansia. Penelitian ini bertujuan untuk menganalisis pengaruh music game dan mengetahui unsur-unsur dari music game yang dapat mempengaruhi interaksi sosial lansia di ruang berkumpul panti jompo. Metode penelitian menggunakan quasi eksperimen dan kemudian dianalisis menggunakan uji statistik Wilcoxon Signed Rank test. Hasil penelitian menunjukkan bahwa ruang berkumpul dapat berfungsi kembali sebagai ruang sosial dengan menghadirkan music game. Kehadiran music game berpengaruh terhadap interaksi sosial lansia berupa waktu keinginan bermain, keinginan mengajak lansia lainnya, jenis kontak sosial, durasi berinteraksi, dan jumlah partisipan. Pilihan permainan video klip merupakan unsur di dalam music game yang memiliki pengaruh lebih dominan terhadap interaksi sosial lansia dibandingkan pilihan permainan foto penyanyi dan nada lirik.

Keywords: communal room, elderly person, music game, social interaction

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1. Introduction

Being old is a stage of life characterized by physiological, psychological and social maturity, and degradation.

According to Maryam, Ekasari, Rosidawati, Jubaedi, and Batubara (2008), there are several theories on aging experienced by humans; an example is the theory of psychology. Changes in psychological functioning

experienced with age are closely related to mental and other functional aspects. Decreased intellectuality experienced by the elderly including perception, cognitive ability, memory, and learning may result in the elderly experiencing difficulties comprehending and interacting.

An increase in the population of the elderly in developing countries especially in Indonesia is a result of Indonesians' increased life expectancy. Consequently, the government and related parties have been expected to play a role in increasing the elderly's quality of life to ensure they do not become a burden to society, but are able to perform all their activities independently. Furthermore, special attention to meet their necessities is required. However, the provision of facilities for elderly people remains very limited in their own homes as well as public places.

Panti Sosial Tresna Werdha (PSTW) is a special services unit for the elderly. Its purpose and function is to provide services and social protection as regulated in Law no. 13 of 1998 on elderly social welfare. PSTW still fulfills social needs in general at a certain place and time. Besides the routines, which have been determined and scheduled by the management of the nursing home, the elderly often do not engage in activities. Consequently, they do not enjoy much social contact and often feel alone. The social isolation experienced by the elderly may cause depression, loneliness, and/or other social and cognitive impairments (Theodore, 2017). The connection between aging and loss of social contact has a negative effect. Consequently, the prevention of social isolation has become an important priority in the lives of the elderly. Previous interviews on free time activities revealed the elderly desire to engage in activities that make them happy and active; examples include hobbies such as listening to music, watching television, reading books, gardening, and playing sport.

Based on data from initial observations, 71% of the elderly want activities related to music. Although music has become one of the most important aspects of our daily life, the impact it has on a person's quality of life is underestimated. Hays and Minichiello (2005) found that music is a source of entertainment, which allows people to share and connect their lives with others. It also connects past events and periods such as childhood, family, school, romance, and friendship. Music also helps one manage time and is instrumental in creating friendships. Furthermore, music is used in nonverbal communication like clapping, stomping, and swaying one's head and body. It has also been shown to decrease the elderly's shyness when interacting with others and increases their self-confidence (Erwin, 2013).

A music game is a stimulus that can trigger human interaction. Everyone needs a sensory stimulus to understand the environment. The only way to obtain

information perceived by the brain is through vision, sound, touch, taste, smell, and movement (Jakob, Collier, & Book, 2015). Through stimuli in the form of music games, vision and hearing are stimulated in their adaptation to the presence of a stimulus. The elements of music that become stimuli are closely related to sensing. The elderly explore their sensory abilities through vision, sound, and movement. Photographs, videos, and audios can be employed to trigger the elderly's past memories and generate interaction with others. Jakob et al. (2015) revealed that classical music, music from a certain era, and/or personal music preferences can stimulate cognition and memory. The lyrics of music may result in opportunities to express opinions about the lyrics or the message conveyed. Consequently, it may be the most optimal way to interact with others and improve social skills (Erwin, 2013).

A consideration of this background motivated the author to conduct a study on the elderly's involvement in activities based on their hobbies through a music game. The latter became a stimulus to ensure the function of communal room as a space for socializing could be re-functional and increase the elderly's quality of life. The study attempted to answer two questions. First, what is the impact of a music game on the social interaction of elderly people in the communal room of a nursing home? Second, what elements in a music game affect the elderly's social interaction in the communal room of a nursing home? It is hoped that the findings will increase knowledge and awareness of the way old people act and how they are affected by the spatial characteristics of their place of living. Accordingly, it is hoped that cognizance of the elderly's experience and perception of space will be taken into account when designing rooms for them.

2. Methods

In this study, both quantitative and qualitative approaches were employed and a quasi experiment was conducted. The quantitative approach was used to determine the elderly's perception of the music game and their social interaction; participants completed a questionnaire to assess their social contact and interactions. The qualitative approach comprised direct observation to explore the other forms of social interaction the participants engaged in that were not assessed by the questionnaire as well as to support the results of the questionnaire.

Variables. The independent variables included elements of the music game, namely, singers' photographs, notes, lyrics, and video clips. In the music game the participants guessed song titles and names of singers in an effort to increase social interaction. The songs in the game included popular songs of the 1980s. The three categories categories in the game, which included national and

local/regional categories, depended on the independent variables of the study. The dependent variables were game perception and social interaction. Game perception may be defined as the elderly’s response to the music game. Social interaction comprised the action and/or verbal and non-verbal communication conducted by each individual while playing the music.

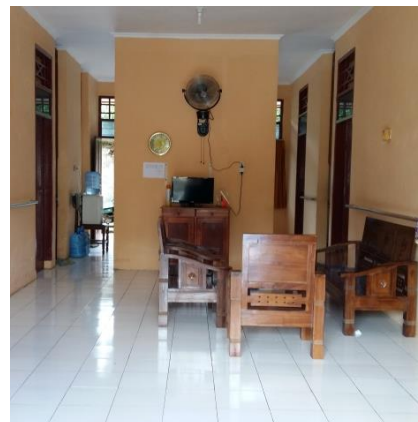
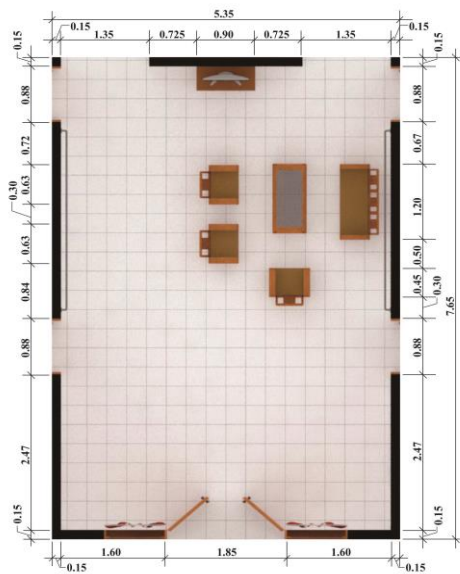
The control variable was the time the study was conducted, namely, 15:30 WITA; this time was chosen because it had been observed that the elderly were not

engaged in any activities at this time. The game was played in the communal room for 20 minutes.

Participants. The participants included 84 elderly people (29 males and 55 females) in PSTW Gau Mabaji Makassar. They were divided into three groups, namely, junior elderly, middle elderly, and senior elderly who were 60-69, 70-79, and over 80 years of age, respectively. There were 19, 35 and 30 participants in the junior elderly, middle elderly, and senior elderly groups, respectively.

Table 1. Characteristics of the elderly: Dormitory, sex, and age category in PSTW Gau Mabaji Makassar

| No | Dormitory | Type of Layout | Number of Elderly (Person) | Gender | Age | | |
|-------|--------------|----------------|----------------------------|-----------------|----------------------------------|----------------------------------|-------------------------------|
| | | | | | Junior Elderly (60-69 years old) | Middle Elderly (70-79 years old) | Senior Elderly (80 and above) |
| 1 | Dormitory 1 | Type A | 5 | Female | - | 4 | 1 |
| 2 | Dormitory 2 | Type A | 5 | Female | - | 3 | 2 |
| 3 | Dormitory 3 | Type B | 7 | Female | 1 | 3 | 3 |
| 4 | Dormitory 4 | Type B | 6 | Female | 3 | 1 | 2 |
| 5 | Dormitory 5 | Type B | 8 | Female | 2 | 5 | 1 |
| 6 | Dormitory 6 | Type C | 7 | Male and Female | 1 | 4 | 2 |
| 7 | Dormitory 7 | Type C | 10 | Male | 4 | 4 | 2 |
| 8 | Dormitory 8 | Type C | 6 | Female | 2 | 2 | 2 |
| 9 | Dormitory 9 | Type C | 6 | Female | - | 2 | 4 |
| 10 | Dormitory 10 | Type C | 7 | Female | 2 | 2 | 3 |
| 11 | Dormitory 11 | Type C | 6 | Male | 2 | 3 | 1 |
| 12 | Dormitory 12 | Type D | 7 | Male | 1 | 2 | 4 |
| 13 | Dormitory 13 | Type D | 4 | Male and Female | 1 | - | 3 |
| Total | | | 84 | | 19 | 35 | 30 |



(a)

(b)

Figure 1. (a) Plan and (b) existing condition of communal room in PSTW Gau Mabaji dormitory

Purposive sampling was used. The characteristics of the participants are presented in Table 1. The sample comprised 55% male and 45% female. Furthermore, 25%, 45% and 30% of the sample were classified as junior elderly, middle elderly, and senior elderly, respectively. In relation to their highest educational level, 30% had completed elementary school. Although the participants' length of stay at the nursing home varied between one month and 19 years, the majority had been at the home between one month and three years.

Object of Research. The study was conducted at PSTW Gau Mabaji. The home has four different types of dormitories: Type A (dormitories 1 and 2), type B (dormitories 3, 4, and 5), type C (dormitories 6, 7, 8, 9, 10, and 11), and type D (dormitories 12 and 13). A consideration of the sample revealed type C contained a variety of elderly people (gender and age). Therefore, dormitories 6, 10, and 11 were used; a total of 20 participants. The focus of the study was the communal room used by the elderly to socialize with other elderly people. The area of the room was approximately 40 m² and its interior elements such as the arrangement of chairs and a table were arranged in the form of a sociopetal. There was also a television rack (see Fig. 1).

Experiment Stimulus. The stimulus used in the experiment was developed by employing Adobe Flash Professional CS6 software to create the game application. Music from the 1980s was chosen because it was believed many of the elderly would have many memories of and be familiar with this music.

Photos of singers. For this stimulus, photographs of two categories of singers' faces were shown to the participants. Furthermore, the national category comprised 20 questions and the local category, 13 questions (see Fig. 2).

Notes and lyrics. This stimulus comprised notes and lyrics that were played to the participants without any visuals. Once again, the national and local categories comprised 20 and 13 questions, respectively (see Fig. 3).

Video clips. This stimulus comprised a video clip display equipped with song lyrics. Once again, the national and local categories comprised 20 and 13 questions, respectively (see Fig. 4).



Figure 2. Display of user interface of singers' photographs for the national (a) and local (b) categories.



Figure 3. Display of user interface of notes and lyrics for the national (a) and local (b) categories.



Figure 4. Display of video clip user interface of the national (a) and local (b) categories.

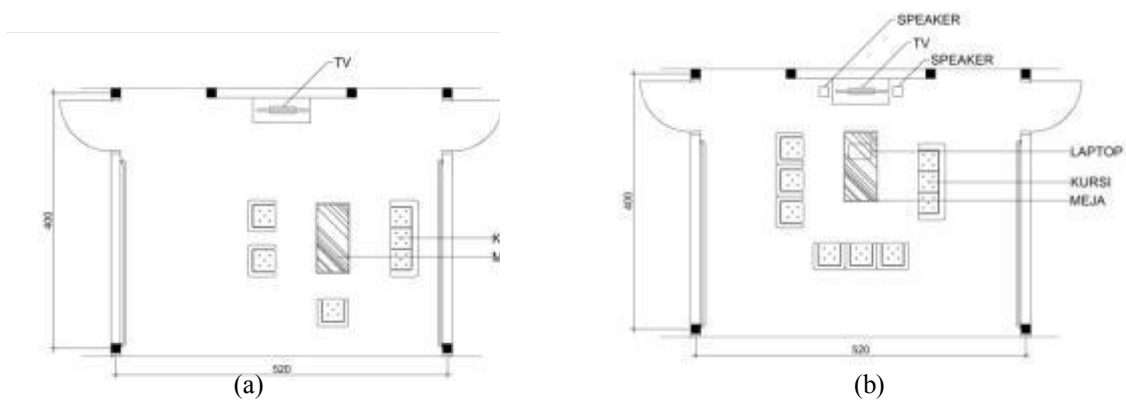


Figure 5. Communal room: (a) condition 1 and (b) condition 2 in a PSTW Gau Mabaji dormitory

Experiment Measuring Tool. The measuring tools comprised a questionnaire and direct observation. A five-point Likert scale was used in the questionnaire to assess game perception and social interaction. Game perception was discernible in the following aspects: duration of game, perception of happiness, willingness to play again, showing interest, frequency of playing, preference shown for options of games, and ease in using equipment and answering questions.

Social interaction can be assessed from social relations, social contact, and the number of participants (Bowling, 1991; Hughes, Waite, Hawkey, & Cacioppo, 2004). The variable of social interaction related to the number of participants and behavior of elderly people was measured through observation; verbal and non-verbal communication was recorded. The following forms of social interaction were assessed: eye contact, body orientation, gestures, physical contact, proximity, and dialogues (Mehrabian & Russell, 1974).

Experiment Equipment. The equipment used during the experiment (Fig 5) is as follows: (1) A communal room in

a nursing home; (2) SONY LED TV 32; (3) Joystick, hub 4-Port USB 2.0, and USB extender cable; (4) ASUS X450J Notebook and Adobe Flash Professional CS6 software; and (5) Sony NEX-5N camera.

Procedure. 1. The experiment was conducted in the communal room, which is often used by the elderly to socialize with others. The experiment was conducted at 15:30 WITA for 20 minutes. The participants included 20 of the elderly residents at the nursing home. The experiment comprised two conditions. In the first condition, the participants did not participate in the music game. The researcher observed the participants' social interaction directly. Subsequently, they answered questionnaires. 2. After observing condition 1, the elderly were notified about the schedule for music games. Their reactions were observed. At the same time on a different day, the second condition was implemented, namely, the music game. The tools for the game and procedure to be followed were explained. After the game had been played, the participants completed the questionnaires. As noted previously, the experiment was conducted in the communal room of three dormitories.

Data Analysis. The questionnaires were analyzed by using SPSS software. Furthermore, the data from the observations were also analyzed. Forms of interaction were noted from three videos in the three dormitories. This data were used to substantiate the data obtained through the questionnaires. The following statistical analyses were conducted: 1. Calculation of frequency distribution, mean value and standard deviation (SD). 2. Wilcoxon Signed Rank Statistics test to compare mean value of data variables of ordinals between and after the given stimulus in the form of music games. 3. The test results were deemed significant if the value of $p < 0.05$.

3. Results

Perceptions of music games and social interactions were tested for validity and reliability. Cronbach's Alpha revealed the reliability test of the perception of music game = 0.640 (see Table 2). Consequently, it can be concluded the questions that assessed perceptions of music game were valid (>60%).

Table 2. The reliability of questions on the perception of music games

| Cronbach's Alpha | Cronbach's Alpha Based on Standardized Items | N of Items |
|------------------|--|------------|
| 0.640 | 0.386 | 10 |

According to the Corrected Item-Total Correlation and Cronbach's Alpha, if items are deleted then all the perception questions of the music game are reliable. The questions about the preference levels of games regarding photographs of the singers, and the notes and lyrics would have the value of Cronbach's Alpha if the items deleted were <0.60, namely, 0.430 and 0.557. In addition, the questions on the level of ease in using equipment and answering questions had the value of Cronbach's Alpha if items deleted were <0.60, namely, 0.512. It indicates that question items were not reliable when if the question items were omitted, it would not affect the perception of music games. Therefore, the question could not be used to obtain valid data. These questions were measured through direct observation and in-depth interviews.

Table 3. Reliability of questions on social interaction

| Cronbach's Alpha | Cronbach's Alpha Based on Standardized Items | N of Items |
|------------------|--|------------|
| 0.723 | 0.757 | 14 |

Cronbach's Alpha revealed the reliability of the questions on social interaction was 0.723 (See Table 3). Thus, it may be concluded the questions on social interaction were valid ($\geq 60\%$).

According to the Corrected Item-Total Correlation and Cronbach's Alpha, if questions were deleted, then all the social interaction questions were reliable. All question items have Cronbach's Alpha if item deleted above 0.60.

Therefore, it can be concluded that most of the questions about the perception of the game music were valid and reliable. Furthermore, the social interaction questions were valid and reliable.

Most of the elderly (55%) felt happy with playing the music game. Furthermore, 55% wanted to play the music game again. The majority (50%) preferred to play the video clips rather the games with singers' photographs, and notes and lyrics.

According to the results of Wilcoxon Signed Rank Statistics test, there was a significant increase on all variables of social interaction after the music game in the communal room of the nursing home in comparison to the levels before the game. The elderly's levels of willingness to interact with other elderly people in the morning, at noon, in the afternoon, and at night increased significantly from 3.4 to 4 ($p=0.005$), 2.6 to 3.1 ($p=0.003$), 3.9 to 4.7 ($p=0.001$), and 2.7 to 3.4 ($p=0.003$).

Furthermore, the elderly's desire to interact with other elderly people during the day, their willingness to invite other people and the elderly from different dormitories, and being asked by other people to interact also increased significantly from 3.7 to 4.3 ($p=0.008$), 3.3 to 4.3 ($p=0.000$), 2.7 to 3.9 ($p=0.000$), and 3.4 to 4.4 ($p=0.003$). In relation to social contact, their willingness to invite just a friend to interact and the duration thereof, and their willingness to invite close friends to interact and the duration increased significantly after the music game from 2.7 to 3.7 ($p=0.000$), 2.2 to 3.5 ($p=0.001$), 3.3 to significant increase in social interaction of inviting males and females from 2.9 to 3.8 ($p=0.002$) and 3.4 to 4.3 ($p=0.001$).

The majority of the elderly wanted to interact with others in the afternoon; 50% had wanted to interact in the first condition whereas 70% really wanted to interact in the second condition. Furthermore, 65% wanted to interact with a close friend. Once again, there was a significant increase from the first to the second condition; whereas 25% and 45% wanted to interact with a friend or close friend, respectively in condition 1, these percentages rose to 45% and 65% in condition 2. In addition, after the music game, the elderly desired to have longer interactions. Furthermore, the majority of elderly females still preferred to choose elderly females with whom to

interact after the music games even though some still hoped to invite the males. The elderly males also preferred to interact with males after the music game.

4. Discussion

Happiness and willingness to play again. The elderly's perceptions of the music game can be assessed from their levels of happiness and willingness to play again. It can be concluded that the elderly had a positive interest, which triggered social interaction. Their motivation to play the game was also evident in their willingness to invite others to participate. This was observed from the participants' enthusiasm as they tended to stand up or sit on the floor rather than sit in their seats. This enabled them to have a better view of the television. They also appeared to be more expressive and more focused (see Fig.6). The elderly in line with Besha (2015) stated that music improved a person's cognition by enhancing their concentration and memory. The participants' interest was also revealed when those from other dormitories came in to their dormitory when they were playing the game.

Furthermore several elderly people had a collection of song lyrics; thus, indicating they had hobbies related to music. Social interaction may be increased when interests are common. In essence, the music game motivated the elderly to socialize with one another.

Option of games. Video clips engage one's vision and hearing. Consequently, because the elderly could see the singers, they preferred the games with the video clips. National songs and local songs reminded the elderly of their past. They revealed the local songs enabled them to remember their hometowns. This is in accordance Jakob et al. (2015) who noted that music from a certain era is able to stimulate cognition and memory.

Social interaction. According to Goffman (1963), social interaction that occurs because of music games may be characterized by stages and levels, namely, passive social interaction and active interaction. Passive social interaction comprises co-present and co-attention while active social interaction includes co-exchange and co-

action. These stages were evident during the observation. Co-presence occurred when they gathered in the communal room. When the game started and the elderly tried to make sense of the game, co-attention occurred. Both constitute the stage of passive interaction.

During the stage of active interaction, the elderly began to communicate with others either about the music game or their past. This stimulus succeeded in triggering the elderly to reminisce about their past. This was evident when they unintentionally talked about their past experiences, which were triggered by the presence of the stimulus. Thus, co-exchange occurred. Later when the elderly spontaneously carried out actions by moving parts of their body, co-action occurred.

The elderly played the music game for the duration of the time determined by the researchers, that is, 20 minutes. One can deduce that they were interested and enjoyed the stimulus. As noted previously, elderly from other dormitories also wanted to participate in the music game.

Based on direct observation, in condition 1, the interior design contained chairs arranged in a sociopetal form and a television. This facility is not adequate for social interaction activities. Toepoel (2013) asserted that watching TV is a passive activity, which does not generate social interaction. Furthermore, a sociopetal arrangement is most generally applied in rooms used for the function of socializing. This arrangement is aimed at facilitating social interaction. However, not much social interaction took place in condition 1. In essence, the elderly only sat quietly and watched television in the communal room without interacting with others (see Fig. 7). Hall (in Dixon, 2012) stated that the furniture arranged in the form of sociopetal gives people an easier chance to interact. However, Gifford (in Laurens, 2004) noted that the pattern of seats in a sociopetal arrangement does not guarantee social interaction because of other factors, which may affect socialization. Furthermore, many elderly people remained outside of the communal room in the dining room, terrace, or in their bedrooms.



Figure 6. The enthusiasm of elderly men and elderly women when playing music games

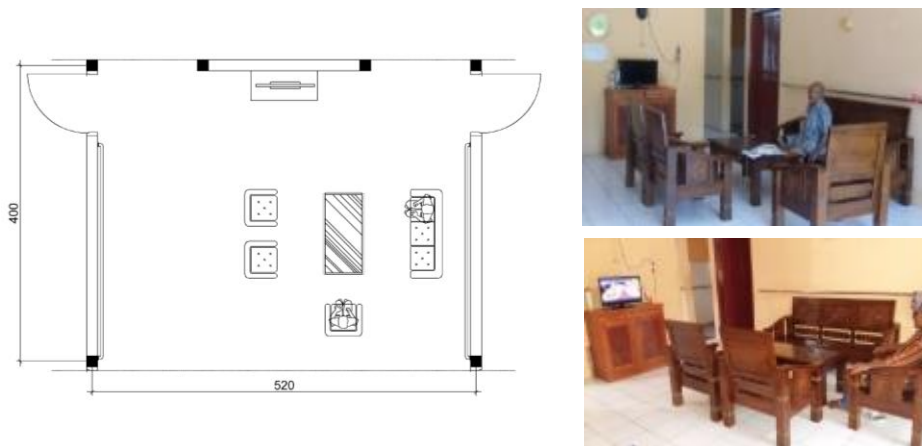


Figure 7. The elderly only sit quietly and watch television in condition 1



Figure 8. Form of social interaction through verbal communication (a) elderly people talk to other old people and (b) ask other elderly people to sing and dance together

In condition 2, speakers were placed in front of the elderly. Furthermore, to enable the elderly to hear, the volume was increased. Wagner-Hartl, Grossi, and Kallus (2018) noted the elderly's hearing ability decreases; the older a person, the higher the hearing loss. Natural lighting from the window and door was used. Evensen (2014) stated that natural lighting can encourage social interaction. The distance of television monitors need to be considered when playing music games. As a person grows older, their level of visual penetration is higher (Kunduraci, 2017). Accordingly, the distance of the television to where the elderly sat was 1.3 m-2.5 m. It is believed this distance is insufficient for the elderly to see the displayed stimulus clearly. Therefore, some of the elderly people moved closer to the television.

Social interaction was created among the elderly in the communal room. It was revealed that through the music game, the elderly's interaction with one another increased. This was evident in their verbal and non-verbal communication. Their verbal communication included sharing answers, reminiscing about the past, and participating in the singing and dancing while listening to a song (see Fig. 8). Erwin (2013) noted that listening

to music affords the opportunity for discussion and thus, interaction.

Erwin (2013) also noted that music results in satisfaction and allows the listener to act, which may enhance cognitive ability. This was noted during the experiment. The elderly began to move their hands and feet, thus, demonstrating their enjoyment (see Fig. 9). Thus, the music game not only helped the elderly to improve their social interaction, but helped to increase their mobility.



Figure 9. Social interaction through nonverbal communication

Time for social interaction. Most of the elderly people chose to interact with other elderly people in the afternoon because of the tight schedule of activities already arranged by the management of the nursing home. However, a number of the elderly felt that playing music games with others should be conducted whenever they had free time.

The elderly who interacted with close friends tended to have more interactions than those who participated with just friends in the music game. They were more comfortable and felt more excited when playing with close friends.

Because they felt close to one another, they no longer felt embarrassed and no longer had to re-introduce themselves to other elderly people. Based on the duration of interactions, the elderly preferred interacting with close friends.

The elderly females felt more comfortable interacting only with females; they usually only greeted the males. Males and females used the distance from their dormitories as an excuse for their lack of interaction. However, the elderly females still hoped to invite their male counterparts to play the music game. Some females believed that elderly males are more expressive, loud and exciting.

5. Conclusion

It may be concluded that the music game restored the main function of the communal room, namely, social interaction among the elderly. The elderly had a positive response to the game as they wished to play it again.

There was a significant change in social interaction from condition 1 to condition 2. Their willingness to ask and be asked by other elderly to interact was the result of playing the music game. The music game also led to their desire to communicate with others, in particular, a friend or with a close friend. The length of their social interactions increased and the number of those wanting to play the music game increased.

The video clip games had a significant impact on the elderly's social interaction. The visual element of the video clips allowed them to watch the movements of the singers. This increased their memory, cognitive, and mobility as they were able to recall their past, respond, and move parts of their body.

It is recommended that further studies be conducted on the elements of the interior that are related to the implementation of this game setting of room including distance and dimension of television, furniture layout, sitting distance, and lighting. Playing the music game in other rooms is also recommended in relation to the social interaction of the elderly. Furthermore, studies on

personal space as an indication of social interaction are recommended. The use of the joystick as a medium to answer questions in the music game troubled the elderly. This could be replaced with an easier tool that they understand. Further development on the content of music games in terms of categories of games and number of questions is recommended.

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