
Values-Led Intergenerational Participatory Design of Interactive Media to Enable Playful Interaction Between Preschool Children and Older Users

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Abstract

This research aims to explore how to engage with preschool children and older users in values-led participatory design processes. The project would result in a set of methodological recommendations and guidelines on how to design interactive media aimed at an intergenerational audience.

Author Keywords

Participatory, design; interactive, media; values; intergenerational; playful, interaction; preschool, children; older, users.

ACM Classification Keywords

H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

Introduction

In response to demographic changes over recent decades, research and development of technology designed for elderly users has dramatically increased, drawing on existing theories and models of gerontology [1]. Both literature in gerontology and Human Computer Interaction (HCI) describes the ageing process as mainly characterized by risk of social

isolation, loss of independence and decline in physical and cognitive abilities. Older users are generally depicted as slow at performing with technology [26;14]. However, due to radical improvements in health and advances in ageing research, older adults are increasingly experiencing a better quality of life, enjoying active, participative and fulfilling lives into old age [3;8]. Indeed, many older adults report they do not consider themselves as 'being old' [28]. The risk of classifying this cohort of people based only around their 'declining' capabilities is to reinforce the stereotype that the ageing population is a homogenous group, potentially instigating fear and denigration around the ageing process [26]. There is limited research about technology and the ageing population which addresses the potential of the social and mental capital that older generations hold and the special role that this group of people plays in the lives of their grandchildren [28]. In recent years, there is increasing interest in the potential of interactive media, such as digital games, as a means to foster intergenerational interaction. Researchers have recognized the potential of play as a way to promote connection and intergenerational learning [11;3]. In intergenerational interactions, the beneficial contribution on the wellbeing of both parties has been widely acknowledged [3;25]. For older adults, playful intergenerational interactions have beneficial impacts on their physical and mental health, reducing stress, promoting relaxation and facilitating positive changes in mood [23;28]. New technologies designed for intergenerational interaction may provide a playful experience in which users play different roles, offering new perspectives in the relationship between younger and older generations. However, there is little existing research which explores how technologies can be developed to support intergenerational play. This may

be due in part to the challenge of conducting research and design for a dual audience such as younger and older users. The difficulty to engage with children in research, particularly very young children, also may have a role. Therefore, it is common for researchers and designers of new technologies to ask adult carers such as parents or teachers what they think their children or students may need, rather than ask children directly [5;6]. Druin [7] proposes a theoretical framework which defines the roles that children can play in the design process of new technology. They may become the users, testers, informants and design partners according to how adults relate to them, what stage in the design process they are involved in, and the goals of the research. The author also highlights the resourcefulness of engaging with children in the design process. They can help the researcher to think beyond the traditional needs, be a valuable resource of energy and creativity, and force the adults to keep questioning [7].

Aims and Objectives

In this context, my research project has two main aims. First, it seeks to understand how interactive media may be designed to enable intergenerational playful interaction between preschool children and older adults, defined here as over 60 years old. The focus will be on the values of the playful intergenerational interaction and how those values can inform the design of an interactive media. The nature and type of the interactive media will be co-defined with the intergenerational cohort during the participatory sessions, according to their preferences, their desires, and their existing habits. We could hypothesize that the interactive media will be likely to entail direct simple manipulation suitable for the motor skills of young

children and the elderly, adding a tactile dimension to the interaction. Previous research on playgrounds [23] highlights how children at this age prefer games which entail objects manipulation. Moreover, however modern technology offer a wide range of options when it comes to media consumption, videos appears to be the most common preschooler digital pastime [9]. Interactive artefacts such as digital storybooks could offer beneficial experience to young children and could enhance their imaginative play, their initiative to explore, and use abstract symbols [20]. Therefore interactive videos might be a suitable media to promote children's engagement and facilitate the intergenerational interaction. Some level of design ambiguity, openness and flexibility could also be exploited as a design resource to spur imaginative play, intergenerational meanings negotiation, initiative to explore, and to allow the expression of different roles. We could anticipate that the interactive media will also offer full control over the interaction and assure an embodied experience in order to facilitate an enjoyable and natural play experience. Secondly, the research intends to gather understanding about how we might engage intergenerational participants in participatory design processes. Intergenerational participants are here meant as younger and older generations addressed as one group, rather than approached as two separate entities. Therefore, the emphasis will be on preschool children and their adult carers addressed as a 'whole'. The research aspires to result in a set of methodological recommendations about how to engage with preschool children and older users together, in participatory design processes. Besides ways and methods in which to engage them in participatory design sessions, the recommendations will include guidelines on how to

design interactive media tailored to the values, capabilities and preferences of the intergenerational cohort. The outcome guidelines to the design of the interactive media will respond to current understanding of preschool children and older users' interaction with media and technology, using developmental psychology and cognitive theories on aging, and combined with a deeper understanding of the role that the artefact may assume in playful intergenerational interactions.

Methodology

The research is still on its initial stage. Methodology will be formatively refined through each stage, informing the next. First, an iterative approach to the design process will be adopted, following the design thinking methodology [17]. The design thinking approach entails five main stages: *empathize*, *define*, *ideate*, *prototype* and *test*. Starting with the empathize phase, a deep understanding of the intergenerational cohort has been gathered, through the design of a set of personas. The personas led to the definition of the design challenge, emerged as follows: *"How might we design intergenerational interactive media to enable playful interaction?"*. In the ideation phase, values and meanings behind the playful intergenerational interaction will be elicited, through participatory design sessions. Concept ideas for intergenerational play will also emerged. The data gathered in the previous stage will inform the creation of low-tech prototype/s of an interactive media. In the last stage, the low-tech prototype/s will be tested with the same intergenerational sample of participants and refined through an iterative approach to the design cycle. A representative sample of participants, selected in pairs of preschool children (2 to 6 years old) and their 'older adult carer' (over 60 years old) (e.g. grandfather,

babysitter, family friend) will be recruited.

1. Empathize: Persona Design

First, a set of personas has been designed to configure the intended users of the interactive media. Experiences gathered in previous projects and literature about preschool children's interaction with existing media informed the design of the personas (e.g. [22;19]). The engaging perspective to the creation of personas has been adopted. This approach emphasizes how the story can engage the reader, produce involvement and insights through the understanding of characters, and create a vivid and realistic description of fictitious people [21]. Considering the very young age of the children, 'paired personas' were created. In this sense, the story of the preschool children was intertwined with his/her relationship with an adult carer. For each persona, a use scenario was created to support the elicitation and prioritization of the design requirements. Besides the narration of how the media is currently used, stories of how it may be used in the future were also imagined to inspire possible alternative scenarios.

2. Define: Design Challenge

The personas so designed has been exploited as an ideation tool. The media emerged as possible promoter of the intergenerational interaction. This guided the research toward playful intergenerational interaction mediated by new media and technologies, and led to the definition of the design challenge.

3. Ideate: Intergenerational Participatory Design

The next stage will see the engagement of preschool children and older users in participatory design (PD) sessions. The children and their older adult carer will be addressed as a single entity and the emphasis will be on the experience emergent from the playful interaction. Specifically, the values led-PD approach

[13;10] will be adopted to explore how to generate spaces for co-creation and co-exploration, and understand deep motivations behind participants' needs and observed behavior. *Values* are here meant as dimensions of meanings which people use to organize their psychological experience and make sense of it [18]. This perspective differs from how others view values in HCI. Values are not seen as 'worth' [2] nor as concepts universally shared [7]. Instead they are emergent from the personal experience of the individual and used to predict life circumstances, present and future, channeling the behavior in particular directions [12].

The sessions will embrace open-ended techniques specifically tailored to meet the intergenerational sample's needs and capabilities. A playful participatory environment for young children and their adult partners will be developed with content and activities suitable for this age group. Different levels and types of facilitation to support the co-creation process will be implemented during the sessions. Such young children perceive the world by playing and singing [16;27], therefore the activities organized will be mainly art-based. For example, the use of music, although often neglected in the co-design process with children, may function as a trigger in the creative process, promoting their engagement, eliciting attention and arousing sensations [24]. The PD sessions will result in the co-creation of concept ideas for intergenerational playful interactions.

4. Prototype/s creation

Based on the concept ideas emerged at the ideation stage, low-tech prototype/s will be defined.

5. Test: Evaluation of playful intergenerational interaction mediated by the low-tech prototype/s

The prototype/s so generated will be refined and tested through an iterative approach with the same

intergenerational sample of users. This stage will result with the definition of one final low-tech prototype of an interactive media aimed to enable playful intergenerational interaction.

Contributions

The project will result in a set of recommendations on how to engage preschool children and older users in participatory design processes and how to design interactive media for an intergenerational audience. A set of guidelines about methods and approaches to elicit and embed values in the design process will be produced. The outcomes may contribute to promoting ethical design in respect to people's values, connecting generations, and ultimately having possible beneficial impacts on the wellbeing of both younger and older users.

References

1. David C. Burdick and Sunkyo Kwon, eds. 2004. *Gerontechnology: Research and Practice in Technology and Aging*. Springer Publishing Company.
2. Gilbert Cockton. 2004. From quality in use to value in the world. In *Extended Abstracts on Human Factors in Computing Systems* (CHI EA '04). ACM. New York, NY, USA, 1287-1290. DOI: <https://doi-org.salford.idm.oclc.org/10.1145/985921.986045>
3. Hilary Davis, Frank Vetere, Martin Gibbs, and Peter Francis. 2012. Come play with me: designing technologies for intergenerational play. *Universal Access in the Information Society*, 11,1: 17-29.
4. Allison Druin and Cynthia Solomon. 1996. *Designing Multimedia Environments for Children: Computers, Creativity, and Kids*. Wiley Computer Publishing, John Wiley and Sons, Inc., One Wiley Drive, Somerset, NJ.
5. Allison Druin. 1999. *The Design of Children's Technology*. San Francisco: Morgan Kaufmann Publishers.
6. Allison Druin. 2002. *The Role of Children in the Design of New Technology*. Behaviour and Information Technology (BIT) 21 (1), pp. 1-25.
7. Batya Friedman and Peter H. Kahn Jr. 2002. Human values, ethics and design. In *The human-computer interaction hand book: fundamentals, evolving technologies*, Andrew Sears and Julie A. Jacko (Eds.), L. Erlbaum Associates Inc., Hillsdale, NJ, USA, 1177-1201.
8. Cheryl Grady. 2012. The Cognitive Neuroscience of Aging. *Nature Reviews Neuroscience*, 13: 491-505.
9. Alexis Hiniker, Sharon S. Heung, Sungsoo Ray Hong, Julie A. Kientz. 2018. Coco's Videos: An Empirical Investigation of Video-Player Design Features and Children's Media Use. In *Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems*, 254. ACM.
10. Ole S. Iversen and Tuck W. Leong. 2012. Values-led participatory design: mediating the emergence of values. In *Proceedings of the 7th Nordic Conference on Human-Computer Interaction: Making Sense Through Design* (NordiCHI '12). ACM. New York, NY, USA, 468-477. DOI: <https://doi-org.salford.idm.oclc.org/10.1145/2399016.2399087>
11. Matthew Kaplan, Mariano Sánchez-Martínes, and Leah Bradley. 2013. *Using Technology to Connect Generations*. University Park, PA: Penn State University & Washington DC: Generations United.
12. George A. Kelly. 1955. *The Psychology Of Personal Constructs. Vol. I, II*. Norton, New York. (2nd printing: 1991, Routledge, London, New York).
13. Tuck, W. Leong and Ole S. Iversen. 2015. Values-led Participatory Design as a pursuit of meaningful alternatives. In *Proceedings of the Annual Meeting of the Australian Special Interest Group for Computer Human Interaction*, ACM, New York, NY,

- USA, 314-323. DOI: <https://doi-org.salford.idm.oclc.org/10.1145/2838739.2838784>
14. Siân, E. Lindley, Richard Harper, and Abigail Sellen. 2008. Designing for elders: exploring the complexity of relationships in later life. In *Proceedings of the 22nd British HCI Group Annual Conference on People and Computers: Culture, Creativity, Interaction-Volume 1*, British Computer Society, 77-86.
 15. Lisa, P. Nathan, Batya Friedman, Predrag Klasnja, Shaun, K. Kane, and Jessica, K. Miller. 2008. Envisioning systemic effects on persons and society throughout interactive system design. In *Proceedings of the 7th ACM conference on Designing interactive systems*, DIS '08, ACM. New York, NY, USA, 1-10. DOI=<http://dx.doi.org.salford.idm.oclc.org/10.1145/1394445.1394446>
 16. Jean Piaget. 1962. *Play, Dreams, and Imitation in Childhood*. Norton, New York.
 17. Hasso Plattner, Christoph Meinel, and Larry Leifer. Eds. 2010. *Design thinking: understand-improve-apply*. Springer Science & Business Media.
 18. Jonathan, D. Raskin. 2002. Constructivism in psychology: Personal construct psychology, radical constructivism, and social constructionism. *American communication journal*, 5, 3: 1-25.
 19. Kelly, L. Schmitt, Daniel, R. Anderson, and Patricia, A. Collins. 1999. Form and content: looking at visual features of television. *Developmental psychology*, 35, 4: 1156.
 20. Smith, R., Cynthia. 2002. Click on me! An example of how a toddler used technology in play. *Journal of Early Childhood Literacy* 2, 1: 5-20.
 21. Eva Sønderstrup-Andersen. 2007. Personas. En domæneanalytisk tilgang. In *Dansk Biblioteksforskning*, 3, 2.
 22. Gemma Taylor, Padraic Monaghan, and Gert Westermann. 2018. Investigating the association between children's screen media exposure and vocabulary size in the UK. *Journal of Children and Media*, 12, 1: 51-65.
 23. Barbara Teater. 2016. Intergenerational Programs to Promote Active Aging: The Experiences and Perspectives of Older Adults. *Activities, Adaptation & Aging*, 40, 1: 1-19.
 24. Ruut Tikkanen and Netta Iivari. 2011. The role of music in the design process with children. In *IFIP Conference on Human-Computer Interaction*, Springer, Berlin, Heidelberg, 288-305.
 25. Frank Vetere, Hilary Davis, Martin Gibbs, and Steve Howard. 2009. The Magic Box and Collage: Responding to the challenge of distributed intergenerational play. *International Journal of Human-Computer Studies*, 67, 2: 165-178.
 26. John Vines, Gary Pritchard, Peter Wright, Patrick Olivier, and Katie Brittain. 2015. An Age-Old Problem: Examining the Discourses of Ageing in HCI and Strategies for Future Research. *ACM Trans. Comput.-Hum. Interact.* 22, 1, Article 2. DOI: <https://doi-org.salford.idm.oclc.org/10.1145/2696867>
 27. Lev Vygotsky. 1978. On the Zone of Proximal Development. In: *Mind in Society*. Harvard University Press, Cambridge, 84-91.
 28. Fahn Zhang, and David Kaufman. 2016. A review of intergenerational play for facilitating interactions and learning. *Gerontechnology*, 14, 3: 127-13