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CHAPTER 6

Playful Learning by Design in Kenya

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Abstract

Design projects can function as a carrier for learning a subset of 21st century skills – but how does that play out in a rural community in Kenya that is unfamiliar with this approach to design education, and in a culture and context that the developers of such design education are not familiar with? This chapter recounts the development of a workshop programme that aims to teach design-related skills to primary school aged children in the non-formal context of a community centre in rural Kenya. As a collaboration between a Dutch academic design school and a local Kenyan non-profit organisation, the project required rethinking design education for a different cultural and economic context. This impacted the educational approach, including learning goals and design goals, didactics, educator support, and communication channels. Travel restrictions due to the Covid-19 pandemic enforced a remote development process, which created space for increased agency of the participating children and facilitator. The resulting workshop instruction guide scaffolds the local facilitators' design (education) knowledge and supports playful group learning processes.

Keywords

co-design – playful learning – design education – culture – maker activities

1 Kenyan Children Designing Toys: The Initial Assumptions and Aims

Times of hardship can spark initiatives with unforeseen value. In 2020, the Covid-19 pandemic brought formal primary education in rural Kenya largely to a standstill. In West Kenya, in Kisumu County, there is a local community centre run by Sustainable Rural Initiatives (SRI). The director of SRI sought opportunities to provide the local children with alternative informal learning

experiences. He contacted old acquaintances from the Dutch design school Industrial Design Engineering (IDE) at Delft University of Technology. At IDE, a research and development project had previously been conducted on co-design as an educational format for children in primary education in The Netherlands (Gielen et al., 2020; Klapwijk et al., 2021). Hence our thoughts went towards creating a programme that would implement design education for children in the specific cultural and economic context of rural families in SRI's community.

The project was loosely defined around various assets at SRI. The community centre housed workshop facilities for crafts such as woodworking and tailoring that could be used. A facilitator was available to support children's learning process. At IDE, knowledge was available of design methodologies (Van Boeijen et al., 2020), including culturally sensitive design (Van Boeijen & Zijlstra, 2020). The previous project at IDE had identified factors that enhance design as a learning process (Klapwijk & van den Burg, 2019) for training a subset of 21st century skills (Voogt & Pareja Roblin, 2012), such as creative problem-solving and communication. Finally, IDE could provide a Master student eager to develop a design education format. Designing and building toys was deemed an appropriate focus for the workshops, based on the following assumptions: toys relate to children and motivate them to engage in the design process; designing toys would enable the children to replace their current imported toys with ones that reflect their own cultural identity and individual play preferences; it could replace plastic with more sustainable locally sourced materials; and it might even provide a basis for setting up production and sales of toys – an opportunity to train their entrepreneurial skills. Combining the perceived assets and focus on toys, an assignment was drafted to develop an educational design programme for the children attending workshops at SRI's community centre. Over the course of five months and within the evolving constraints of the Covid pandemic, this project was carried out by a graduating Master student in Industrial Design Engineering (1st author), operating as education developer. During this period, a series of workshops with supporting instructions and videos were developed, sent to the local SRI employee, discussed before and after each session for as far as communication channels were available, and improved in an iterative design research process. In some cases, the results of the workshops were shared with the education developer, who could send feedback to the children through video messages. After several iterations, the final workshop instruction sheets and supporting videos were integrated in a toolkit that aims to aid in hosting a series of educational design workshops for children at SRI, and for the workshop facilitator to independently host follow-up workshops. This chapter recounts the insights evolving from the project and the playful design toolkit in which it resulted (Westerhof, 2021).

2 Drivers for the Workshop Development Process

Designing is dealing with uncertainty. The result is never clear at the start and the solution space may alter, depending on intermediate insights and contingencies. Five main drivers that influenced the solution space of this specific project are identified and discussed below.

2.1 *Remote Collaboration during a Pandemic*

Usually, designers attach great significance to experiencing a context they are not familiar with themselves (Van Boeijen, 2015). As an outsider (Banks, 1998), it is key to participate closely with local people to avoid biases and to understand what is relevant for the design and what not. Subtle details are difficult to understand from, for example, literature alone (Hao, 2019; van Boeijen & Stappers, 2011). However, due to the COVID-19 pandemic the education developer was not able to travel and study the context locally or facilitate early versions of the workshop himself. Therefore, new ways of research and development were implemented via remote collaboration with SRI's employees and the involved children.

To cope with remotely developing the education programme, the education developer's efforts focused on facilitating 'learning by doing' by preparing digital instruction materials. With the help of these materials, the local facilitator took on the role as organiser and facilitator. Conversations after each workshop and the photos and videos of the activities that the workshop host recorded allowed the education developer to acquire an understanding of the local context and to improve the workshop materials.

Few funds were available at SRI, which put heavy constraints on how the communication could be sustained. Video or audio calls between the education developer and the workshop host and participating children were too costly and unreliable to maintain during the workshops. To limit these costs, it was essential that the toolkit would make the facilitator function independently during the workshops. Thus, the workshop toolkit came to focus on instructions for the facilitator rather than the children. It was the facilitator who needed to understand and apply the characteristics of the workshop that triggered children to learn design skills.

2.2 *Co-developing Culturally Embedded Workshops*

For the workshops to be effective, a culture-sensitive design approach (Van Boeijen & Zijlstra, 2020) is key. The way in which the workshops are structured and fleshed out is important to the suitability of their use in the context, but also to what they teach and in what way. A variety of aspects was considered,

including the topics for the design challenges, design terms (language and jargon), and the language and music that are used in the supporting videos in the toolkit.

During the development of the toolkit, the children's opinions of the activities were mainly interpreted by the facilitator and then relayed to the education developer. Because of the constant dialogue between these two during the project, the facilitator, and indirectly the children, could suggest changes or specific additions or omissions from the workshops, and thus had a strong say in the development of the toolkit. Because the facilitator performed the bulk of the activities after the education developer had prepared the materials, he could not only tailor the instructions for hosting the activities to better fit the occurring situation, but also translate, interpret, and adapt specific aspects of the workshops to better fit the context. For the education developer, this meant that the toolkit needed to be developed with a strong focus on supporting an effective transfer of the necessary knowledge to the facilitator.

2.3 *Children's Participation Motives*

The absence of the education developer during the workshops not only put more responsibility on the facilitator, but it also affected children's motivations to participate. As the community centre does not provide formal education, children are free to come and go as they wish. Their initial curiosity towards what the design educator could teach them dwindled once it became clear that these workshops followed a strict task-based structure that felt like formal schooling. Not being present during the sessions, the education developer could not improvise on the spot to mitigate the negative aspects of the set-up. He had to rethink the programme from the perspective of children, as recounted by the facilitator, and decide how to keep them engaged. The workshops had to be inviting, have exciting relatable topics for the children, be fun to partake in, and give the children a sense of accomplishment. And for a large part, the facilitator had to accomplish this with the support of the workshop toolkit.

There already is a variety of educational programmes that aim to teach children design skills. The first activities organised at SRI were based on the 'Your Turn' design education programme (Klapwijk et al., 2021). This programme focuses on letting the children experience working on real design challenges in multiple design sessions in structured classroom settings. The workshops at SRI were initially also planned as a series of sessions, each dedicated to a phase in the design process. It turned out to be difficult to make this set-up work in SRI's context. The children experienced the organised activities as school-like and quickly lost interest in taking part in them, which meant they would also

not experience the joy of seeing their design come to life. To enthuse the children for joining the activities, it helped to give them tangible design goals that were feasible to reach in a single workshop. It also helped if assignments were relatable and interesting to a diverse group of boys and girls.

2.4 *Scarcity of Resources*

The scarcity of resources available for the project had a strong influence on the workshop activities. Initial proposed formats, based upon Dutch examples, made use of a variety of materials, e.g., printed paper templates for brainstorming activities, colour pencils for sketching, raw materials to build models through woodworking and tailoring, and a mobile phone or computer (including internet costs) for recording videos. All of these materials proved difficult to make available, possibly because the children's activities were not deemed economically relevant. To make a viable programme that would survive in the economic conditions after the project had ended, it was essential that SRI could independently organise these workshops with the toolkit alone without external funding after the collaboration ended. Thus, it was decided to only make use of materials that are widely available for free in SRI's surroundings, such as twigs and clay. The children collected the materials before creating artefacts as integral part of the workshops to limit the costs. The use of local, freely available materials makes the workshop less dependent on external contributors, more resilient to adverse circumstances, and hopefully also easier to disseminate to other locations.

2.5 *A Shift from Toys to Playful Design Experiences*

The original intent of the Kenyan stakeholder for this project was for the designer to co-design and craft toys with the children, that could potentially also be sold locally by the children to train their entrepreneurial skills. Creating their own toys would have allowed children to develop crafting skills and get access to toys that were potentially more affordable and durable than the current supply of imported plastic goods. Furthermore, these toys would reflect the local cultural context, as the children having access to 'appropriate toys', as an extension to 'appropriate technology', was deemed important. Although play itself is a universal phenomenon, what children play with is informed by the context and surroundings. Through play, children explore and acquaint themselves with the rules and symbols of their communities (Else, 2009, pp. 44–45). Appropriate toys were thus seen as a valuable medium to support their social development.

However, early in the development process of the workshops, the emphasis shifted away from the end-product (available, affordable, sustainable toys) to

the playful learning experience of design and creation. The low durability of the local materials that were available during the workshops greatly reduced the feasibility of creating durable toys. Thus, the building activity itself became more dominant. Initially, the shift in focus away from creating usable toys was perceived as a great setback and loss of value. However, crafting is a universal form of play and toys are a popular crafting category. So, could the activities in the workshops become a form of play and still have the desired educational effect?

A review by Zosh et al. (2017) concludes that, although free play is an important part of child development, adults can also help to facilitate learning by structuring children's play. When adults guide children's play, they can help them to develop skills by providing them with joyful, engaging, iterative and socially interactive play experiences. By extension, in this case the workshops could help children develop design skills in a fun and engaging way through structuring children's crafting and building during the workshop as a design process, an exploration of form and function. In a conventional design cycle (Van Boeijen et al., 2020, pp. 45, 47, 57), the prototyping stage follows on ideation. Here, the building activity itself became the core of the ideation process. Making, assessing, and altering the artefact became a fluent process which encapsulated divergent, convergent, presentation, and feedback activities, as a form of iterative 3D-sketching. The artefact was no longer a prototype or model referring to a possible future product; the artefact was the nascent toy – or rather, the clay and twigs were the toys, and designing was the play. The distant collaboration made it hard to assess the actual playfulness during activities. However, some indications were found through video reports and discussions with the facilitator.

Children could freely explore the materials and their expressive potential. Construction play, the process of 'creating meaning', was the dominant play type. Artefacts showed a variety in design, level of detail, and backstories. This suggests that the children experienced freedom to express personal fascinations, which is an indication of an open-ended playful process. The joyful pride of the children for their final artefacts signals the importance of working towards an end goal, but there was ample room for enjoying the process: this is an important aspect of playfulness as well.

The above-mentioned drivers for the solution space of the project (remote collaboration, culture-sensitive co-development, children's participation motives, scarcity of resources and focus on a playful design process), helped shape the final design of a toolkit that allows local facilitators to independently carry out educational design workshops. It offers a blueprint that structures the activities and supports the facilitator in applying productive didactic techniques but becomes more open-ended with every follow-up workshop.

3 The Design: A Workshop Format and Toolkit

A workshop format and several workshops based on this format were developed through which the children can learn design skills, based on design skill didactics (Klapwijk & van den Burg, 2019). Several tools were developed to support the facilitator to host these workshops independently, and thereafter create more workshops based on the same format: instruction materials and challenge suggestions collected in a manual, as well as supporting videos. The series of workshop descriptions and tools together thus form an open-ended toolkit.

3.1 *Workshop Format*

The workshops are divided in three distinct phases: Exploring, Building, and Presenting. See Figure 6.1 for an illustration of the three phases. The structure of the workshop is based on contemporary design methodologies (Van Boeijen et al., 2020). Typical elements of these design processes are adapted to fit an afternoon-long workshop, e.g., the iterative element present in many design processes is given a subordinate position in the final format. This helped to put more emphasis on the joy of building (in contrast to deliberate and time-consuming iterations) and to streamline the process for both the children and the workshop host.

In the first phase, a topic is introduced and explored by asking several questions to provoke discussion between the children, as illustrated in Figure 6.2. With each question and subsequent discussion, the children further elaborate on their design goal

In the second phase, the children gather the materials they want to use, and then build their solution with those materials. See Figure 6.3 for an example from one of the workshops. Throughout the process of building, the children further ideate, test, and iterate on their initial ideas to develop their ideal solution.

In the third and final phase, the children present their designs to each other, and discover and celebrate the great diversity of possible solutions to come out

FIGURE 6.1 The workshops are divided in three distinct phases: Exploring, building, and presenting

FIGURE 6.2 The facilitator introduces the children to the topic of a workshop through a video

FIGURE 6.3 A child in the process of building an artefact as his answer to his design goal

FIGURE 6.4 Children presenting their designs in the third phase of the first workshop

of the design goal they defined in phase 1. An example from the third phase of one of the workshops is given in Figure 6.4. This three-part process provides a minimal logical structure to the children's design process, guiding them through the design process, while maintaining an enjoyable pace and a natural flow throughout the workshop.

3.2 *Predefined Workshops*

A sequence of several workshops was developed. The first two of these workshops are predefined through videos that introduce the topic and pose questions that help the children define their design. In the first workshop the children design a toy car. In the first phase of the workshop, a video is played to introduce the topic of car design to the children, after which it poses questions to define their design goal. The questions relate to the aspects of the design, such as what it will be used for, by whom, when, where, and how. The video prompts the facilitator to pause the video after each question to allow the children to discuss it. At the end, the video gives the children examples of how they could prototype specific parts of their design e.g., how they can use clay and twigs to make wheels affixed to an axle to allow their toy car to be rolled around. Figure 6.5 gives an overview of the first workshop video through a selection of stills.

In this video the children are first shown how clay models are used in car design processes. Then, several questions are posed in the video to help the children specify the aspects of the car they will design through discussions. The video concludes with a question to trigger them to think about what they

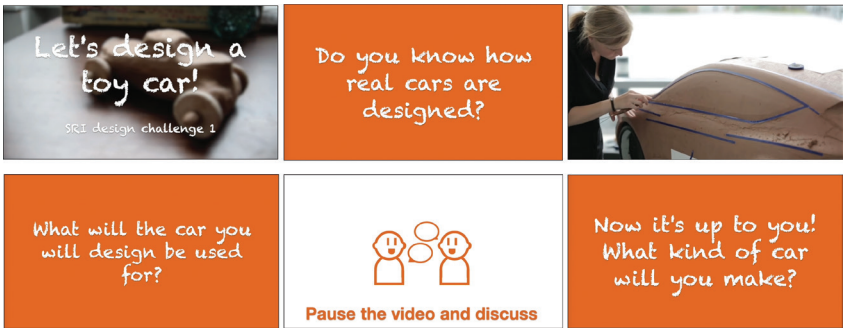

FIGURE 6.5 A selection of stills from the first workshop video

want to design. In the second phase of the first workshops, the children are asked to collect clay and some wood from around SRI's grounds, after which they can start to build their toy car. The children inspire each other, but also have distinct ideas about what the function of their toy car is. As they figure out how to build the functions of their car into their design, the children experience the fun of creating something. Finally, in the third phase, the children show off their designs to each other and celebrate all the different outcomes of the workshop.

The topic in this first workshop is narrowly defined. As the children develop their design skills with each subsequent workshop, they are given a bigger 'solution space' for the challenge they are faced with while receiving less strict support in how to address the design challenge, as illustrated in Figure 6.6. The video structuring the second workshop in the sequence poses fewer constraints, and consequently the second workshop itself is more open as well. In this workshop the children are asked to design 'a building' that aims to serve a specific purpose in their own community. The video poses several questions to make them think about what kind of building would be of value to their village, and lets the children discuss that amongst themselves. In contrast to the previous video, this one does not give examples of what materials the children

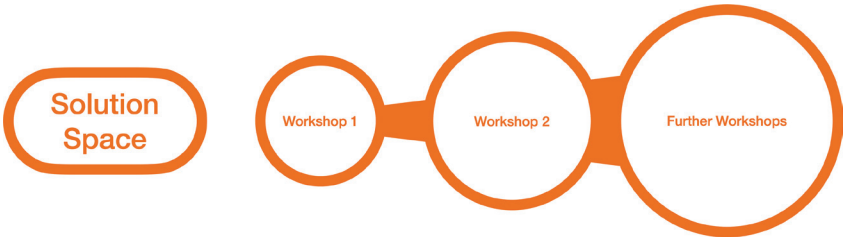

FIGURE 6.6 The solution space gradually increases with each workshop through the way in which topics are introduced and the design goals are formulated

could use and how they could answer the other questions in the video. The larger solution space in this workshop as compared to the first challenges the children's design and problem-solving skills more extensively. The focus thus also further shifts from building a specific toy, to an artefact that is more like a scale model for a solution in the real world.

The facilitator may refer to the manual for a structured instruction on how to independently organise the third and further workshops. The instructions contain several suggestions for topics with a large solution space to be used in workshops, such as e.g., challenging the children to design something to help someone cross a river or to make a boat that can stay afloat. After having organised these workshops, it is up to the facilitator to come up with more workshops with the appropriate solution space to challenge the children.

3.3 *Toolkit and Tools*

The toolkit consists of a manual and several videos that help the facilitator to host the workshops, which are illustrated in Figure 6.7. By using these tools to organise the workshops, the facilitator becomes acquainted with the workshop format and proposed didactics and gradually becomes independent in designing more workshops himself.

The manual contains an introduction to the toolkit, explanation of the workshop format, elaboration on the suggested progression of difficulty in the workshops, and step-by-step instructions for organising the first two workshops in the outlined sequence. Additionally, it contains a format to help the facilitator come up with topics and challenges for further workshops. It also

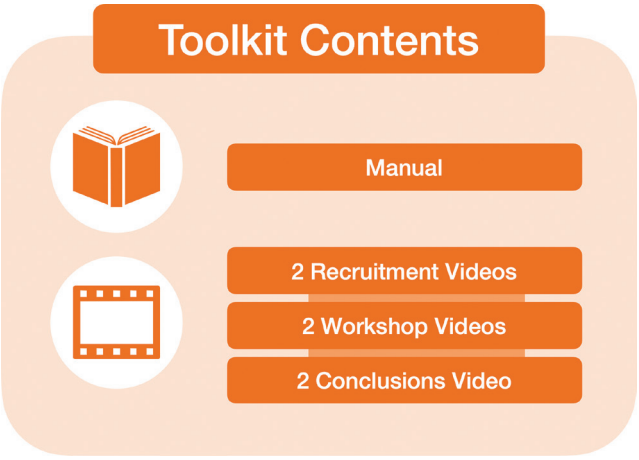

FIGURE 6.7 Overview of the contents of the developed toolkit

contains several suggestions for workshops based on that format e.g., letting the children design something to help someone cross a river. This format aims to help the host to become self-reliant in carrying out subsequent – more open – assignments.

The toolkit also contains several instructional materials, which are illustrated in Figure 6.8. The videos in the toolkit support the workshop host in preparing, facilitating, and concluding the workshops. From the third workshop onward the workshop host has the responsibility to introduce the topic and questions to the children without the support of a video. The manual provides the facilitator with suggestions through several 'challenge sheets'. Each challenge sheet presents the story of a main character who faces a problem in reaching their goal. The children are then invited to help solve the problem through their design.

In addition to the videos that aid the workshop host in organising the first two workshops in the sequence, the toolkit contains two recruitment videos and a conclusions video. The two recruitment videos briefly introduce the workshops and theme in an uplifting way, to help the host enthuse local children for joining the activities. These videos are played to the children at the community centre.

The final video in the toolkit, the conclusions video, helps the workshop host communicate to the children which skills they are developing. Klapwijk (2017) describes seven key design skills that are considered the most relevant for primary school pupils: 'thinking in all directions' (divergent thinking), 'developing empathy', 'making productive mistakes' (early and frequent iteration), 'making ideas tangible' (convergent thinking), 'sharing ideas' (communication), 'defining your direction', and 'making use of the process' (meta-cognitive skills). All these skills come into play during the design workshops, and they are illustrated in the conclusions video by the narrator, who links them to the phase of the workshop in which the children applied them and celebrates the children's work. The facilitator can point at evidence of applying these skills in the children's designs and design processes to increase the learning outcome.

FIGURE 6.8 The developed instruction materials: With each workshop, the supporting materials become less prominent and elaborate, transferring the responsibilities for hosting the workshop to the facilitator

4 Conclusion

This chapter explained the remote development of a workshop to introduce children living in small villages in rural Kenya to design in a playful way. The original goal of the project was to help children build their own toys. These self-made toys would reflect their environment and cultural background better than imported toys. The project took on a longer-term focus in which building toys or other objects served a higher-level goal; children who are skilled at design. In this new focus, learning to design is ascribed a quality similar to what toys represent, that is 'playing'.

The following paragraphs present reflections on each of the five drivers of the workshop development process that were introduced in Section 2.

4.1 *The Remote Collaboration during a Pandemic*

During the development of the workshop format and toolkit a disadvantage unexpectedly turned into an advantage. The travel restrictions due to the Covid-pandemic enforced a remote collaboration and made the education developer highly dependent on the facilitator, in which the latter became more involved and influential on the end result, leading to a reciprocal relationship. Inadvertently, the specific remote collaboration approach taken in this project helped to further embed the workshops in the context effectively. Although it increased the responsibilities of the facilitator, who had the task of inviting children, hosting the workshops, and documenting the children's process during these workshops, it also helped to shift the agency in the design process from the education developer to the facilitator.

4.2 *Co-developing Culturally Embedded Workshops*

The result – a series of compact workshops accompanied with a toolkit – is based on an established notion of what design is and how designing, the design process, basically functions. This process is not universal but rooted in a specific design school culture. In this case, this was a design culture that can be typified as systematic, research-based, and problem-solving-focused. Although the education developer and his supervisors have done their best to approach the project in a culture-sensitive way, one should still stay critical towards the extent to which the result is attuned with the local situation, that is, in line with the local context, people's values, and practices. By default, a design, which is here the series of workshops and a toolkit, cannot be value-free. Many decisions are made in its creation, and they are partly based on designers' cultural backgrounds, understanding of the situation, and their beliefs about what is a good answer to the problem posed. Especially in vulnerable situations, such as the

one here with children and with economic dependence, we need to be modest and give space for a discussion on possible long-term effects. For example, one could question whether the systematic design process, with three separated phases, is an appropriate export product that is useful to teach the children or whether the learning should address a more fundamental set of knowledge and skills: the understanding and ability to confront life's diverse challenges with a creative mindset of solution-focused flexibility. There are also more intuitive and artistic ways to approach design. Would they be more appropriate? We do not know. Another consideration is the kind of design assignments. In what way do they address the interests of children, for example regarding gender roles, but also regarding what they know about it. In the first workshop, the children were introduced to 'building a car'. Several archetypes for specific functions (truck, bus, pick-up, etc.) were shown to get the children started. In the following workshops the assignments were more open; from 'designing a building for the community' to 'something to cross the river', giving children the space to come up with their own interpretations, avoiding communicating norms about what a car, a house, or a bridge should look like. To what extent do we need to encourage children to follow the existing world with its current dominant values and practice? Or do we want them to think differently, imagining a world we could not even think of.

Furthermore, the division of roles has not been explicitly discussed. For example, the relationship between the facilitator and the children and the involvement of parents and other people responsible for the children's upbringing were not addressed. Moreover, the form of the instruction videos, the representation, is a point of attention. Practical aspects, such as orientation of illustrations in the manual that need to be read from left to right were attuned to local conventions. And we assume that the drawn figures in the video that represent the targeted children were rather abstract. Together with the chosen music, voice-over, and language, they were understood for their practical purpose, but what about the symbolic meaning of these manifestations?

4.3 *Children's Participation Motives*

Rewards in, for example, the form of seeing oneself and what one has made in a video proved important. Furthermore, informality and playfulness were needed to motivate the children to come to the workshop. Compared to prior primary school design approaches such as 'Your Turn' (Klapwijk et al., 2021), many of the formal design phases have been omitted or simplified, e.g., the well-known procedure of creating many ideas and then selecting or combining the best ones for further elaboration. This repeated divergent/convergent thinking process is regarded as an essential procedure to arrive at higher-quality design outcomes

(Van Boeijen et al., 2020, p. 51), yet it also leads to frustration in novice designers who cling to initial ideas (Schut et al., 2020). Instead of forcing each individual participant to produce many ideas, the SRI design workshop format and toolkit use the power of the group as it reviews and celebrates the diversity of outcomes of each workshop, thus conveying at least part of the learning experience that there are multiple solutions with various qualities for each problem. It may be less adherent to formal design-methodological training but superior in its support of children's intrinsic motivations to engage in the workshop.

4.4 *Scarcity of Resources*

As in every 'Base of the Pyramid' project in rural – often vulnerable – areas a holistic approach is key, which considers the principles Affordability, Accessibility, Availability (of resources), Reliability, Sustainability, and Acceptability (Van Boeijen et al., 2020, p. 27). Except for the internet costs needed to download the videos, the materials were chosen in line with these six principles.

4.5 *A Shift from Toys to Playful Design Experiences*

We might wonder if the children actually made toys in the end; a house, a car, a bridge to play with? Ultimately, we focused on the making itself and not on what the children could and want to do with the result at a later date. It would be worth investigating this further.

It is too early to answer the question if this design is scalable, which means that other rural community centres in Kenya or elsewhere, with similar circumstances, could successfully use the workshop format with the toolkit. It would be helpful to first see how the design is used at the SRI centre independently, without the background support of our education developer. More testing of the workshop format and toolkit at SRI's community centre and in other similar places is necessary to assess their robustness and long-term value.

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