



Exploring How a Multisensory Media Album Can Support Dementia Care Staff

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Abstract

For dementia care staff working in residential facilities, it may be challenging to interact on an interpersonal and multisensory level with residents. The progressive nature of dementia influences a person's physical and cognitive functioning. Research has shown that offering multisensory interactions for people with dementia can improve their behavior and mood. We are interested in gaining an understanding of how dementia care staff could be supported to engage with people with dementia. To explore this, a multisensory media album was designed to encourage care staff to interact with their residents on an interpersonal

and multisensory level. Observations and interviews gave insight into how dementia care staff experienced the design, and how it helped them to interact with a variety of residents. We suggest that future design-researchers explore alternative means of multisensory engagement by utilizing photos, audio fragments, and textiles, as these showed potential to support dementia care staff to connect and communicate with residents.

Keywords

Dementia · Dementia care staff · Multisensory stimulation · Reminiscence · Meaningful associations · User-Centered design

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1 Introduction

Dementia care staff working in residential facilities are posed with care challenges due to the diverse and complex nature of dementia [1]. Dementia is a progressive disease which influences a person's physical and cognitive functioning. People with dementia are confronted with cognitive decline, affecting their ability to communicate with others. These communication difficulties are often experienced as frustrating for people with dementia, and can be distressing for care staff, which in turn can affect the staff's ability to identify the needs of a person with dementia [2].

To this day, there is no cure for dementia. As design researchers, it is therefore interesting to explore non-pharmacological alternatives to satisfy the needs of people living with dementia, as these can support alleviating distress [3], and improve the quality of life and well-being of people living with dementia [4]. Technology plays a role in complying to their needs, as it can enrich their daily life activities [5]. In addition to using assistive technologies, residential care facility staff can incorporate other strategies to engage with their residents on a personal level. Strategies may include but are not limited to using multisensory stimulation (MSS), using tactile elements, and organizing reminiscing activities.

2 Background

2.1 Multisensory Stimulation

MSS [6] is an approach aiming to stimulate the senses in a gentle manner without the need for other higher cognitive processes such as learning [7, 8]. MSS allows caregivers to provide person-centered care [9] to people with dementia, as it requires a resident-oriented attitude, knowledge, and skills. Moreover, when MSS is introduced in daily care activities, it can positively impact residents' behaviors and mood [10, 11], reduce anxiety [12], and increase resident-staff interactions [13]. Furthermore, the utilization of tactile elements within the dementia care space can offer opportunities of sensorial exploration and experience, fulfilling one's preferences and psychological needs, including comfort, security, identity, occupation, and pleasure [14].

2.2 Reminiscence in Care Practices

Reminiscence activities are popular for engaging with people with dementia [15]. Individual reminiscence activities have reportedly been successful for people with dementia, benefiting

mood, well-being and aspects of cognitive functioning [16]. Moreover, Morgan and Woods suggest that tangible outcomes of reminiscence work, such as life story books and memory boxes, may prolong the effects of reminiscence and act as a maintenance tool for people with dementia living in care homes [17].

One way to stimulate reminiscence is by using music [18]. Music also brings about other benefits, as it has been shown to facilitate social interactions [19], relieve stress and boredom [20], encourage physical movement [21], and act as a stimulus for exploring and maintaining identity [22]. Additional to music, sounds of everyday life are another category of sounds that human beings can perceive. These sounds are important for us, as they leverage communication, provide information, build expectations, and cue behaviors [23, 24]. Everyday sounds have also shown to affect the mood and behavior of people with severe or profound intellectual disabilities in a positive way [25].

The majority of studies in residential dementia care focus on the people with dementia, rather than focusing on care staff working in residential care facilities. Dementia care staff often deal with high working pressure, and forms of aggression [26]. A recent study revealed indications that a film installation allowed dementia caregivers to connect with people with dementia through made associations followed from the contents in the film [27]. Moreover, Treadaway et al. [28] suggest that visual and tactile sensory cues can prompt deep memories and associations, even though the triggers for these are highly personal and related to individual preferences and experiences.

Drawing on reminiscing practices, we argue that designing a combination of MSS elements into an object that prompts familiarity through associations can support dementia care staff, improve the quality of the care they provide, and can improve their working environment. Therefore, we aim to design a tangible, psychosocial intervention, which can support care staff to engage, connect, and communicate with people with dementia.

In this paper, we present the design of a multisensory media album, which focused on assisting residential care staff members at Leigh Place Aged Care, Sydney, Australia to interact on a personal and multisensorial level with their residents using a combination of visual, auditory, and tactile cues. These cues aim to prompt recognition for both care staff members and the residents, so they can build upon each other's prompt responses to create a connection.

3 Designing the Multisensory Media Album

The design is the result of a thorough contextual exploration, which consisted of an observation of care staff and a creative workshop with care staff. Here, we offer insights in how dementia care staff experienced using the design during their shifts, and how it helped them to interact with a variety of residents.

3.1 Methodology

3.1.1 Observation and Creative Workshop

Prior to the design of the multisensory media album, dementia care staff were invited to take part in an observation and a creative workshop.

An observation was done to obtain initial insights in how care staff interact with people with dementia on a regular basis. By making field notes and through informal conversations with care staff during the observation, an understanding was gained of the care staff's routine activities, their overall experiences during their shifts, their ways of engagement with residents, and opportunities for engagement were identified.

The creative workshop aimed to acquire further insights in how care staff might engage with people with dementia through physical or digital media. Five care staff members made low-fidelity prototypes, which were a representation of what they deemed suitable forms of engagement for people with dementia. To elaborate, a

personalized book was made, while other prototypes included a television, maracas, a shaker, dumbbells, binoculars, and a gardening area. These prototypes indicated different engagement opportunities by for example promoting physical activity, and engaging in music activities. These prototypes, combined with the observational insights, inspired the design of the multisensory media album.

The observation and creative workshop were approved by the Human Research Ethics Committee of the University of Technology Sydney (ETH19-4209) and by the Ethical Review Board of the University of Technology Eindhoven (ERB2019ID9). All research activities described within this paper were approved by the managing staff of Leigh Place in Roselands, Sydney.

The field study and evaluation described in Sect. 4 were approved by the internal Materialising Memories Committee of the University of Technology Sydney and by the Ethical Review Board of the University of Technology Eindhoven (ERB2020ID1).

3.2 Design Rationale

As mentioned above, the prototypes made inspired the design of the multisensory media album. For example, one participant made a prototype of a reading book. Other prototypes included a television and a tin can phone. These prototypes allow for different kinds of interaction. For instance, the personal reading book and television can be utilized to present forms of physical and digital media, and the tin can phone can be used to encourage social interactions amongst residents, or between care staff and residents.

As suggested by Jakob and Collier [14], caregivers will be able to respond to individual preferences, needs, and abilities by offering a multisensory experience. Additionally, they state that a person with dementia might find it easier to relate to environments and occupation combining sensorial input on multiple levels, as the world we live in is also highly multisensory. For the resident, this means that the design should aim to

provide more than one way to connect to, and enjoy their surroundings. By basing the multi-sensory media album on a photo book style object, this can be facilitated. A photo book presents a personal collection of memories that is often shared with others, promoting and suggesting a reminiscence activity.

For the pictures, we chose to only include generic photographs as opposed to personal, as people with dementia were observed to produce more detailed and emotional stories of personal significance when using generic photographs [29]. However, the photographs used should try to reflect the interests and abilities of the resident, as these will be more likely to motivate them to engage in the activity [30, 31]. Through the themes, we tried to represent the community of Leigh Place, addressing a mix of national and international topics of interest, which would prompt recognition for the 14 residents. For example, we chose to incorporate themes of an Australian children's show on page 1, well-known Australian beaches on page 4, and historical poetry on page 7 (Table 1). The other pages represent more internationally known

themes, with generic photos and sounds. The textiles were chosen to fit the pictures. For example, for the theme Christmas, white wool is used, as it could imply feelings of warmth (Fig. 1).

By designing the album in this way, it allows for reciprocal interaction between care staff and residents. For example, the care staff can make associations with, and elaborate on the pictures and audio fragments, and can encourage a resident to touch the textiles. In return, the resident's senses are stimulated and could remember things of the past.

3.3 Design Description

The prototypes made during the creative workshop presented a variety of ways to engage with people with dementia, which were therefore incorporated in the design. Our design utilizes music, pictures, and textiles for care staff to interact with residents. An off-the-shelf photo album was modified to feature a conductive touch pad on each page of the album. Each touch

Table 1 Themes, audio, and textiles used in the multisensory media album

Page	Theme of pictures	Audio	Textile
1	Australian children's show	Intro song of the show 'Skippy the bush kangaroo'	Brown linen with sandy texture
2	Birthday	Song 'Happy birthday to you', karaoke version	White linen with soft texture
3	Wedding	Song 'Let's twist again' by Chubby Checker	Pink felt
4	Beach	Sound of waves crashing, recorded at Bondi Beach	Pink polyester with flower pattern
5	Christmas	Song 'We wish you a merry Christmas', karaoke version	White wool
6	Historical poetry	Narration of 'Scots of the Riverina', poem by Henry Lawson	Brown linen with sandy texture
7	Nature	Composition of 'Eine kleine Nachtmusik' by Wolfgang Amadeus Mozart	Pink felt



Fig. 1 The multisensory media album's pages (1 to 7 from left to right) as presented to the residential care staff. The different themes on each page are accompanied by

textile matching the theme. Audio fragments related to the theme are triggered when the conductive pads are touched

pad triggers an audio fragment related to the theme brought forth by the pictures on that page (Fig. 1). Whenever a sound or song was triggered, it could be stopped either by touching another pad, or by touching one of the sensors on the back of the album. Furthermore, the pages of the album are covered with different textiles for the resident to engage with (Table 1).

4 Engaging with the Multisensory Media Album

4.1 Study Setup

A user-centered design approach [32] was applied to explore how a multisensory media album could assist caregivers to engage on a multisensory and personal level with people with dementia. All participants described in this study took part on a voluntary basis and provided consent, which was accompanied by an information sheet. Any pictures taken were processed anonymously, and emphasized on interactions with the multisensory media album, rather than on any individual.

Five care staff members participated in the field study. We were interested in how, when, and why care staff would interact with residents using the multisensory media album. We were also interested whether the amount of experience in the field and their current role at the care facility would influence the degree in which the multisensory media album would be able to support the care staff. Table 2 shows a demographic overview of the participants.

Participants were introduced to the multisensory media album, and they were shown how it works through a demo. The participants were instructed to focus on their regular duties during their shift, and were told that they were free to use the multisensory media album whenever they wanted. Observations were done during this time, which took up to two hours per participant.

During each observation, notes were made to try and capture the ways of how care staff engaged with the residents through the multisensory media album. The notes also gave an insight in when the album was used. Several caregiver-resident interactions were observed. After each observation, a semi-structured interview [33] was held with each participant. The interviews were audio recorded for post-event analysis. The questions focused on the care staff's general responsibilities, their experiences of using the multisensory media album, and how they thought the residents experienced the multisensory media album.

A thematic analysis [34] was conducted using an inductive approach to reveal reoccurring themes within the observational field notes and semi-structured interviews. In total, five themes were identified.

4.2 Care Staff's Duties and Responsibilities

As seen in Table 2, the participants had varying occupations at the care facility. A clear distinction between Recreational Activities Officers (RAOs) (P1, P3) and regular caregivers (P2, P4,

Table 2 Demographical data of participants

Participant	Male/Female	Occupation	Time employed in current position	Total time in aged care
P1	Female	Recreational Activities Officer	1 year	2 years
P2	Female	Regular caregiver	14 years	14 years, 8 months
P3	Female	Recreational Activities Officer	10 years	19 years
P4	Female	Regular caregiver	5 years	10 years
P5	Female	Regular caregiver	22 years	22 years

P5) was evident from the observations and interviews. The RAOs' duties and responsibilities were described as to *"encourage the residents to come to activities, and also engage for socialization and to make the residents feel like home and happy, and be aware if someone is in need of anything to or to find out what they need, and to fill that in for them"* [P1]. The regular caregivers are responsible for routine care activities as identified in the initial observation described in Sect. 3.1. When asked what regular caregivers found the most important thing they did, answers varied from *"...make them happy..."* [P2], and *"Respect their choices and dignity."* [P5] to *"Everything"* [P4].

Due to these differences in care activities, RAOs were observed to engage with a higher number of residents, and overall spend more time per resident with the multisensory media album. P4 also mentioned that the RAO *"...would probably benefit from (the multisensory media album) everyday, because she's got time. She does one on one sessions with the residents, so she might spend, I don't know how long, she spends half an hour or whatever it is and she could take that and use it."*

4.3 Interactions Between Care Staff and Residents

The design was observed to provide a way for care staff to engage with residents. Care staff initiated an interaction by introducing the album to several residents: *"I want to show you*

something, it's very interesting" [P3], and *"Can I show you a book I have?"* [P1]. In total, 16 interactions were initiated.

Also, care staff were observed to try and encourage residents to interact with the album by asking questions and giving instructions: *"How does that feel like?"* [P1] (Fig. 2), *"You have to dance! Do you like it?"* [P2], *"Touch it here"* [P3].

The interactions with the album were observed to offer an enjoyable experience for both care staff and residents. For example, P2 was observed holding a resident's hand and asking him: *"You and me, are we going to marry?"* on the wedding themed page. This resulted in them laughing together. Moreover, P1 noted the following on the behavior of several residents: *"...they were tapping, uhm. I could see them recalling and thinking back of memories, it was bringing back a memory that was making them happy. And they were singing. [...] They were relating the texture to the pictures."* This indicates that the care staff had the impression that residents had an understanding of the represented themes in the album, due to their behavioral changes, which was also evident from P3's statement: *"...you can see the reaction from some of them, when they're touching and the music catching their attention so they're looking, and also if you have questions they're looking, and some of them they can identify the objects and the pictures."*

Overall, engagement was sought successfully through the album. However, there were two occasions in which two separate residents did not

Fig. 2 P1 encouraged the resident to touch the textile



seem to be interested in any interaction with the album. The care staff elaborated on these moments in the conducted interviews: *“At the moment he’s scratching his leg so he’s itchy. So that is distracting him at the moment”* [P1], and *“He was not in the mood, he just wanted to go. Just walk.”* [P5]. The resident that showed no interest to P1, was observed to enjoy P2’s and P3’s engagement when introduced to the album, supporting P1’s statement.

4.4 Care Staff’s Thoughts on the Design

During the interviews, care staff expressed their thoughts on the multisensory media album. They reported that it supported them during their care activities: *“Yes! For the one on one engagement, individual engagement with residents, I find that this would be very beneficial, because it has a memory recall for them, it’s helping them to engage with you, and I see the enjoyment in their face. And all residents respond differently: some do the texture things, some will sing along, some will be tapping, and you can see their face light up, and that’s what we want.”* [P1], and *“Yes,*

yes! [...] Because it’s less stress (for) both of us, especially for the residents” [P2].

P3 commented on how the multisensory cues of the album could distract residents for longer periods of time: *“It’s good, especially for people with dementia. Because they can have at the same time the music and the pictures, that is coming together and it can be good for them, that they can, like I said, catch their attention, [...] If you show them a picture or a book, they can have a look for a little time before they get bored, and with this project I think so they can stay for a little while observing, and listening, so they can engage for a longer time.”*

Moreover, P1 made a remark on how she thought the design helped the residents: *“Things to engage a resident, that’s the number one thing that really helps you can see them coming out of their shell and it helps... I think it helps them to focus on something, and it’s sort of pulling them out of the place that they’re in, their own world. And it’s bringing them happiness, and that’s all we want.”*

Furthermore, participants shared some design considerations that could be used for further development of the album: *“And something that you could do more: shows from the past with pictures to help them recall, or even old ads that*

were on TV.” [P1], and “*It has to be happy music*” [P2].

4.5 Context of Using the Design

In addition to P1 stating that the design would support her during one on one engagement sessions, other insights were gained on the context in which the design was used. For example, participants deliberately chose which residents to approach with the album: “*Yes, it depends which residents, [...] we already know the character or the impression on their face, yes, it’s like we have to have a look to them, and choose to offer them*” [P2].

P1 also mentioned reasons for not engaging with residents: “*...they might be tired. [...] One resident might want me to sit down with them, they might want me to take them for a walk. Another resident might just want to sit down and talk to me.*” However, P1 stated that she would try to use alternative ways to engage with residents instead: “*So, I just gage by: I’ll bring it out, if they’re not interested in that I just do something else.*”

Residents were often accompanied by another person whenever the album was shared with them. In most cases, this was the participant themselves. However, P2 was observed sharing the multisensory media album with family members of a resident. After this moment, P2 went back to the kitchen area to continue preparing food for lunch. In the interview, P2 noted that “*they enjoyed with their family and especially [resident’s name], he was impressed, they were listening to the music, and pressing the buttons with their family. And the granddaughter she was showing it to him. And when I asked to them, they said yes, we love it too, it’s a very nice book, and also, in his face, he was showing happiness.*” P2 noted that it was a good thing to be able to share the album with family members whenever she did not have the time to engage with the resident.

There were also two instances in which a resident was left unaccompanied with the album

for a short time. During the observation of P1, the resident browsed through the pages and stroked the textile, and during the observation of P3, the resident browsed through the pages of the album until P3 returned.

4.6 Regular Caregivers’ Time Constraints

From the regular caregivers, P2 was the only one who managed to use the multisensory media album during the observation with more than one resident. P4 only had a short interaction with a resident while being instructed, and P5 tried to engage with a resident, but was unsuccessful as described in Sect. 4.2. All regular caregivers brought forward that they had too little time during their shift to spend a reasonable amount of time with the design: “*Well, if you have time, and you’re sitting down, you can take that and give it to the residents and listen to them. But this afternoon, like you could see, there is no time where I could try it*” [P5], and “*But sometimes the staff, no person has time. I like to do many things, but the kitchen, the cleaning, the everything, we have to do that*” [P2].

The regular caregivers also communicated that they would appreciate it if they would be able to spend more time to engage with the residents: “*I would love to interact more with the residents, but we don’t have the time*” [P5].

Regardless of the regular caregivers’ limited time to engage with residents through the design, they were observed to interact with residents during their regular care activities, which was also evident from the observations. For example, both P2 and P5 were talking to the residents while doing the dishes, and P4 was talking with the residents while she was administering medication to the residents. P4 described why it was impossible for her to use the album during these activities: “*Definitely not at that time, no, we couldn’t bring it in during those times, because we need full concentration at medication time.*”

5 Discussion

Overall, the multisensory media album was a helpful tool for care staff to engage with residents. It offered moments of joy for both care staff and residents, and mediated communication between them. This was done by care staff who were encouraging residents to interact with the visual, auditory, and tactile cues as featured on the multisensory media album. The interactions between care staff and residents were enriched by making meaningful associations with contents presented by the multisensory media album. This allowed residents to remember things of the past, and their senses to be stimulated.

As revealed in Sect. 4.2, a clear difference between the responsibilities of the regular caregivers and the RAOs was observed in our study sample. After the first research phase, it was thought that regular caregivers would be able to pick up a design as presented, and share it with residents in between the moments of regular care activities. Yet, this was not apparent from our observations in the second research phase. Regular caregivers were observed to be more task focused, leaving less to no room for incorporating a design to engage with residents. Regular caregivers did express their wishes to engage more with their residents, and were observed to compensate this by approaching residents with a combination of verbal and physical communication during their regular care activities. One time, P2 was observed to give the album to family members of a resident, so they could interact with their loved one, using the album. During this time, P2 went back to carry out her care duties. The observed actions of P2, P4, and P5 resonate with the statements of regular caregivers feeling they do not have the time to utilize a design as such during their shifts. The differences among the care staff's responsibilities therefore contributed to when and in which instances the multisensory media album was used.

These results suggest that the multisensory media album is more suitable for care staff who have similar responsibilities to the RAOs as described in this study. The RAOs'

responsibilities compared to those of regular caregivers, make RAOs more flexible in creating moments of engagement with the residents. They were observed to engage with a higher number of residents, and overall spend more time per resident with the multisensory media album. However, it must be noted that the RAOs communicate and interact with residents as part of the job, while the job of the regular caregivers, as abovementioned, is more task oriented.

The amount of years of employment in aged care did not seem to contribute to the degree in which care staff was supported by using the multisensory media album. We assumed that the more years of experience our participants had working in aged care would have an influence on their adaptability when introduced to our design. Though, this was not evident from our sample. Rather, their occupation and responsibilities seemed to be the most influential factors.

Although the multisensory media album showed promising results, this was not the case in all instances. It is important to note that within the dementia care space, each and every individual has different desires and needs, at different points in time. By introducing the multisensory media album to care staff, we were able to offer them an alternative way to support them to engage with people with dementia.

Even though the sample size of this study was low, our findings showed promising results for future implications. Due to time limitations, no pilot test was conducted. Instead, care staff were approached for input for the design prior to deployment. Adjustments to the design will likely be beneficial for care staff to provide residents with more effective and longer periods of engagement. To achieve this, the album could include additional pages, featuring personal themes of interest, or themes that would trigger the memories of residents. Moreover, we support the suggestions made by P1 and P2 to incorporate TV shows and advertisements, and utilize joyful music.

Offering a MSS activity takes time, which was considered valuable throughout the study. Utilizing MSS during care practices may result in

a longer attention span for alike activities, whilst stimulating cognitive processes for people with dementia by allowing them to make associations through photos and audio fragments. For these engagement strategies to be successful within residential care facilities, design-researchers should aim to make MSS activities more accessible, by for example incorporating these in the direct environment of care staff and people with dementia.

6 Conclusion

This paper has provided explorative insights in how a multisensory media album can support care staff to engage with people with dementia. The design provided dementia care staff with a multisensorial activity for their residents, which was observed to be enjoyed by both. By presenting care staff with an alternative way to interact with residents, they can be assisted during their care practices. When designing for people with dementia and their caregivers in care facilities, we should be aware of the organizational structure, as this can influence the degree to which design is used and experienced. With this work, we aim to inspire other design-researchers to develop assistive technologies supporting combinations of multisensory engagement, as these have shown to be beneficial for care staff and people with dementia.

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