

Child designers creating Personas to diversify design perspectives and concepts for their own Technology Enhanced Library

**Helvi Itenge-
Wheeler**

NUST

Windhoek, Namibia
hwheeler@nust.na

**Heike Winschiers-
Theophilus**

NUST

Windhoek, Namibia
hwinschiers@nust.na

Alessandro Soro
QUT

Brisbane, Australia
alessandro.soro@qut
.edu.au

Margot Brereton
QUT

Brisbane, Australia
m.brereton@qut.edu.au

ABSTRACT

We report on a participatory design project that explored the use of child-created Personas to enable child designers to empathize with other children thereby contributing multiple divergent perspectives. The ongoing project aims to promote reading and creative writing skills among young children in Namibia. For decades libraries worldwide have been the key actors in fostering reading. Hence, in order to maintain their relevance, they are being re-conceptualized to cater for new needs and aspirations in the 21st century. In Namibia, dysfunctional public and school library services are lagging behind in this renovation effort, and are not contributing to the promotion of a reading culture. In an ongoing collaboration with a school in Windhoek, to design and implement an interactive tech library, 19 young learners engaged in weekly participatory design workshops to redesign their own school library. The children first created four distinct Personas for which they then modelled spaces and technologies. This paper reflects on the techniques used to enable children to become active design partners and to gain an understanding of designing for other children.

Author Keywords

Children, persona, design, reading experiences, Namibia, interactive tech library, participatory design

ACM Classification Keywords

Human-centered computing → Interaction design → Interaction design process and methods → Participatory design

INTRODUCTION

Multiple methods and techniques have been devised to engage children in design activities, drawing from user-centered and participatory design traditions such as comic boarding [16], role-plays, scenarios, focus groups, brainstorming, [8] and many more. Children's roles in the

co-design of technologies range from tester to design partner [7]. In this paper, we focus on the use of the technique of Personas in designing with children. Personas were popularised by Cooper (1998) and have been widely adopted in the design and validation of technologies. Personas are fictitious users, archetypical representations that are based on aggregated quantitative and/or collected qualitative user-data [17]. Child-personas, more specifically, help designers to deflect from their own childhood experiences and memories, focusing on the agreed upon characteristics of the fictitious child-persona [1]. A number of researchers have investigated the creation and use of child-personas for the design of more appropriate technologies for children [22, 5]. However, so far, children have only been engaged as informants to create and validate the personas. Research has not yet explored using child-personas more fully within a child co-design process, in which children as design partners contribute their creativity and make direct design inputs. Further, [10] suggest extending children beyond the role of design partners to protagonists with the emphasis on developing their critical reflection and design abilities [10]. [21] has shown that child-created personas can help children to synthesize children's insights. Moreover, considering children's inclination to create and identify with fictional characters, as part of their childhood development, we anticipate a seamless adoption of personas as design tools. Based on these premises, we are investigating the use of child-created personas to enable child designers to empathize with children different from themselves thereby contributing multiple divergent children perspectives.

Motivated by the general lack of a reading culture in Namibia [13], we are investigating how reading experiences for Namibian children can be enhanced with emerging technologies. We established a long term partnership with a school in Katutura, an underserved suburb of Windhoek, to co-design an interactive school tech library. Over a period of four months we engaged 19 children aged between ten and thirteen in the redesign of their own school library in order to create a conducive reading space and technologies that cater for children with a variety of reading skills and liking for reading. We aimed for the children to abstract from their own perspective and design to accommodate different kinds of children.

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In the following we first present related work on designing with children and on the technique of personas. Then our empirical work is presented within the broader context of Namibia and the collaboration with the school. We then share a detailed description of the workshops in which the children first created four very distinct child-personas in terms of reading skills and liking for reading. The children then modelled reading spaces and technologies using wood, clay, recycling materials, and Legos to play out different persona scenarios. Under the premise that “Children come to understand more abstract ideas through implicit, metaphorical elaboration of their physical experiences” [3] we dedicated one session for the children to embody personas. The children simultaneously enacted personas to experience spatial relations and constraints within a common space. Reflecting on the persona technique as an enabler for diversified design perspectives and concepts we identified themes for discussion, such as children identifying with personas, persona related design outputs and design affordances. We conclude that the use of child-created personas is a useful tool to enable child designers to conceptualize technologies and spaces for other children.

REAL AND FICTITIOUS CHILDREN IN DESIGN

Co-designing with real children

The significance and benefits of designing with children has been widely recognized, with researchers progressively exploring and extending the role of children as research collaborators in design [7], [21]. Children have been in charge of conducting interviews and keeping diaries, while synthesizing findings in form of self-created personas. [21] confirmed that children could be capable research collaborators yet emphasized the need for specific training. While we agree with [9] that children, though naturally creative, cannot “replace” designers who have been trained and gained experiences over years, we argue that the point of enabling children with design abilities is to embrace them as peer design partners, wherein they contribute in their own capacity as “experts at being children” [8]. We aim to explore further how we can extend their role in mixed generation participatory design endeavours, developing critical thinking, design skills and understandings that endure beyond the immediate design project. To extend learning in this way, appropriate supporting tools and techniques need to be devised. Hence, in the next section, we examine how the persona technique can be adapted to enable child designers to broaden their perspectives.

Personas

Conventionally a persona consists of three compounds a name, an image and a meaningful narrative [15] in the form of a free text or a structured description of the personas traits, likings, needs, goals or other relevant information to determine technology requirements and appropriate features. “Personas help us understand users, not as part of a group or a demographic, but as individuals with a history, goals, interests and a relationship to the product” [19]. They can ensure focus and efficiency, build empathy, encourage

consensus, and lead to better design decisions [17]. On the other hand, personas have been criticized for the lack of a systematic creation process and designer bias, such that they may not accurately ‘identify representative users’ [19]. From a participatory design perspective, a major criticism is that personas can replace involving real users in the design process.

However, personas have also been appropriated into participatory design with real users in two ways. First, pastiche personas have been used as a communication tool within participatory design sessions [6] to unveil design issues. Second, participants have been involved in creating personas. [23] successfully engaged health workers in a rapid-persona building workshop in order to harness expert knowledge and reach design consensus. [24] facilitated a group of Malaysian youth creating personas to then freely simulate personal sms conversations needed for further design decisions. While [4] explored cultural variants of user-created personas and their ability to express needs and values across cultures.

Real children designing with fictitious children

We now narrow down the discussion to child-personas and their use by child design partners. The most important aspects of child-personas are their developmentally based needs and focus on experiences rather than task oriented goals [1]. One could argue that engaging “real children” would prevent biases yet [16] remind us that the often skewed selection of child participants in PD sessions, may lead to designs that favor those participants’ characteristics rather than designs for a more representative group of children. [21] engaged children in collecting data and creating personas in order to synthesize personal information of participants and relatives as a basis for further design discussions [21]. The approach seems promising yet requires more empirical work. Thus we investigate personas as a tool to enable child designers to abstract from their own perspective and develop multiple child perspectives.

RESEARCH CONTEXT

Reading culture in Namibia

The majority of Namibian learners especially in the government schools only read textbooks [11]. The lack of a reading culture in many African societies has been attributed to an oral cultural background [20]. In the absence of reading at home, school libraries play a critical role nurturing reading skills, comprehension and writing skills (World Bank (2008)) as cited in [18]. Although there are libraries in all Namibian schools, more than 80% lack adequate resources, especially reading books [18].

Design process and phases

Within the four months of engagement, different phases and design activities were undertaken. The children started designing their physical space determining themes to be accounted for in the interior design of the new library. The children were then exposed to different existing technologies, such as free apps and specifically designed

apps by the university students make [12]. Subsequently the children engaged in persona creation, followed by the modeling of library spaces for the personas and an enactment of the personas. Afterwards, the children engaged in a number of very specific tech designs in collaboration with the university students. The semester was concluded with a public open day interactive exhibition by the students and children to show-case the complete design of the interactive tech library. A secondary aim was to attract sponsorship to implement the design.

PERSONA CREATION AND USE BY CHILDREN

Overview

The study described in this paper reports on the activities related to the persona creation and use sessions only, which consisted of four distinct phases. Firstly, the children were grouped according to their story reading and representation abilities to then be assigned to the design of a specific child persona. Secondly, four distinct personas were created by the assigned groups. Thirdly, in a workshop, children modelled spaces for the personas. Lastly they enacted the personas within a shared space, simulating being in their imagined library. Figure 1 below gives an overview of the phases.



Figure 1. Phases in the creation and use of personas

Phase 1: The grouping process

In the first session thirteen children were engaged in reading a story and illustrating the story with their own drawings. The primary purpose of that workshop was to prepare for a later demonstration of a story-board technology. At the same time, an analysis of their drawings was used to group the children for the persona design workshop.

A set of printed stories were retrieved from the internet with the search ‘free short stories for children’. The stories were selected for their suitability for the 7-14 year age group. The children, in order of youngest first, selected one story each. They were then given time to read for about 20 minutes, during which most of the children read aloud alongside each other. The children were then given plain white and colored paper on which to draw illustrations, to reflect back on what they remembered from the story. These were collected for later review. After the workshop, the facilitators reviewed the drawings and grouped the children according to their understanding and representation of the story:

Group A: Three children understood the story very well, their drawings showing the main characters and scenes.

Group B: Five children understood the story, with most of the characters visible in their drawings, but with some important details were left out.

Group C: No children were assigned to this group which was intended for students who did not understand but were trying to relate to the story with detailed drawings. Thus it was kept open for the absentees from the drawing session.

Group D: Five children made drawings that only marginally related to the story, depicting one seemingly randomly selected object that was mentioned somewhere in the story.

Phase 2: Designing personas workshop

Fifteen children participated, eleven of whom had also participated in the previous drawing session. The four who were not present during the grouping were assigned to Group C. Each group was requested to design a persona based on two parameters; the persona’s skills and liking for reading.

The purpose of creating these four distinct personas was to cover the entire spectrum of child users in a simple manner. The assigning of groups was based on the assumption that children would find it easier to create a persona with traits similar to their own than a persona with which they could not identify. E.g. children passionate about reading could easily create a fictional character resembling their own traits.

Each group had one facilitator guiding the children in their design through prompting if necessary. Jointly they determined the name and gender of the child and step by step the children generated more details using their thoughts and imagination, by writing, drawing and putting sticky notes on A1 sized paper. After 100 minutes the groups presented their personas to the rest of the participants. The personas designed by each group are presented below.

	Name: Anna Michel Ruth Age: 13 years old Gender: girl Grade: 7 Reading skills: good, likes reading
	Family details She’s from a middle income family.
Physical appearance	She’s medium sized and pretty. She’s lighter in complexion. She has long hair and wears a bow tie.
Relationships	She does not have a boyfriend. She’s loved by teachers. She has close friends.
Personality	She is very helpful. She’s kind a sweet. She is also outgoing and loves to be with other kids.
Reading	She has excellent grades. She got her specs from reading so much. She learned how to read since she was small. Because she grew up with a family that loves reading, she adopted to it. Her friends and family are readers too. She likes to read in quiet corners. She wants to become a librarian, storywriter or a teacher. She likes to motivate others to read.

Table 2. Group A Persona: can read / likes reading

Group A consisted of girls only with excellent reading skills and a liking for reading. The creation of the persona was a straightforward

listing of only positive characteristics together with a drawing of a child, light in complexion in contrast with all participating children.

	Name: Rivaldo Ronaldo Age: 12 years old Gender: boy Reading skills: good, does not like reading
Family Details	Has one sister. Lives with his mother and father.
Physical appearance	He is handsome and tall.
Relationships	Like splaying soccer with friends
Personality	He is smart. He's good in school. He loves soccer. He does not care about doing his homework instead he wants to play soccer.
Reading	He's mother read to him when he was small. He stopped reading because of the influence of his friends. When it's time to read he goes out to play soccer as he hates reading.

Table 3. Group B Persona: can read / dislikes reading.

Group B consisted of girls with good reading skills and a liking for reading. The group created different scenarios with 6 drawings of the persona at home, at school, asking friends to stop reading to go play football, playing football, and refusing to read. The persona listed a mix of positive and many negative characteristics.

	Name: Vicky Age: 12 years old Grade: 6 Gender: girl Reading skills: poor, likes to read
Family Details	She lives with parents.
Physical appearance	She has big eyes. She has long hair. She's beautiful.
Relationships	She always plays alone
Personality	She likes to go to school. She can't read she tear up the books.
Reading	She likes going to the library and take books to read. When she can't read, she gets frustrated. She does not know what to do about the books. She takes story books.

Table 4. Group C Persona: cannot read / likes reading.

Group C consisted of girls with a mixture of good and poor reading skills. The creation of the persona was a brown girl with positive and a few negative characteristics. Originally the group only drew an image but added the traits during the class presentation.

	Name: Stella Age: 12 years old Grade: 6 Gender: girl Reading skills: poor, does not like reading
Family Details	She lives with her mother, father sister (11) and brother (12). They live in Kleine Kuppe. The family like to shop at pep store.
Physical appearance	She's short, small eyes like a chicken.
Relationships	She does not like to be with people; Prefers to be by herself.

Personality	Likes Afrikaans, Math, Natural Science, English and life skills. Does not like Social Studies. Does not like to study. Favorite food is pizza. Favorite color is red. She likes modeling, riding bike and playing soccer.
Reading	She needs spelling games/toys

Table 5. Group D Persona: cannot read / dislikes reading

Group D consisted of boys and one girl with poor reading skills. The persona was named after the girl in the group. The persona consisted of a few positive and many negative characteristics.

For the most part, the four personas were created with great details. During the presentations the children added further details which were incorporated in the above descriptions.

Phase 3: Designing spaces for personas

The purpose of this workshop was to create a library space and activities that accommodated all four personas, by making models with a variety of different materials. Fifteen children participated. Firstly, we brainstormed on all the technologies the children had experienced or encountered in previous sessions (such as Charades, Madlibs, augmented reality reading app, and children's technologies shown in videos). Then we refreshed everybody's memory of the four personas created previously. The children rotated in groups between stations with different materials; wood, plastic Lego, paper recycling materials and clay. They created models of different spaces and enacted scenarios within the model spaces with small figures. See Figures 2 to 4. First the children built walls to demarcate the library. Descriptions of spaces made for the four personas follow:

Anna-Michelle: The children created a quiet reading corner, isolated from the other rooms, for Anna-Michelle, with a stack of books for her to grab.



Figure 2: Anna-Michelle: reading corner (Lego, wood, clay and recycling stations)

Ronaldo: One room was dedicated to Ronaldo setup with a soccer projection game. By reading projected instructions on the floor Ronaldo could physically engage in virtual soccer play. Computer based soccer games were also created for Ronaldo to entice him to read. The children also built ships, cars and planes that would only move once the children start reading. It was assumed that Ronaldo would enjoy this.



Figure 3: Ronaldo: soccer projection (wood) moving ship (Lego) computer games (Lego and recycling)

Stella: The children created devices to make reading interesting for Stella such as a reading dinosaur, a talking

flower, a magic reading mirror, a talking robot, reading applications, and water proof books for use in water.

They played a scenario where Stella interacts with a story reading robot, and then takes a break by sliding into imaginary water with water proof books. She then goes to different library corners and plays with technology reading games like Charades, looks at some books and then returns to the robot to continue with her story. Another child played Stella just kicking and tearing the books, which then become a reoccurring theme copied by other children.



Figure 4: Stella: scenarios (wood) technology (clay), magic mirror (clay and Legos)

Vicky: For Vicky, the children created a talking tree with the capability to correct spelling, a magic reading mirror (as for Stella) and a computer with reading technology games. They made a space with books hanging from the ceiling and comfortable pillows so that Vicky could lay down in comfort while she was reading, looking up at the books.

Observations: Throughout the workshops children were copying ideas from each other, confirming ideas or varying them to express different ideas. It was interesting how all groups took a protective approach for Anna-Michelle creating her a quiet space to prevent distraction and disturbance from others.

For Stella, who liked movement and needed help to read, the children responded with slides, water and waterproof books, so that she could move in a variety of ways, together with interactive talking robots and reading dinosaurs to help her read in an engaging way. For Vicky, a less active child who needed help reading they made a talking tree and reading mirror. For Ronaldo, the children responded to his love of soccer, engaging him to read while playing soccer.

Phase 4: Enacting personas in role play

Fifteen children participated in this activity which took place in front of their class room on a small grass patch. The purpose of the activity was for the children to experience the different types of children being in the same space at the same time, in this case in the imaginary tech library, by enacting the personas simultaneously.

In order to create a physical experience every child chose one of the four personas from the previous workshops in their head. We told the children to imagine they're in their school tech library, and to start acting like the persona they selected. After 2 minutes the facilitator shouted 'freeze.' and each child remained in the position they were in at that point. The facilitator went around and touched one child asking them to explain which persona they were acting, what they were doing in the library, and what technology tools are needed in the library to accommodate the persona?

Extracts from the children's answers follow, the numbers in brackets indicating how many children had similar answers:

"I'm Stella ... I was fighting with books. I don't know how to read and I don't like reading (2)... I want books with modelling images because I like modelling."; *"Vicky ...I was trying to read but I could not... I can read next to the talking flower so that it can correct me when I'm wrong ... or a magic mirror ...or a quiet place with someone to help me read (4)";* *"Anna-Michelle Ruth...I just want to be in a quiet place reading without anyone making noise.";* *"Ronaldo ...I know how to read, but I don't like reading. When I take a book, I just look at the picture and throw it away. Throwing the books and kicking them like soccer. I don't care about reading because my mom will always do my homework"*

Observations: The child who acted as Anna-Michelle expressed that she liked the character Anna-Michelle because she would sit quietly and read books. She added that she was not impressed by the other characters like Vicky who tore up the books and they were too noisy. She thinks that's so disrespectful. Another child was not amused by the children who didn't take the activity seriously. She pointed out that two to three children were being silly laughing and biting others once the facilitator shouted freeze. This became evident once asked by the facilitator to elaborate on what they were doing while acting and they had nothing to say. A few children did not grasp this activity. When one child was asked what she thought about the activity she said, 'I enjoyed this activity because in the future people might come to visit the library and ask us to act, and I will be able to act.' One child who likes reading chose the persona Stella who does not like to read. She tossed the books and acted frustrated in the library. She said, 'I like acting pretending to be someone else. I also enjoyed seeing other children acting different persona while I guessed what those personas are.'

DISCUSSION

Reflecting back on the different activities and the consideration of personas as a tool to enable child designers to explore multiple perspectives we have identified different themes. Firstly, we look at how children identify with the different personas. Secondly we analyse the ability of the child designers to suggest designs relevant to the specific personas taking their needs and traits into account. Thirdly we consider how design affordances of the modelling materials influenced the design outcomes. We then briefly account for challenges experienced.

Identification with personas

The identification of children with fictitious characters has been well researched in the field of child development in psychology and education. It has been established that it helps children expand their awareness of themselves and others [14]. Thus personas, as fictitious characters, would help child designers to internalise other children's perspectives if they can identify with the given persona. The personas showed some similarities of needs and likings with the group participants, e.g. a quiet corner to read for Anna-

Michelle, or the soccer playing of Rivaldo and Stella. Furthermore, the naming of Stella was the real name of the only girl in the group. We have observed that the children had no particular attachment to their own persona and when asked to play out or enact a persona they did not choose the persona they had created. In other words, they gladly identified with another character with traits and needs very different from their own. A sole exception was Stella, the only child with a persona named after her, who then also acted as Stella. Thus for the majority of the children identification with personas was natural and enjoyable, providing a basis for diversified design thinking.

Persona relevant designs

Acknowledging others' needs and likings is one issue, yet to design appropriate technologies and spaces is another one. [2] describes mapping personas to designs as challenging. In our setting the children were exposed to numerous technologies and discussions thereof over the months which directly reflected in their creations. We observed that the children took great care in firstly ensuring the inclusion of a vast variety of designs in their modeled spaces thereby catering for all personas. Secondly in playing out the scenarios or enacting the personas the children did map the designs to the personas in accordance with their understandings of the persona's needs and likings. The most intuitive seemed to be the mapping for Anna-Michelle who's need was expressed explicitly in the persona description, namely the quiet corner. The expressed fixation of Ronaldo on soccer was equally translated into the designs created for him. Interesting here was the approach to design technologies where the reading is hidden in activities that Ronaldo would enjoy. More challenging was the design of appropriate technologies for the personas who cannot read, like Stella and Vicky. The children were very imaginative coming up with talking flowers, trees, robots and magic mirrors with different degrees of reading to the children up to correcting the children's reading. They also suggested technologies allowing for movement and other excitement such as water proof books to be read in a swimming pool. Again this directly correlated with their own collective desires to be physically active as we have observed throughout the design sessions. The children much enjoyed, for example, a reading treasure hunt design which allowed them to run across the entire school premises. Thus the designs certainly incorporated their own wishes with the ones of the created personas. A further observation was that for most of the activities the children did not differentiate between Stella and Vicky. We speculate that it is hard for the children to imagine that somebody cannot read but likes reading thus the children ignored the distinction of the likings between those two personas and mapped the same designs to them. Overall we argue that the children did do an adequate mapping of designs to personas.

Design affordances

We are aware that the tools and techniques provided to support design activities provide different affordances

influencing the outcome. Most children expressed their preference for the wood station, which allowed rapid and clean expression of ideas as stated by one child "the one I enjoyed a lot was the wood station because everything was already made and you just to put them or design them like a library. It was fun because it had tiny people made out of wood so we could use them like characters." The clay, on the other hand afforded detailed designs as one child stated 'I liked the clay because clay was so nice and soft when touching it and it was also nice and fantastic when I was painting things like the magic mirror I love it.'. We also observed that the scenario playing with materials afforded better design thinking than the enactment of personas which was too abstract and mostly provided awareness of shared space. It may need more development and props. Overall we recommend further investigation of the different affordances of techniques and materials for exploring personas.

Challenges

As in all design endeavors, the process was not without challenges. The 19 children encompassed a variety of personalities, desires and abilities which surfaced throughout the activities. While some children were very focused and creative, others lost interest and attention quickly. In presentations at times the children without ideas just repeated what they had heard or seen from others. At times some children did not understand the instructions or the purpose of an activity. For example, during the persona enactment some of the children simply concentrated on acting and being wild rather than identifying with a persona. Also during modelling sessions some children needed much prompting to unleash ideas and creativity and at times ended up not participating.

CONCLUSION

In this study we have contributed to empirical work on personas from a different angle. We have shown that personas can enable child designers to explore different children's perspectives, thereby diversifying their own design thinking and contributing a greater variety of design concepts. Children's ability to identify with fictitious characters promotes the child designer's empathy for other children. The child designers successfully mapped appropriate designs to the distinct personas. Each technique and tool used to support persona design afforded the child designers with a different focus. For example, the wood station provided spatial thinking while the clay promoted detailed modelling of technologies. Despite challenges in engaging children with different needs and skills, personas as a technique provided structure, helped children to empathise, remember and reflect. Thus we conclude that the use of child-created personas is a useful tool for child designers to diversify their design contributions.

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SELECTION AND PARTICIPATION OF CHILDREN

The children were selected from the hostel of the collaborating school as follows: The main researcher presented the project to grade 4, 5 and 6 learners. It was explained that they would be part of redesigning their own school library during 2-hour weekly design sessions at the school. The children interested raised their hands and were given consent letters to be given to their parents. Only the children who returned the signed consent letters were permitted to join the project. Before every session we explained the purpose of the workshop, the children's right to leave and to refuse being recorded. The children then signed a form indicating that they want to be part of this workshop and that pictures and videos may be taken-

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