

Designing a crossover multisensory picturebook with older adults at a care home

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doi.org/10.21606/drs.2024.780

Abstract: Picturebooks have often been studied in the children’s literature field with a focus on child readers, but recent studies have begun to discuss the cross-age aspect that embraces wider audiences. This study explores the design space for a crossover multisensory picturebook that would also engage older adults via positive design approach. In this multidisciplinary study, we aimed to nurture the positive sides of aging by transforming life-long experiences into narratives in the form of a picturebook that embodies memories and transfers heritage in an engaging way during shared reading. Within this scope, we conducted interviews and design evaluations with older adults in a care home. In this paper, we share reflections on the book-making process and discuss how picturebooks can support well-being. Additionally, we speculate on positive interactions that may arise from intergenerational shared reading experiences while adapting a media mainly geared towards children for older adults.

Keywords: design for wellbeing, crossover picturebook, intergenerational shared reading, multisensory interactions

1. Introduction

The history of the modern picturebook is relatively short compared to other literary media, though it has evolved upon the tradition of illustrated books for children. Its origins can be traced back to the practice of visual storytelling, which can be seen in the earliest paintings on cave walls that have captivated people of all ages (Salisbury & Styles 2012). In time, illustration in picturebooks has become widespread; although this targets mainly child readers, recent studies have started discussing also the cross-age aspect that embraces wider audiences (Beckett, 1999, 2012). Adults have mainly accompanied children as co-readers or mediators of picturebooks, but they increasingly read picturebooks for their own personal pleasure (Beckett, 1999). As picturebooks can be considered an art form in modern society, many artists are likely to present their work in picturebook format, which might lead



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to a growing trend of crossover picturebooks as well as “picturebooks for adults”. In fact, the lines between crossover picturebooks and picturebooks for adults are blurred, as inter pictorial and intertextual references chiefly define a picturebook for adults (Ommundsen, 2017). Yet, so far there has not been a specific category for older adult readers or much discussion of them, though they can be considered under the adult category.

The studies indicate the benefits of picturebook reading for older adults as they develop strategies for recall and fostering interactivity while reading aloud to children. All of these come with the dual benefit of supporting the cognitive functions of older adults (Fujiwara et al., 2009; Sakurai et al., 2016). Including similar reading activities, the intergenerational programs for children and older adults (the latter with or without dementia) generally present positive outcomes for both parties (Gualano et al., 2018), such as mutual enjoyment (Isaki & Harmon, 2015), an increase in children’s literacy skills, and social interaction and quality of life for older adult readers (George & Wagler, 2014). Hence, studies that capture older adults’ personal preferences for the picturebook genre or their perceptions about diverse design attributes in shared reading settings would highly benefit a deeper analysis.

While many studies on aging center around increasing older adults’ quality of life by providing solutions to compensate for their limitations, recent studies increasingly highlight the positive sides of aging rather than focusing on the negative aspects (Vines et al., 2015). In this respect, there have been many studies in Human Computer Interaction (HCI) that adopt a participatory approach while conducting research with older adults for their well-being and empowerment (Rogers et al., 2014; Light et al., 2016; Reuter et al., 2019; Fischer & Östlund, 2020). It is in this context that we considered designing an interactive literary work with older adults, which could inspire further studies in HCI due to the potential offered by the multimodal aspects of picturebooks.

Accordingly, we conducted field research consisting of in-depth interviews and design evaluation sessions with older adults living in a care home, in order to design a multisensory picturebook prototype that would engage older adults in a joyful way during shared reading. Likewise, our aim was to examine and highlight the potential of picturebooks for triggering positive exchanges between generations, to support dialogue and empower not only the young but also older adults via leveraging their knowledge during shared reading settings in care homes. This attempt would go beyond mitigating or alleviating the negative aspects of aging. In addition, we present our reflections on the process of picturebook making, addressing a positive design approach (Desmet & Pohlmeier, 2013).

2. Background

The definition of “picturebooks” can seem simple, referring to two main characteristics: the medium (book) and the content (pictures/text), but the term has been discussed within academia with vast expansions and nuances. For instance, we cannot consider every illustrated book a picturebook (Kümmerling-Meibauer, 2018). The picturebook is an object

of study for many disciplines such as children's literature, literary didactics, art history, media studies, linguistics, education, developmental psychology, cognitive studies, picture theory, art and design. While some of these disciplines adopt pedagogical approaches dealing with a child's relation with picturebooks, others concentrate on visual and verbal elements and their complex interrelations (Kümmerling-Meibauer, 2018). This spectrum tends to become wider as the picturebook, being a multimodal art, breaks the boundaries of its own genre and can blend with various other forms of art and imagery that could engage wider audiences (Salisbury & Styles 2012). Different types of picturebooks, such as baby books, toy books, novelty books, and books for the disabled, explore varied options for materiality regarding physical, sensory, and digital formats. The picturebook is driven by technological advancements through the ongoing tug of war between printed and digital media, and this pushes the boundaries of the reading experience (Veryeri Alaca, 2019). As picturebooks are multilevel and multilayered, they can invite different forms of reading with regard to the age and experience of the reader. For instance, children, adolescents, and adults can all attain pleasure from crossover picturebooks, even though they all read from different and varied perspectives (Beckett, 2012).

2.1 Picturebook as a multisensory playground for design

Scholars from various disciplines have extensively studied the pleasures and learning processes evoked by picturebooks, emphasizing their crucial role in developing a child's cognitive, linguistic, moral, and aesthetic capacities (Kümmerling-Meibauer, 2015). On the other hand, picturebooks possess the capacity to provide empowerment to both young and adult readers alike (Beckett, 2012), having various ways of relationships between verbal and visual representation (Nikolajeva & Scott, 2000). There are different types of picturebooks, such as fiction, nonfiction, pop-ups, concept books, photobooks, tactile, multisensory, digital, and even edible ones (Veryeri Alaca, 2022). All of these can be followed by further types introduced via new technologies and artistic approaches. The combination of traditional printed picturebooks and those emerging from information and communication technology (ICT) offers exciting opportunities to explore the potentials of picturebook design further. These allow playful exploration of material forms and experimentation with interactive elements, such as manipulation of text and exploring hypertext, or tailor-made preferences like sound on electronic devices during interactive reading experiences (Veryeri Alaca, 2019). Including multisensory interactions in books, either digital or printed, has the capacity to grab people's attention and make the reading experience more dynamic. "Sensory reading" is proposed as involving all the senses – vision, hearing, touch, smell, taste, and proprioception – in order to push forward novel investigations into reading practices (Kucirkova, 2022). The research that highlights the benefits of multisensory involvement has predominantly concentrated on individuals with special needs, both adults and children (Pagliano, 2012). There are many multisensory books on the market now, mainly targeting child readers with or without special needs, but they are still few in number compared to traditional books due to production costs.

In HCI studies, little attention has been paid to picturebooks so far, although what has been published is quite inspiring. For instance, a workshop paper investigated the creative potentials of conventional books by blending and merging various media, in order to examine the current and future influence of mixed media books for children. The goal of this paper was to establish links between the book-publishing industry, User Experience (UX) practice, and related fields, fostering collaborative efforts and building connections among different disciplines for future developments (Pinto et al., 2013). The same research group presented a mixed-media picturebook prototype fusing physical and digital elements, and allowing child readers to explore the narrative through traditional pages and synchronized complementary content via a tablet-based magnet sensor technology (Figueiredo et al., 2013). Apart from creating interactive reading materials, a prevalent approach involves transforming traditional picturebooks into digital formats. One study suggests that picturebook apps serve as spaces where the negotiation of value and the support of community and culture take place, and these negotiations inevitably interact with other elements within the app's ecosystem, influencing the overall quality of the reading experience it offers (Meyers et al., 2019). Another research project centers on creating an environment for picturebook reading named LIT ROOM, which utilizes interactive technologies to harness cognitive and embodied processes for enhancing literacy skills (Schafer et al., 2018). Also found is recreation of an existing picturebook through traditional crafts and computational technologies (Posch, 2021), enhancing the multisensory interaction with embedded smart and electronic textiles in a handmade interactive picturebook.

When we examine the studies focusing on older adults around picturebooks or related instruments, the projects have been developed mainly as reminiscence interventions for this specific audience. As such, a multimedia book offers the chance to create unique content with audio, exploring different themes related to the collective memory of a specific era, like “the Italy trip” showcasing images from Italy of a specific time period (Huldtgren et al., 2016). Another study focusing on older adults is a tablet application that was developed for a digital life storybook, enabling the flexible creation of personal stories using multimedia elements while also capturing emotional responses linked to each memory (Catala et al., 2020). Based on our particular review, there is an evident dearth of picturebook studies related to older adults. Thus, examining the picturebook utilized by older adults can present unique insights.

2.2 Shared reading for intergenerational exchanges

In picturebook studies, specific attention has been paid to shared reading. It has predominantly been examined regarding its advantages for children in the context of child–adult relationships (Ezell & Justice, 2005; Fletcher & Reese, 2005; Vanderschantz et al., 2020). The reason might be that picturebooks are mainly considered something for children, so their reception is the focal point; although co-readers such as parents, grandparents, and other caregivers consume the same reading material, it is not tailored considering them. One study discusses this issue through a case study of a picturebook designed for older

adults with dementia. It points out that the design of the book is a significant factor that provides additional opportunities for intergenerational dialogue and potential appeal to crossover, cross-cultural audiences via its nostalgic content (Karaoglu & Veryeri Alaca, 2023). While nostalgia was historically linked to negative emotions like homesickness and depression, recent empirical studies indicate its positive impact on a person's well-being (Cheung et al., 2013; Robertson, 2013; Sedikides et al., 2015). Hence, such books that feature visual materials reflecting nostalgia would benefit older adult readers as well as younger readers if the content is open to discovery. When we consider the potential of content which demands prior knowledge in picturebooks, this could also empower older and adult readers. Thus, they can enrich the narrative with their existing knowledge on the related topic and facilitate meaningful exchanges between generations (Narančić Kovač, 2021 ; Karaoglu & Veryeri Alaca, 2023). This connection has the potential to boost their self-confidence, which could positively impact on their overall well-being (Yamaguchi et al., 2010). In addition, the concept of joint child–adult play and its potential to enhance cross-age attitudes via children's literature has been explored (Deszcz-Tryhubczak & Kalla, 2021). Accordingly, children's books offer valuable opportunities for playful interactions between different age groups, redirecting the focus from distinctions and disagreements between children and adults towards the examination of mutual reliance between different generations. Therefore, we see a great opportunity for research on designing a crossover picturebook for shared reading settings through a design methodology mindset.

3. Methodology

For this study, in-depth interviews and design evaluation sessions were used as methods to iteratively design a crossover picturebook for older adults. Figure 1 shows an overview of the methodology, which is explained in detail in this section. It is important to note that the outputs of the interviews and observations provided input for design evaluation sessions and the final prototype. Hence, the following sections first present the data collection and analysis processes, as well as the findings of the interviews and observations, in order to make sense of the design process of the multisensory picturebook. Then, the design process and related evaluation sessions together with insights/suggestions are demonstrated.

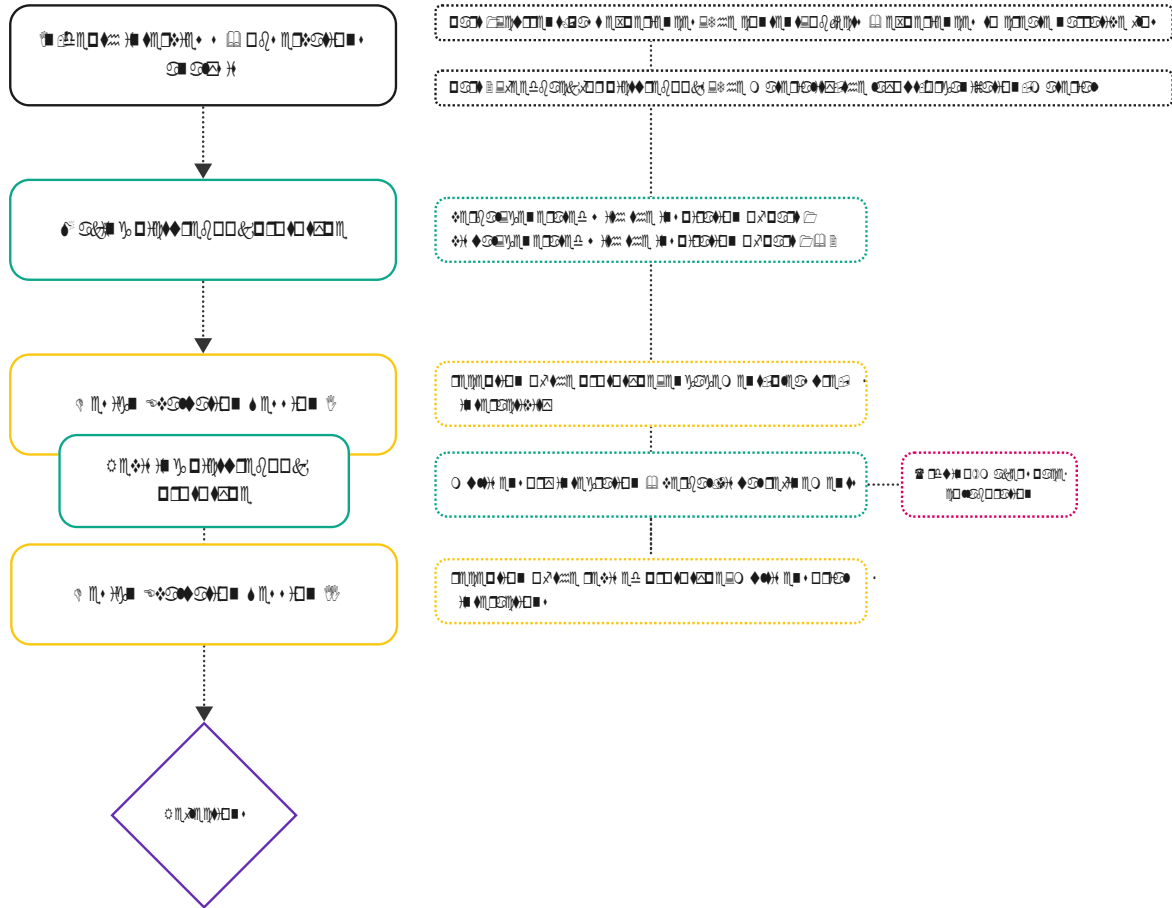


Figure 1 Research Process

3.1 In-depth Interviews

We conducted semi-structured in-depth interviews with older adults residing at a care home in order to generate insights about the content and materiality of the preferred picturebook format. We had conducted interviews with 8 older adults (aged between 60–81 years old).

The interviews consisted of two parts. The first part included questions meant to help learn about their daily practices, likes, dislikes, and reading habits. The second part was dedicated to the evaluation of picturebooks that we had selected from among fiction and nonfiction genres with different illustration techniques and contents. Supported with the observation technique where we took notes in addition to voice records, this part aimed at getting feedback regarding the types of picturebooks the participants would like to engage with more. We asked consent for interviews before the study. The study has ethical approval from Koç University. The interviews, which took an average of fifty minutes, were conducted in two sets, with 4+4 participants and sound recorded. For the second set of interviews, we used existing photo-novels in book and magazine formats printed in the 1970s, inspired by the one participant from the first set of interviews. These were used as prompts for sensitizing and probing.

3.2 Analysis

The interview recordings were transcribed, and the thematic analysis was carried out in an inductive manner (Braun & Clarke, 2006). Recurring patterns were coded and then grouped to define the following themes: weakened intergenerational ties, challenges in reading experiences, memories for cherishing the moment, pleasure and concerns about photo albums, and transitive perceptions about existing picturebooks. The two parts of the interview, mentioned in the section above, were analyzed separately. The analysis of the first part helped us to define the content of the book prototype, while the second part guided us regarding the scope of materiality and interactivity.

4. Findings

In this section, we present our findings regarding the interviews and observations together with the discussion thereof, as these will support the development of the prototype which is explained in Section 5.

4.1 Weakened intergenerational ties

The participants primarily made comparisons between intergenerational relationships in the past, with many expressing the belief that such connections were stronger in earlier times. Five of the participants (P1, P2, P3, P6, P7) mentioned the lack of respect of today's younger generations, leading to weakened intergenerational relationships. When we specifically inquired about care home workers, the participants generally expressed positive feelings considering the care facilities and services. However, one participant (P2) mentioned that conversations only occur if initiated by residents; otherwise, care home workers do not invest time in reciprocal exchanges.

Overall, all participants stated their willingness to share their time or their knowledge with younger people, but their expectations from them regarding a positive intergenerational dialogue are low. They think the younger generations neglect the old in numerous ways. Hence, it is vital to search for possible ways to promote intergenerational dialogue.

4.2 Challenges in reading experiences

The majority of the participants expressed that they used to be avid readers, but their reading habits had now been hindered due to health-related issues and the limited availability of the books they enjoyed. Five of them (P1-2, P5-6, P8) stated that they used to read a lot, but now they cannot read due to bad eyesight and concentration problems. P2 stated that she would like to listen to books in addition to following many programs on television (e.g. general culture, quiz shows). Considering her willingness to learn new things, it can be inferred that by providing relevant conditions, the participants are likely to read as they used to. Design solutions, such as larger fonts with shorter, plain text would be appropriate as an initial step.

4.3 Memories for cherishing the moment

All participants enjoyed talking about the past, expressing their longing for the relationships and traditions of the old days. While some participants (P1, P2, P5, P7) mentioned specific media, such as graphic novels (Tommiks, Texas, Red Kit), photo-novels, postcards/letters, and radio, others (P3, P4, P5, P6, P8) talked about pleasurable traditions or experiences they used to be engaged in, such as celebrating national holidays and carrying out cultural rituals. The experiences on which they joyfully reminisced can be categorized as tangible ones (photo-novels, graphic novels, radio, etc.) and intangible ones (traditional festival days, sitting on the floor while eating/sharing food, bread toasted on a stove, writing letters, sending cards, neighborliness, evening cinema screenings). Also, a few participants (P1, P2, P7) stated some items such as knitting, headscarves, or gas lamps which reminded them of specific people they missed.

We observed that the conversations got richer when the right object or experience was uncovered through memories. In the second set of interviews, we witnessed that the participants found many things to talk about after photo-novels were mentioned, as this was a popular medium in their youth. (Photo-novels resemble book-format versions of a film, composed of photographs and characters' speech balloons.) The materiality of the nostalgic object might help the participants to recall further memories presenting positive feelings. It can be inferred that tangible objects from the past trigger further topics and fun mood.

In addition, we often monitored an increase in their self-confidence and mood among participants when the researcher – who conducted the interviews – showed excitement for learning new things (e.g. photo-novels, film or book names, historical information regarding a place or transportation methods, etc.) from the participants.

4.4 Pleasure and concerns about photo albums

All participants mentioned getting pleasure from nostalgic memories through objects and ephemera, with a special emphasis on their family albums. Seven of them (P1-3, P5-8) mentioned looking at photo albums as a delightful experience. They stated the joy of looking at photos that related to their past lives. Still, some participants (P2, P6, P8) shared similar concerns about keeping photo albums in the care home settings due to privacy, storage, and access problems.

4.5 Transitive perceptions about existing picturebooks

All the participants reacted to the picturebooks we showed as “these books are for children” at first sight, so they did not show much interest. When participants interacted with picturebooks, they often introduced further topics related to the text or images which they found familiar within their own lives and experiences. Thus, published picturebooks can be good probes to initiate or deepen the conversation with older adults, provided that the right picturebooks are selected. The participants engaged more with the books with realistic content regarding visual and verbal aspects. Most of the participants interacted more with black-and-white photography integrated into the visual narrative of the selected book. Their

interest was not limited to nostalgic content alone but also their enthusiasm about travel, and animals, too.

Overall, we observed that participants engaged more with nonfiction picturebooks including photography and real documentary content (places, animals, biography) without complex illustration styles. In addition, they were also interested in the topics or images they were familiar with.

5. Designing a crossover multisensory picturebook

Our objective was designing a picturebook for the subjective well-being of older adults, thus at this stage we benefited from the positive design framework (Desmet & Pohlmeier, 2013) in order to ensure that older adults may find joy and meaning while interacting with the picturebook we designed. The findings guided us to define key points for the concept, such as supporting intergenerational dialogue, using nostalgic elements for happiness, the need for an easy and engaging reading experience, and the importance of photography. We also learned the participants' preferences regarding picturebook content and materiality. In addition, once we had the materials (inspired from memories) to compose the book, the positive design framework helped us to construct the prototype in a meaningful way.

Making the picturebook prototype took almost one year, supported with extensive research and practice-based activities. During the design process, we held two design evaluation sessions for the prototype in order to get feedback, taking an average of 30 minutes. We refined our prototype after the first design evaluation, then tested the final multisensory picturebook prototype in the second evaluation session. In this section, we present the picturebook-making process and evaluation sessions together with the discussions relevant to these design iterations.

5.1 Making process

We had inspiring insights from the findings of the interviews, that findings match well with the positive design framework, which would meaningfully bridge the initial findings with the well-being related decisions in the design process.

There are varied examples for the utilization of positive design framework in the design field, considering older adults' well-being (Chen, 2018; Fronemann et al., 2016; Karaoğlu & Subaşı, 2021; Mann & Oatley, 2017; Treadaway & Kenning, 2016; Zou & Zhang, 2023). In this study, however, we planned to benefit from positive design in a different field, literature, in order to design a picturebook, an object from a literary medium. We thought this could be a novel experiment that can be discussed in future multidisciplinary studies.

Having been inspired from positive psychology, positive design framework was developed to guide designing products to lead meaningful goals, along with supporting users' happiness (Desmet & Pohlmeier, 2013). The ultimate objective of positive design is "human flourishing," which gives particular and intentional emphasis on experiencing pleasure, developing oneself, and having a purpose and interest in life (Desmet & Pohlmeier, 2013).

According to the Socioemotional Selectivity Theory, individuals become more selective in later life and they are more likely to engage in meaningful activities (Cartensen et al., 1999). Therefore, we consider using the positive design framework, which would also support our design process in making a prototype that would be more engaging for older adults.

We focused on the aforementioned three fundamental components of positive design: pleasure, personal significance and virtue for the subjective well-being of the participants (Desmet & Pohlmeier, 2013). For “pleasure,” we concentrated on the items from the interviews that would trigger some happy moments for the participants. We created a list of each participant’s mentioned nostalgic objects and experiences which led them to a cherished moment during the interview. Depending on this list, we designed eight double-spread pages, dedicating one double-spread to one participant. For instance, each double-spread includes content tailored to one participant. From this perspective, our process can resemble creating a life story book (Elfrink et al., 2018; Mckeown et al., 2006) with a person-centered care approach (Goodwin, 2016). However, our picturebook is not tailored to a single person but instead incorporates views of multiple people in the whole book. As the participants shared a common time period, we assume that they were able to find common aspects in other spreads, which makes the book appeal to wider audiences. To provide “pleasure,” picturebook with its nostalgic content (visuals and text) was already capable to enjoy older participants. However, we also planned to integrate multisensory interaction for more joyful engagement. But first we planned to test the content together with the materiality of the book and then decide where to embed multisensory features after the design-evaluation session. In some double-spreads we also added question marks to trigger conversation in a playful way.

For “personal significance,” the book could be a bridge among generations so that older adults can share their experiences. The book being tailored to them could achieve older adults’ goal to transfer their learnings to the next generations. To support that, we tried to pick items from the list which would be unfamiliar to younger generations, in order to increase curiosity and provide motivation to listen to older generations. Hence, the older adults would feel morally good via this knowledge transfer. The more they share, the more they feel empowered, which serves the “virtue” aspect of positive design. Besides, the book would facilitate a virtuous activity which is reading, supporting the virtue of knowledge and wisdom.

5.2 Verbal and visual narrative development & format

We concentrated on each participant separately and started to compose the text while scrutinizing his/her memories. The poetic style also supported the unity of the whole text with runs and end rhymes which is easy to follow and read. In addition, onomatopoeic words were added, such as “chuffa chuffa” for train or “dut dutt” for ferry, in order to give a heritage-based sound association. These sounds were not just randomly selected but catered to the older audiences’ experiences especially via the vehicles frequently used in the city and can bring back soundscapes of a certain era. Soundscapes have been found useful to

trigger memories and act as catalyzers for recalling certain times and places (Yelmi, 2016). As such, child readers like to engage with onomatopoeia in text, but anyone can resonate with these sounds and connect them to various nostalgic experiences.

For the visual counterpart, depending on the interview analysis, we developed images as collages of photography and illustration as we target older adults and younger readers, including children. For the prototype (Figure 2), we did not use the real photos that the participants shared, which makes this picturebook different from life-story books. Instead, we used found photos that can stimulate similar senses. In each double-spread, we paid attention to the composition of text and visuals so that the visuals do not repeat the text but instead complement and enhance the narrative (Nikolajeva & Scott, 2000).

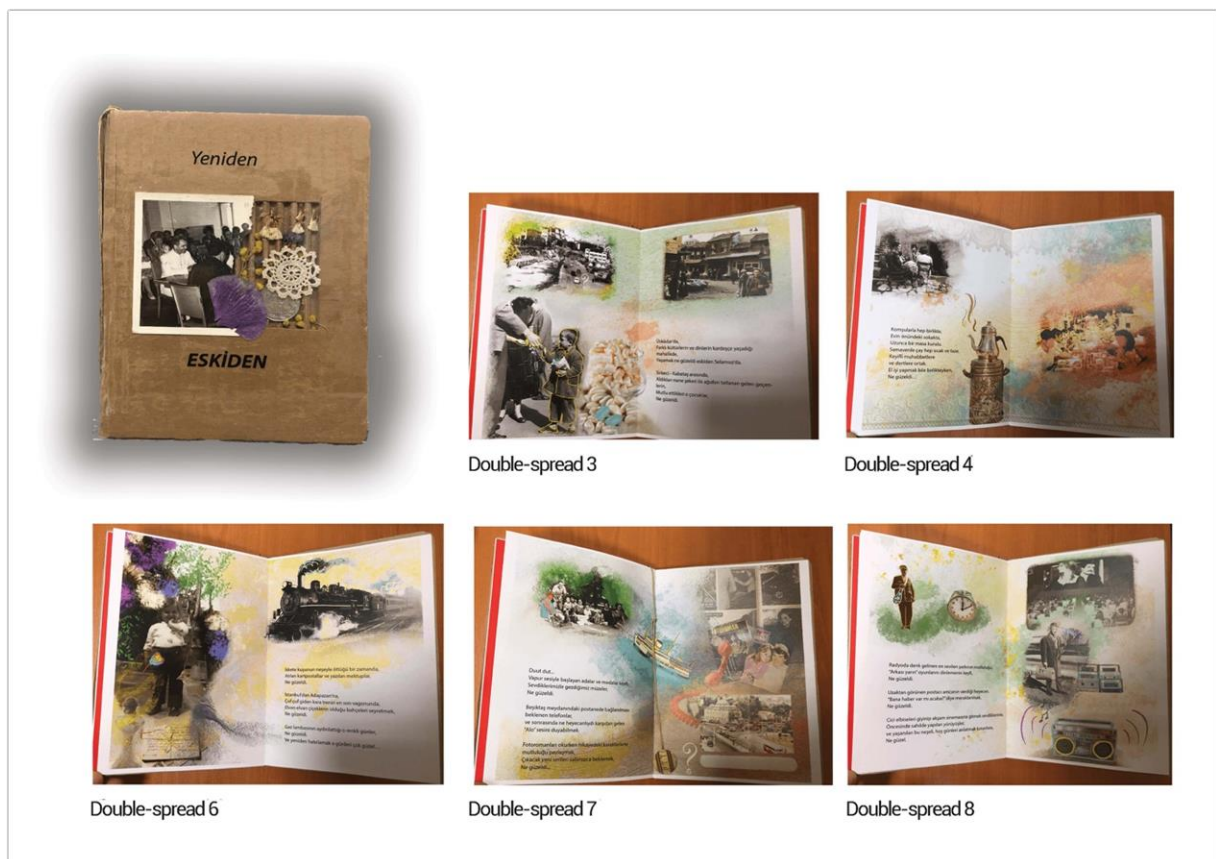


Figure 2 Cover and sample pages from the initial prototype.

Similar to text generation, we tried to relive the memories recounted by the participants in order to embody them in visual format. We used found photos, ephemera to visualize participants' stories. We preferred A5 size, closer to the usual novel-size codex format, in order to maintain a resemblance with adult novels. In order to control the size of the images and fonts, we made a dummy in black and white for the pilot study, checked it for readability, and assessed the overall work.

5.3 Evaluation session I: Reception and suggestions

In the evaluation sessions, we acted as co-readers, running read-aloud sessions, and let the conversation be led by the participants (see Figure 3). The picturebook received positive feedback from most of the participants, with praise for the verbal content. We noted that each participant engaged deeply with the page which was tailored to them. While reading the picturebook, most of the participants started a conversation on the topic they heard or saw in the visuals. A few participants also recommended some refinements to the text, extending the content regarding topics and images. One participant (P2) tried to look closer at one image in which her favorite place was represented. For this particular request, the tablet version would perform better, as there would be a possibility to zoom in. Two participants appreciated the use of cardboard as a material for the sustainability and innovative use of the materials. Towards the end of the session, we explained that the prototype was shaped by the memories they shared. Upon discovering this, they became more engaged and enthusiastic, expressing their desire to contribute further. Some participants offered to send illustrations, suggested title names, and even volunteered to provide photos and some old coins they had collected beforehand. All this experience revealed their enthusiasm for the work and the experiences they extracted from it.

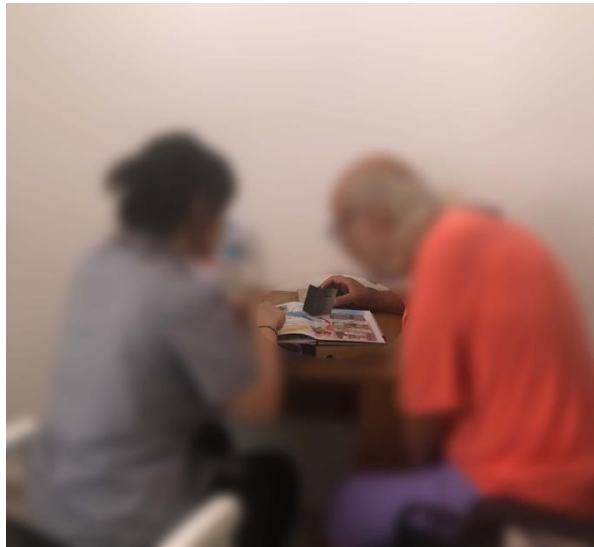


Figure 3 Design evaluation session.

5.4 Refined picturebook prototype: Augmenting nostalgia via multisensory interaction

After the evaluation session, we made minor text refinements and added tactile elements, as one participant showed interest in the lacework located on the cover but could not touch it as there was a stretch film over it. We therefore put another piece of lacework in double-spread 4 where the theme concerns handicrafts.

Besides externally manipulated sensorial interactions, we planned to embed sensorial interactions in the picturebook to increase engagement and joy via enhancing the nostalgic ambiance. Thus, we selected three double-spreads (see Figure 4) depending on participants'

engagement level and the suitability for the verbal and visual narrative. We then implemented the system for multisensory interaction. It is known that sensory experiences support recalling memories (Herz, 2004; van Campen, 2014), and therefore many researchers have worked on multisensory stimuli in reminiscence studies.

We also devised a strategy to integrate into the picturebook prototype materials/experiences which participants had previously mentioned and potentially engaged with in the past, such as using metal public-transport tokens, turning on the radio, etc. This approach aimed to heighten the book's tangible quality and stimulate their reminiscences over past experiences. A similar approach can be seen in activity reminiscence therapy, which uses old tools people are familiar with from their past experiences in order to support recall, thus people with dementia can gain confidence and be empowered by the recall of knowledge (Yamaguchi et al., 2010).

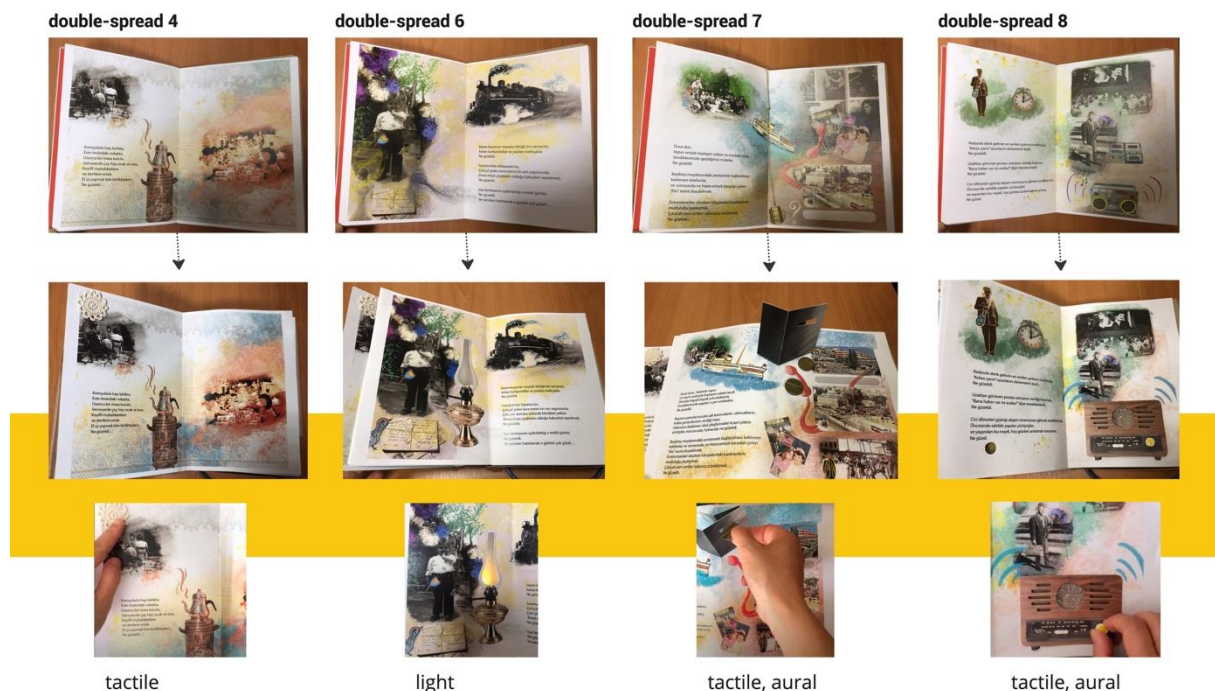


Figure 4 Revised picturebook prototype.

In the previous version of double-spread 6, we had an image of a gas oil lamp in a collage with other images. We reorganized the oil lamp as a cut-out with a transparent part for the light. We put a hidden button under the paper located in the area where people used to arrange the intensity of the gas lamp. As the user clicks one time, the lights turn on, mimicking the previous lighting experience and complementing the verbal narrative “The beautiful days illuminated by the gas lamp”. In double-spread 7, we added a pop-up structure to represent a toll gate where people used to drop metal tokens in order to board the ferry. Here, we wanted to embody the experience of interacting with the metal token. When the user drops the metal token into the hole, the sound of a ferry is heard, supporting the verbal narrative which is about making ferry journeys with loved ones. In double-spread

8, we cut out an old photo of a radio with a real rotating button to turn it on or off. When the user turns the button, a well-known song from the 1970s plays, augmenting the nostalgic reception of the verbal text: “The happiness of coming across the most beloved song on the radio.”

We got support from a maker space to design the electronic circuit via Arduino technology in order to create the multisensory interactions (mentioned above). The implementation within the book and the schematic showing the parts with arrangements can be seen in Figure 5.

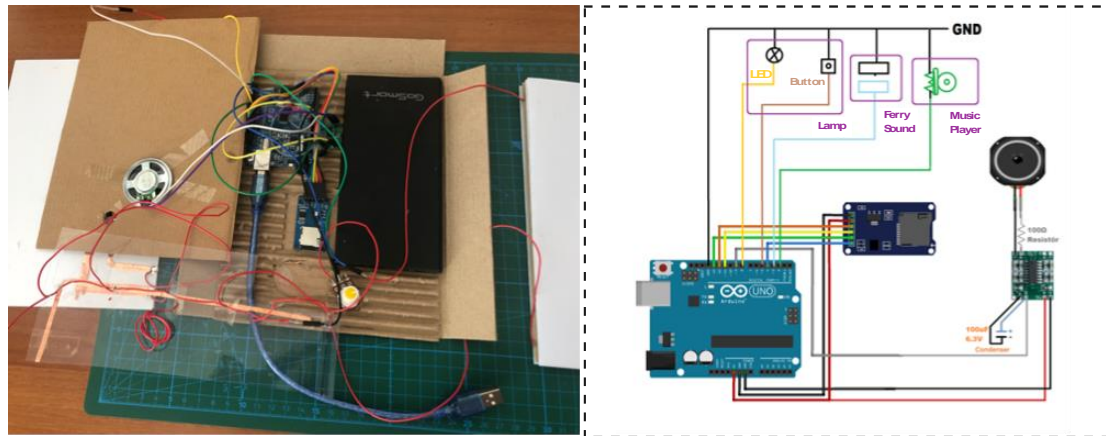


Figure 5 The Arduino electronic circuit: The photo of the arrangements and the schema of the circuit plan.

5.5 Evaluation Session II: Cooperation, Pleasure and Existence

The final prototype with multisensory experience was well-received by all the participants (6 former + 2 new) with positive feedback and reflections. Most of the participants stated that they had never seen such a book and expressed their amusement at this experience. When we inquired about their favorite page, the majority of participants pointed to the one in which music had been integrated, where they even sang along with the song. A second favorite was the page having light integration for the gas lamp. We observed that multisensory interaction enhanced the pleasure aspect of the picturebook reading. In addition, they recalled further topics and seemed happy to extend the conversations. Although the changes were minor apart from the integration of multisensory features, each participant mentioned different subjects upon reading this final version. This can attest to the richness and potential of picturebooks, leading to varied experiences in each reading due to the interplay of text and images in shared reading settings.

For the second session, the participants were all familiar with the researcher and they were aware of their involvement and support for the output. Some of the participants had already mentioned this process to other residents as well as care officials. In the care home environment, this picturebook together with its production process represented their existence in a particular setting and supported further communication among other residents, ensuring the empowerment of older adults.

6. Discussion

In this section, we review the major insights and implications that became prominent in the overall process of designing a multisensory crossover picturebook for older adults. We also mention the limitations of the study and address suggestions for further research.

Picturebook literature predominantly centers around children, even though picturebooks for adults and crossover books have started to attract attention (Beckett, 1999; Beckett, 2012; Ommundsen, 2017). In this study, we aimed to explore the potential of a multisensory picturebook for older adults, which would support their well-being via triggering positive exchanges between generations. Our overall findings based on a multistage methodology, interviews, and design evaluations highlighted that crossover picturebooks (Beckett, 2012) are capable of captivating older adults when tailored to their preferences. In addition, we observed that when older adults contribute to picturebook production, this turned out to be empowering for them and increased their social presence within the community.

The positive design framework (Desmet & Pohlmeier, 2013) guided our process in systematically dealing with our findings and designing a prototype for flourishing older adults through meaningful and joyful activity. While various methodologies such as the participatory approach for content generation have been adopted in children's book studies (Deszcz-Tryhubczak & García-González, 2023; Joosen, 2019), this research introduces a novel application – using the positive design framework – at the intersection of picturebook studies with design and HCI fields while developing a book.

In the study, we emphasized the crossover aspect of the picturebook, which was the critical part of this study as we aimed to engage both parties for mutual joy in the shared reading setting. Older adults could be accompanied by family members (whether children or adults), official caregivers, or other relevant individuals as co-readers. Our proposed picturebook, when read with official caregivers, has the potential to facilitate reciprocal dialogue in a joyful manner in care homes. Thus, this reading activity goes beyond caregiving, allowing care home workers to enjoy learning about the past through an interactive medium. Moreover, care home staff knowing more about the residents could lead to better care, supporting a person-centered care approach (Goodwin, 2016).

Considering the research gap on picturebooks targeting older adults, our work presents a unique case focusing on this specific age group and tailoring a picturebook according to older adults' preferences in terms of artistic and material qualities. Furthermore, we paid particular attention to the multisensory aspects of the book design, with a specific focus on its materiality fostering embodied experiences. Multisensory interaction as well as the materiality of picturebooks are rising topics of interest for all ages, which we also utilized for increasing the pleasure of the reading experience. There has been research on multisensory integration in reading activities for older adults mainly in reminiscence studies (Huldtgren et al., 2016; Catala et al., 2020). In our study, we also aimed at recalling the past, but the main goal of using multisensory stimuli was the enhancement of pleasure. For this purpose, we had the chance to scrutinize older adults' reception of the auditory, haptic, and tactile

interactions during reading. We also explored how further dialogues and joyful moments were triggered in the shared reading settings. We observed that multisensory integration (e.g. embodiment of past experiences) aided to increase the sense of familiarity, which was observed as an important factor for providing gratification and empowerment for older adults while interacting with the picturebook.

We crafted the picturebook prototype based on positive aspects of aging, rather than dealing with the downsides (Vines et al., 2015). Our collaboration with care home residents helped us transfer old-age participants' experiences into the picturebook format, which could then be made available to the general public. In that sense, our prototype could be a model for collaborative picturebook generation across diverse platforms by analog or digital means. For instance, this model could be used to transfer oral-history projects involving interviews into picturebook format. This process sparked our interest for further studies that could even involve artificial intelligence and turn older adults' experiences into a narrative format more easily. Our design process with older adults for an interactive multisensory literary work can inspire further studies in myriad fields starting with design and HCI. The flexible nature of picturebooks allows interdisciplinary research enabling collaborative studies that could be carried out with designers, artists, authors, publishers, engineers, and so on.

This study was a result of a collective work conducted with care home residents, designers/practice-based researchers, and picturebook researchers/artists. We extensively benefited from the foundational sources of children's literature, design studies, and the practical knowledge of all authors. Thus, theory and practice feeding upon real-life experiences helped us to formulate our final prototype. One limitation of the study may be the evaluation of the prototype with people from different age groups such as children. We therefore believe that further study and testing on reading in tandem with various duos would be complementary to this study.

7. Conclusion

In this paper, we presented a multisensory crossover picturebook prototype which evolved through many steps. We aimed to go beyond the classic target readers of picturebooks and sought benefits for especially older adults. Thus, we involved older adults while developing a picturebook in order to make it more inclusive across age groups, referring to this aspect as "crossover" (Beckett, 2012).

As our main objective was designing for older adults' well-being, the prototype was developed to create enjoyable moments via meaningful shared reading activity, mapping the three major components of positive design: pleasure, personal significance, and virtue (Desmet & Pohlmeier, 2013). The content was set up for promoting older adults' knowledge and past experiences, where younger readers are expected to discover new things and enjoy the exchange in the shared reading settings. Multisensory integration augmented the nostalgic atmosphere and complemented the narrative of the picturebook. Overall, the

picturebook prototype managed to depict some cherished moments and achieved a sense of empowerment among older adult participants. This study shows how picturebooks can provide an intergenerational ground where older adults can take pleasure in and build bridges between generations in a meaningful way. Additionally, it can be argued that picturebooks, inasmuch as they are flexible for integrating different modalities, formats, and technologies, present a rich playground for the field of design.

Acknowledgements: We want to thank care home residents who actively participated in our study, as well as the manager, Cansu Kadioğlu, whose assistance was invaluable in coordinating our meetings. We also appreciate Berk Acarkan's (from MakerCodes) support in integrating multisensory interaction into the prototype.

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