



HUMAN-CENTERED DESIGN FOR WATER, SANITATION, AND HYGIENE: INSIGHTS FROM JAKARTA

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ABSTRACT

This paper aims to investigate how human-centered design (HCD), combined with participatory design methods, can address complex problems in communities such as the slums in Jakarta, Indonesia. Literature review points out that even though it embraces a participatory approach and employs some participatory methods, HCD is not purely participatory. This is because HCD allows designers (and researchers) a certain degree of control that would not be accommodated within a pure participatory approach. After establishing proper reasonings for choosing the HCD methodology, the methods of Card Sort, Solution Card, and In-depth Interviews were utilized to investigate the problems of the people living in slums in Jakarta, especially in the field of WASH: water, sanitation, and hygiene. Insights gathered suggest that most of the issues are closely related to low income and the lack of proper infrastructure in the community. Utilizing the methodology of HCD as well as encouraging participatory engagement in a context with such complex issues was proven to be essential in understanding the problems at hand and informing the creation of suitable solutions.

KEYWORDS

Human-centered design; Participatory design; Design and social innovation; Water; Sanitation; Hygiene; Jakarta slums.

1. INTRODUCTION

Semi-permanent housing or settlement in Jakarta tends to grow along waterways, natural rivers, and reservoirs, which exacerbates the likelihood of flooding in these communities, especially during rainy seasons (BAKER, 2012). Therefore, most slum communities are located in highly flood-prone areas (HARYONO, 2013). Floods affect the poorest neighborhoods the most but slum dwellers do not have any option other than to continue living where they are because they cannot afford the cost of housing in lower flood-prone areas (VAN VOORST, 2016). These circumstances deny the urban poor access to the city's urban infrastructure and other amenities (MEILASARI-SUGIANA; SARI; ANGGRAINI, 2018). Rivers in areas surrounding Jakarta were the primary sources of clean water in the past, but today they are contaminated with various pollutants, ranging from toxic industrial waste to household organic waste. Moreover, water obtained from underground pumps also had been stamped as not safe to drink as it has been contaminated by septic tank seepage and polluted surface water. Many diseases are related to the quality of water sources and polluted water sources can lead to cholera, typhus, dysentery, worm disease, and other diseases, along with symptoms of diarrhea.

There is no regulated garbage disposal system in most slums and most residents living along the riverways throw their garbage in the river (VAN VOORST, 2016). Moreover, there is no citywide solid-waste management plan for Jakarta as a whole because the waste collection is largely left to private companies (BAKER, 2012). Waste is a big topic in Jakarta and is almost always related to the recurring floods that happen in Jakarta annually. Floods can result in injuries and death from strong currents and electrocution.

The correlation between health and academic achievement is evident. Improved health means an improved school or work attendance and reduced medical bills for individuals (CAIN, 2007). Arfines *et al.* conducted a study that revealed that slum residents, who are routinely exposed to environmental factors such as high population density, lower-end quality of drinking water and sanitation, and insufficient drainage and waste disposal, possess inadequate knowledge of health and hygiene (2017).

Researchers and designers have focused more on social issues and exploring design implications for the Base of the Pyramid compared to the previous decade (CASTILLO; DIEHL; BREZET, 2012; CESCHIN; GAZIULUSOY, 2017). Also known as Design for the Other 90%, Design for the Base of the Pyramid (DfBoP) can be identified by its focus on people lacking the income to satisfy basic needs and access basic services (LONDON, 2008; SMITH, 2007) and should be limited only to market-based solutions.

This study sets out to highlight the distinct natures of HCD compared to other design methodologies before it is utilized to address the health issues experienced by the urban poor living in Jakarta slums. The focus was established on WASH subjects because an improvement in areas related to water, sanitation, and hygiene largely contributes to health improvement (WHO, 2018). This study carried out important and relevant findings of the application of HCD in the context of a low-income community as well as developing nations. These findings can help inform designers in generating solutions that are suitable for these demographics.

2. THEORETICAL FOUNDATION

In this section arguments that support the critical decision to employ the human-centered design methodology to craft a design solution for the target demographics are presented. Characteristics of human-centered design methodology are elaborated and its proper positioning in a bigger map of different design approaches are discussed. As well as its advantages over other research methodologies, such as the participatory design approach.

Human-centered design (HCD) as culminated by IDEO is geared towards the creation of market-based solutions and encourages the generation of social innovations. IDEO claimed that the international development community has designed solutions to the challenges of poverty without truly empathizing with and understanding the people it is looking to serve (IDEO.ORG, 2015). Therefore, HCD is meant to tackle the issues of empathizing and lack of understanding. It is a process and the reason it is labeled as 'human-centered' is that it starts with the people it is designing for. Solutions can include products, services, environments, organizations, and modes of interaction. (IDEO.ORG, 2011).

2.1. Positioning: Human-centered design

Its participatory aspect differentiates HCD from a pure user-centered design approach. Iivari (2004) underlines how in user-centered design, research and work are done on behalf of the users, while in participatory design, research and work must be done with the users. HCD distances itself from user-centered design as it focuses more on methodologies and techniques for interacting with people in such a manner as to facilitate the detection of meanings, desires, and needs, either by verbal or non-verbal means (GIACOMIN, 2014).

The proper positioning of HCD among various design approaches is illustrated in Figure 1, an adaptation of a map of design research proposed by Sanders & Stappers (2008). On the horizontal axis, HCD is positioned around the middle but still leaning to the left, towards an expert mindset instead of a participatory mindset. This is because even though HCD can utilize a great number of participatory design methods in its methodology, it still relatively maintains a sense of direction from the designer or expert to guide the process and move the research forward. In the vertical axis, HCD is still vastly research-led than design-led because it is not too heavily driven by experts that offer their design expertise to the whole process.

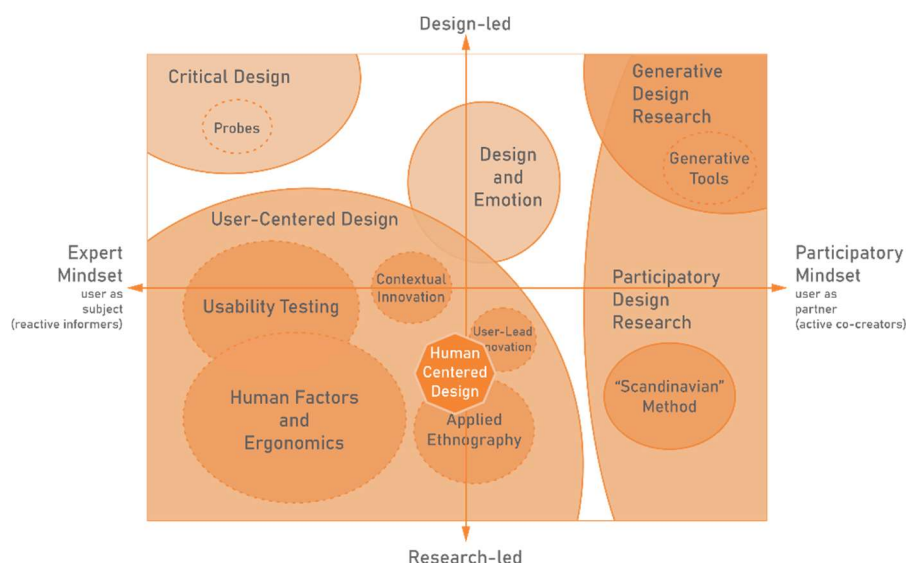


Figure 1: HCD positioning in the map of design research. SOURCE: Based on Sanders & Stappers (2008).

2.2. Comparison: HCD and participatory design

Hyysalo (2015) offers a simpler positioning of HCD when placed in the spectrum of design for, with, and by the user where one extreme represents a situation where designers control and users serve as a mere inspiration for design and the other extreme resides complete designs by users (Figure 2). This spectrum shows the different degrees of responsibility and shares in design activities that stakeholders and designers hold. HCD is positioned leaning towards the left, where the extreme is a situation when designers have complete control over most design decisions. Participatory design/co-creative design/codeign is placed around the middle of the spectrum, indicating a more balanced degree of control between designers and stakeholders.

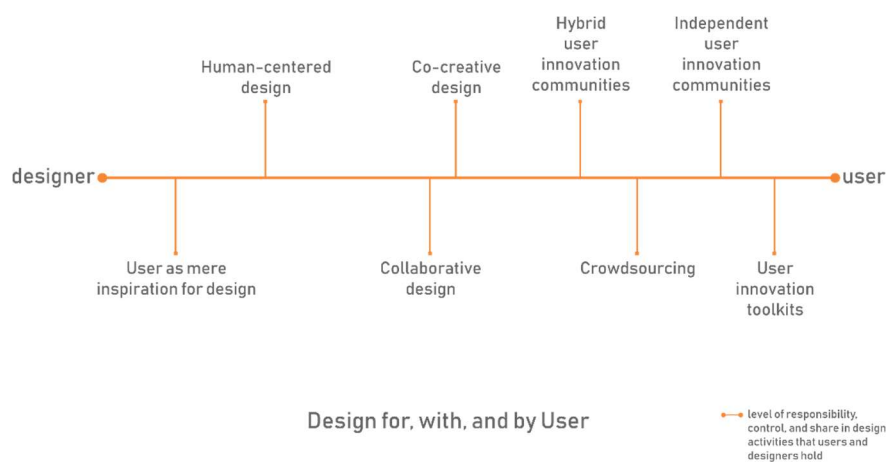


Figure 2: Design for, with, and by the user. SOURCE: Based on Hyysalo (2015).

This spectrum of design for, with, and by the user can be fitted to the framework of modes of farmer participation identified by Biggs (1989): contractual, consultative, collaborative, and collegiate (Figure 3). Biggs' framework was used to explain the relationship between researchers and farmers, what control over the power do they held, and the terms set between different parties. At one extreme, a contractual relationship reflects scientists or researchers contracting farmers to provide land or services, at the other extreme, a collegiate relationship, where researchers work alongside farmers to strengthen farmer's informal research and development systems. A collegiate relationship mirrors the researchers' perception of farmers as their equals. In essence, the complete abolition of hierarchical structure between them. In between are consultative, where scientists consult farmers about their problems and then develop solutions, and collaborative, where scientists and farmers collaborate as partners in the research process.

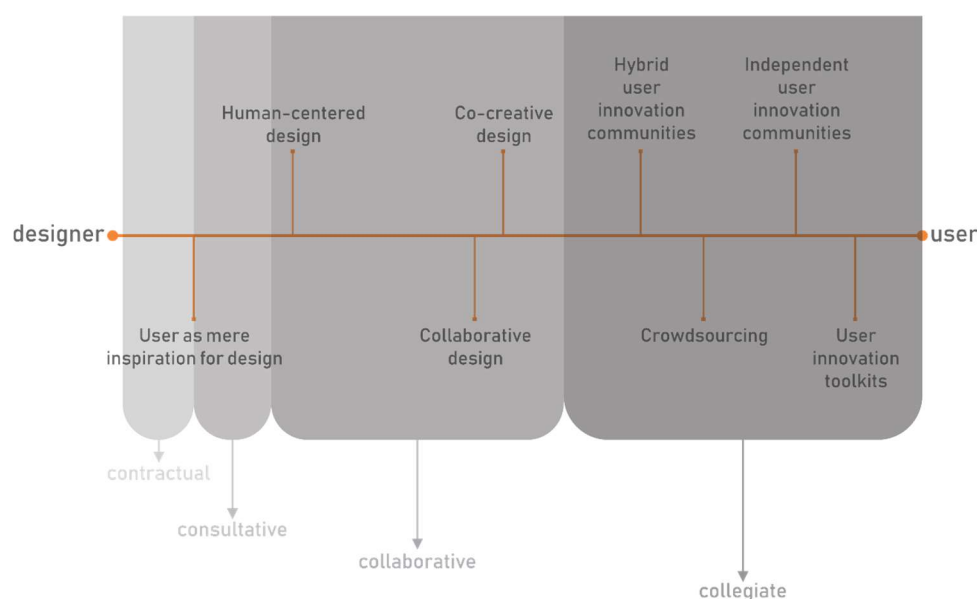


Figure 3: Design for, with, and by the user in four modes of participation.
 SOURCE: prepared by the authors, based on Sanders & Stappers (2008) and Biggs (1989).

This framework can be extrapolated to the context of the relationship between designers and users. In the context of a design process, utilizing users as mere inspiration can be classified ranging from contractual to consultative mode of user participation depending on the degree of user engagement. It can be observed, in a bigger scope provided by this framework, that HCD is positioned under a collaborative mode of participation albeit at the lower end of it. This translates to some amount of participation from stakeholders, in collaboration with designer experts. This is reflected in several methods typically used in HCD, where designers hold brainstorming sessions, co-creation sessions, and live prototyping sessions. In these sessions, designers collaborate with stakeholders and see them as partners in crafting a solution for the stakeholders. In the scheme of control, stakeholders have some control and can guide the research but eventually, the designer must step in to make the proper decision and appropriately direct the research.

Figure 4 demonstrates how HCD methodology differentiates itself from the methodology of participatory design (PD) outlined by Spinuzzi (2005) during the progression of a design project.

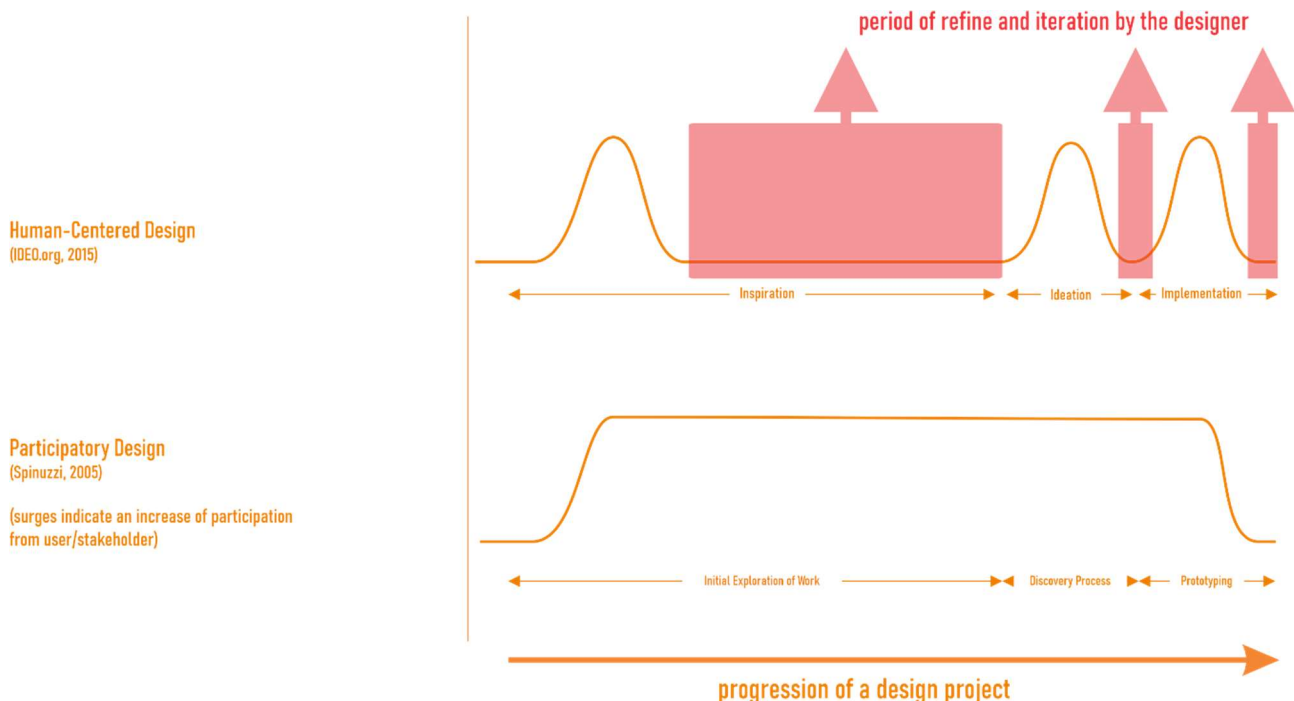


Figure 4: HCD compared to participatory design in the progression of a design project. SOURCE: prepared by the authors.

Both IDEO.org's HCD and Spinuzzi's PD, in a quite similar manner, separate the design process into three stages: inspiration stage (in HCD) or initial exploration of work (in PD), ideation stage (HCD) or discovery process (PD), and implementation stage (HCD) or prototyping (PD). A line surge in PD methodology indicates the increase of stakeholder participation in the design process. Under HCD methodology, stakeholder participation is welcome in all three stages but then closed up towards the conclusion of each stage. Red areas in the figure indicate periods in which the designer takes back control and the direction of the design project by activities of refining and iterating. The areas in red do not take place in a participatory design methodology. Instead, the act of refining and iterating would be done collectively by the designer and the stakeholders. Using Biggs' framework, PD maintains a collegiate relationship between designers and stakeholders. One of the disadvantages of participatory design methodology is that it can be very time and resource-consuming (BIGGS, 1989; CORNWALL; JEWKES, 1995; EHN, 2017). Considering that users or stakeholders do not possess sufficient skills and knowledge, which designers traditionally possess, to make proper decisions that can steer the design project in the right direction. Skills and knowledge such as product design specification and material selection are essential in bringing out proper solutions. HCD, on the other hand, still allows a degree of control to the designer over the progression of a design project. For all the reasons stated, HCD was selected to be a very suitable approach to be applied in this study.

The location of the study was Kebon Melati in the western region of Jakarta. The data was collected through two sessions. Participants came from three different groups in the slum community: adolescents, parents, and local community workers. This dynamic was maintained so every group in the community is represented and their voice can be heard.

3. METHOD AND DEVELOPMENT STRATEGY

A partnership with ISCO Foundation or Indonesian Street Children Organization (www.iscofoundation.or.id), a local non-governmental organization which already active inside the slum communities in various parts of Jakarta, was established to obtain access to the slum communities. Participants come from different groups in the slum community as well as local community workers (ISCO Foundation staff), which means that each group in the slum community was

represented. These groups interact with each other regularly, share activities and space, and ultimately seek the betterment of the community. Different participant groups were identified as follows:

- a) Adolescents: aged 13 to 17, lives in a slum community
This age range was selected postulating that they have a sufficient level of understanding of health and hygiene and therefore can inform the research in a good way. When accompanied with visual research tools, an interview can be a very exciting activity for adolescents which in turn can benefit the researcher in building a good rapport with the community.
- b) Parents / legal guardians: age 18 and over, a parent, lives in a slum community
They were chosen to provide a more comprehensive perspective as a collection of people who supervise other groups; children and adolescents.
- c) Community workers: age 18 and over, ISCO staff, works in a slum community
This group could offer very valuable insights because they interact with slum inhabitants daily and are cognizant about the inner workings of the slum community yet they are inherently not a part of it. As the foremost and closest observer of the slum community, they can be the voice of reason and level-headedness when it comes to concerns about the slum community.

Adolescents and parent participants do not have to be from the same household. However, all participants must be from the same community. This means that a potential community worker participant working in a different slum community than the one focused in this research cannot be recruited even though categorically he or she fits the requirements. The essential thing to be captured here is the synergy of different groups in a particular community that spends their days with each other, interacting and socializing. This is essential to capture the complete loop and encourage systems thinking, which is fundamental to HCD methodology.

The research study was conducted in a youth community center maintained by ISCO Foundation located in a slum community in Rawa Bebek, Penjaringan in the north region of Jakarta, Indonesia. The study was conducted in October 2020.

The method of data collection was a semi-structured in-depth interview with the assistance of visual research tools; Sort Cards and Solution Cards. Visual research tools such as cards help “break the ice” between the interviewer and the interviewee and therefore smoothen the interview as well as keeping the topic on point. Cards, as an informal and friendly mode of communication, can espouse more casual responses from the participants (MURATOVSKI, 2016). Each interview was conducted individually and face-to-face, for one hour at the most.

The first set of cards was a series of daily activities called Sort Cards, as represented in Figure 5. This set was used to draw out the personal circumstances and daily routine of the participants. Participants were asked to sort these cards according to their preference and select up to four or five cards which they relate to the most. The images are taken from The Field Guide to Human-Centered Design published by IDEO.org (2015).



Figure 5: Examples of Card Sort cards.
SOURCE: (IDEO.ORG, 2015).



Figure 6: A participant sorting through the first series of cards.
SOURCE: prepared by the authors.

The second set of cards (Solution cards) contains examples of various solutions specifically targeted to ameliorate the problems of people living in poverty, or design for the base of the pyramid. Each card contains an image of the solution accompanied by a short description in the Indonesian language (Figure 7). One side of the card contains an image of the intervention and the other shows the name of the product along with a brief explanation of how it works. The images were borrowed from fifteen design projects. Some of them are in the form of stand-alone products while others are product-service system (PSS) innovations. Most of them are from a cluster of projects called WASH (Wash, Sanitation, and Hygiene) run by the United Nations through UNICEF. As well as projects conducted by IDEO.org. The rest were identified and collected by the researcher. The majority of the projects were first introduced during the period of the last twenty years but are still running today. This indicates their high success rate. For instance, Hippo Roller, a water transportation tool for rural communities which was first introduced in South Africa in 1997 has expanded to 51 countries.

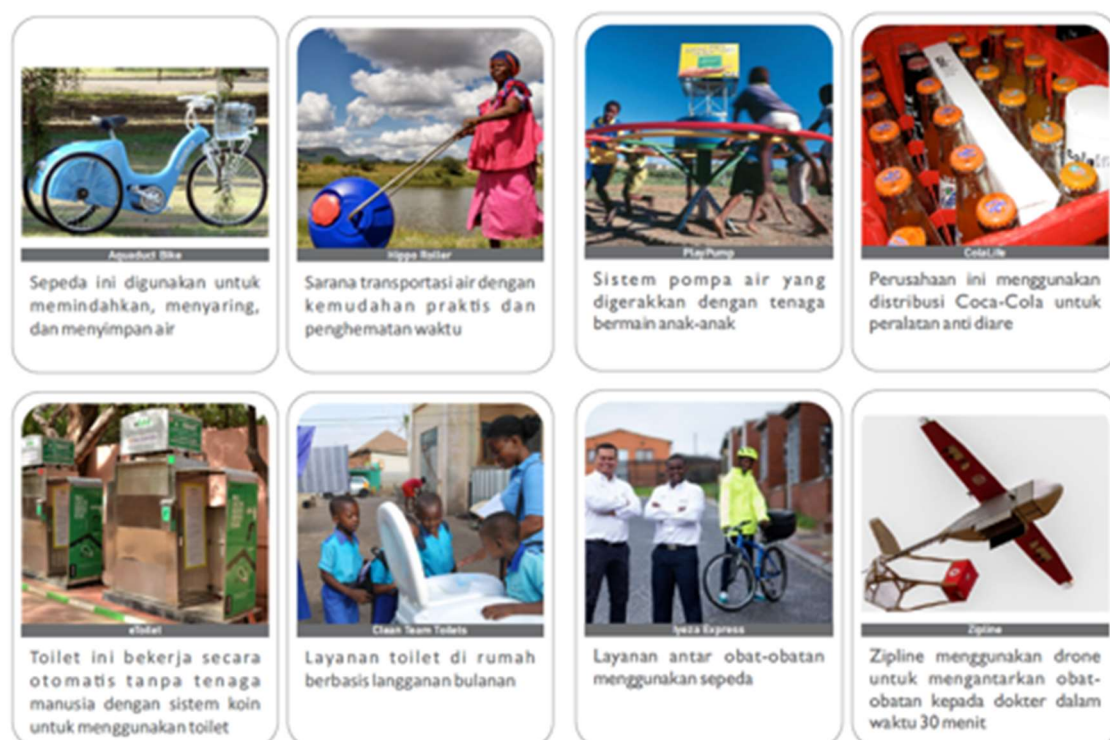


Figure 7: Examples of Solution cards. SOURCE: prepared by the authors.

Table 1 shows how many participants from each group took part in the study and which visual research tool was included in the interviews. The card sort method was only employed in the interviews with the actual slum inhabitants: adolescents and parents or legal guardians. This was intended because the purpose of this particular method was to extract real values only from people living in the slum community. Therefore, the community worker group, which resides outside of the slum community, was excluded from this activity.

Participant group	Number of participants	Visual research tool	
		Card Sort	Solution Card
Adolescent	6	Yes	Yes
Parent / legal guardian	6	Yes	Yes
Community worker	2	No	Yes

Table 1: *Distribution of participants and correlating visual research tool participation.*
SOURCE: prepared by the authors

The interview procedure was as follows. The interviewer explains briefly what the study is about and gives the interviewee a chance to ask questions. After that, each participant was handed the first set of cards (Card Sort cards), participants were given approximately five minutes to observe the cards and then asked to choose a minimum of 4 cards that they thought were most relevant to their identity and daily routine. They were then asked to elaborate on their picks. Then they are asked several questions, such as why they picked these cards and which card they thought is the most important compared to the rest of their picks. The interview then progresses to the topic of various design solutions. Participants are given the second set of cards (Solution cards) and asked to pick a minimum of four examples of design solutions that they think are ingenious and would be applicable in their daily life. At this point, participants were solicited for their opinion on whether any of the solutions seen in the cards could be applicable in their circumstances and their community. Participants are also asked if there is such limitation or constraint in their community that can hinder the implementation of certain solutions that they choose.

4. RESULTS AND ANALYSIS

In this section, the results from participant card pick conducted during the interviews are presented. The interviews were transcribed and then consolidated in a qualitative data analysis software (nVivo) for content and thematic analysis.

4.1. Insights collected from participants

With the integration of different methods applied in the interviews, two kinds of data were collected. First, through the use of visual tools, i.e. Sort card and Solution cards, reveals important values held by participants as well as relevant issues happening in the community. This can be classified as content analysis, where the number of times of each card selected by the participants was recorded (Figure 8). The main reason for this is to see rapidly what we have in the batch of data (LIAMPUTTONG, 2009) as well as determine whether certain topics can be associated with certain groups in the slum community.

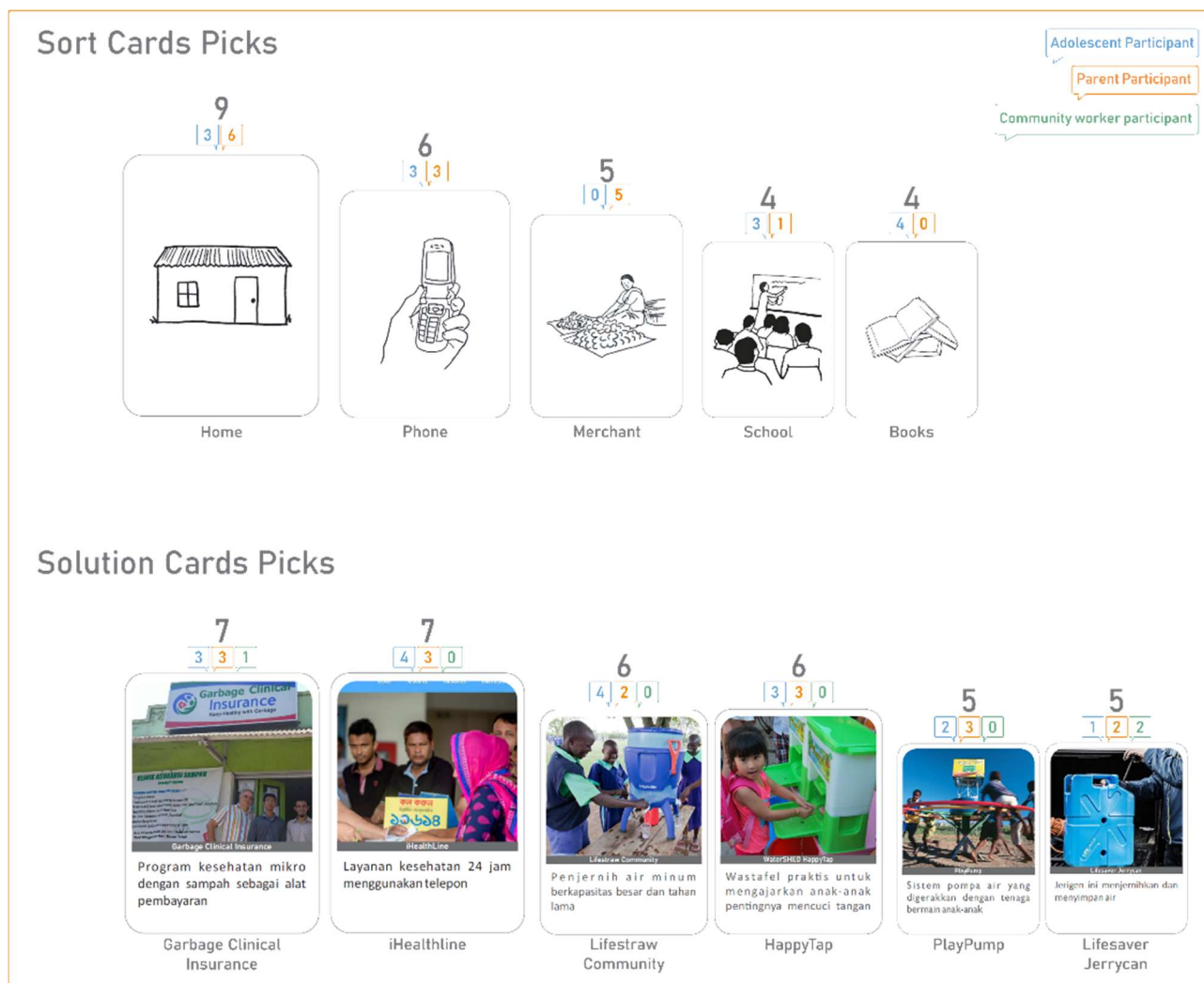


Figure 8: Participant's top five card picks

The cards are depicted with different sizes in direct relation to the number of times they were picked. The numbers on top of each card indicate how many times each card was picked. Below them, smaller in size and shown in blue, orange, and dark grey, are the number of participants from different groups that picked a particular card. For instance, numbers in orange on top of a card indicate the number of parent participants that picked that particular card. Numbers in blue represent adolescent participants and green represents participants from the community worker group.

In Card Sort, the card showing a house was picked nine times. Six parent participants chose this card as well as three adolescent participants. Among the parent group, the subject of a home is the most important. This is reasonable as they strive to provide a good home for their children and relatives. Another important matter is the subject of a profession. This is because most parent participants were small business operators, e.g. running a kiosk at home, selling cookies around the neighborhood, etc. Among the adolescent group, the card showing books was chosen most frequently followed by phone and school. It can be concluded that this particular group acknowledges the benefits of education and therefore regards it in high value. The phone represents communication, another important matter recognized by this group.

In a range of different Solution Cards, Garbage Clinical Insurance, a micro health insurance program with garbage as payment, was chosen by seven participants, with each group represented. This can be connected to the fact that most inhabitants there work as trash pickers and perceived the solution to be a suitable match for their community. Other

high-ranking cards include iHealthline, Lifestraw Community, and HappyTap, thus correlate to the issues of healthcare, clean water, and hygiene.

The following section discusses notable insights from each participant group. Employing thematic analysis, the transcripts were examined and made sense of what was being said by participants from different groups in the slum community.

4.1.1. Adolescent

Adolescent participants were mostly concern about the issue of littering in the nearby river. As well as the lack of garbage containers in their neighborhood. This participant group was also the most concerned about proper education and awareness lacking in the community.

4.1.2. Parent group

With parent participants, a topic that arises frequently was economical. Several parents even limit toilet use for their children to save money. Other topics include the lack of space in their dwellings as most parents were concern that their children do not have enough space for their development. This condition is exacerbated even more when parents are obligated to take in relatives outside of the nuclear family into their home.

4.1.3. Community worker

Community worker participants highlighted how slum inhabitants do not have a long-term plan regarding their livelihood but rather a very short one as they struggle daily to put food on the table.

4.2. WASH themes discussed in Session 2

In this section, themes that emerged from the interviews are discussed. The analyzing method employed here is thematic analysis. In the thematic analysis, the data is organized together by making connections between a major category and its sub-category (MINICHELLO; ARONI; HAYS, 2008). In this case, emerging themes are organized as sub-categories of the three elements of WASH: water, sanitation, and hygiene. The themes are grouped under their corresponding WASH element.

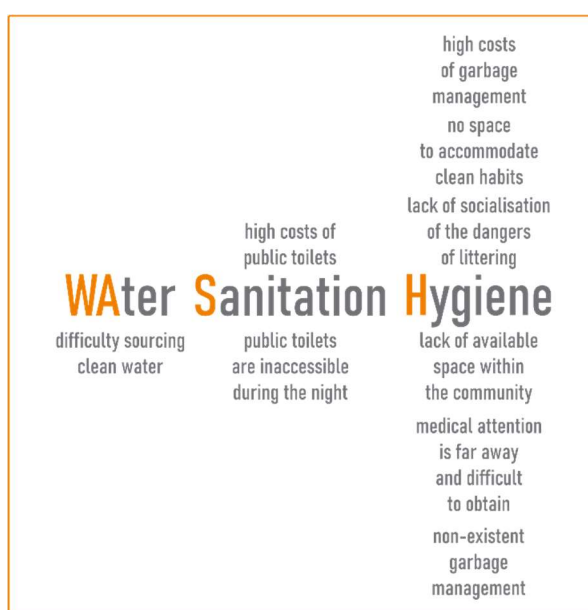


Figure 9: WASH-related themes discussed in the interviews

In the following section, the themes are discussed.

4.2.1. Water

The difficulty of sourcing clean water was brought up by several participants. In this area, most surface water is polluted. Some inhabitants use their water pumps but the water is not clean and smells of iron. Moreover, some households in the community do not have tap water distribution run by the state. This also explains a good number of participants selected a solution related to clean water during Solution card picks.

4.2.2. Sanitation

- Public toilets are inaccessible during nighttimes

Some public toilets are operating inside the community. These providers offer bathroom needs such as toilets and showers, as well as source clean water for inhabitants for laundry and other household purposes. Typically, the building plan includes several separate toilet booths and some space for clothes washing upfront (Figure 10). However, quite a number of them are not open throughout the night. Only some providers do. Therefore, when it is later than 11 PM then inhabitants must search around the community for public toilets which open throughout the day and night.



Figure 10: One of the public toilets in the area. SOURCE: prepared by the authors

- High costs of access to public toilets

Participants are aware of the high costs of access to public toilets and are constantly on the lookout for different solutions to their problems. The providers charge different rates for toilet and shower use. Some public toilet providers source their water from the tap operated by the government and others have private water pumps. One parent participant communicated that her children developed a rash or a kind of skin condition due to using water from a provider with a water pump. For this reason, she switched to another provider with tap water. She elaborated that the water from pumps smells unpleasantly of iron and is unclear as it is brownish. Tap water is typically well-treated and therefore cleaner compared to those from water pumps. For this reason, providers with tap water normally charge double compared to those with water pumps. Thus, inhabitants can spend a significant amount of their income on toilet access, often up to 40 to 50 percent of their earnings.

4.2.3. Hygiene

- Lack of socialization of the dangers of littering

A small creek runs through the community and can present a threat of flooding during the rainy seasons. The likelihood of floods is exponentially higher when garbage is thrown directly into the creek. An overwhelming amount of garbage in the creek reduces the ability to distribute water properly, as seen in Figure 11. Littering remains a significant issue in the community and most participants agree that this is an issue of education and awareness. A massive recurring problem of flood in many areas in Jakarta during the rainy seasons, which is even more pronounced in slum areas, can be traced back to the lack of user participation and engagement (NEOLAKA, 2013). One adolescent participant confided that littering is a generational problem as they often witness their elders as the culprits.



Figure 11: Littering exacerbates flooding in the rainy season. SOURCE: prepared by the authors

- Non-existent garbage management

There is no daily garbage management that enters the community and most inhabitants have to arrange their own garbage disposal. There is a large garbage disposal station situated in the marketplace near the community which is serviced daily and this is where most participants dispose of their household waste. Several privately-owned garbage servicemen did operate inside the community in the past but they gradually stopped since most inhabitants could not afford to pay for their services.

- Lack of space available within the community

The community does have several communal spaces in which children can play (Figure 12), however, these are very limited. Most parent participants were concerned about the development of their children since there is not enough space at home to play. It evokes pity in them for their children observing them only play in such confined space.



Figure 12: A communal space where children gather and play. *SOURCE: prepared by the authors*

- Medical and healthcare is far away and difficult to obtain

Several parents were quite concerned in regards to access to medical services in their area. Even though most inhabitants there possess a Kartu Jakarta Sehat, a health insurance program provided by the Jakarta provincial government since 2012, most of those health facilities are considerably far from the community. Moreover, those facilities only open on certain days and close on most nights. For this reason, most parents seek remedies from over-the-counter medicine for their sick children.

- No space to accommodate clean habits

Several participants pointed out that there is not enough space to accommodate a toilet inside their home. Integrating a bathroom into a layout of such small housing disgusts inhabitants thus prefer using public toilets available inside and around their community.

5. DISCUSSION

A literature review was conducted to fully comprehend the distinct characteristics of human-centered design. This was achieved through literature review and the juxtaposition of HCD and participatory design. The nature of human-centered design and its proper place among a litany of different design approaches has been subsequently addressed. In the spectrum of expert and participatory mindset, HCD maintains a rather balanced position but ultimately still leans a little towards an expert mindset. In the spectrum of design- and research-led, HCD is understood to be predominantly research-led. HCD maintains a series of opening and closing of stakeholder participation in various stages of a design project, which critically distances itself from a pure participatory design methodology. Study findings revealed important insights from every group represented in the slum community.

The results indicate an opportunity for product-service system innovation and design whose main focus is customer satisfaction rather than exchanging product ownership (AMINOFF; KETTUNEN, 2016; BONVOISIN, 2016; CLARK; KOSORIS; HONG; CRUL, 2009; NIEMANN; TICHKIEWITCH; WESTKÄMPER, 2009). PSS innovations typically involve little to zero marginal costs associated with purchasing a product. Instead, end-users pay the provider to get access to the product that benefits them. Offering PSS-type solutions can be beneficial, especially in the context of the poor with such economic underpinnings.

The use of visual research tools common in HCD has been proven to be effective in assisting the data collection process. Participants' insights helped identify highly-regarded values held by the community, such as the importance of shelter as well as the types of solutions which the community prefers, based on their livelihood. The study also identified each participant group's concerns in the community. WASH-related themes were also identified, such as the high costs of

toilet access and the lack of space in the community to enable cleanliness habits. Most issues found in the community were closely related to the low-income level of slum inhabitants.

Card sorting and solution cards methods have assisted in revealing the present situation in the slum community. The card sorting method helped reveal real values held by the community as well as which values are more important in the eyes of various groups in the community. Studies pointed out how card assortment highlighted the difference between groups (WENTZEL; BEERLAGE DE JONG; VAN DER GEEST, 2016; WENTZEL; VAN VELSEN; VAN LIMBURG; DE JONG *et al.*, 2014). Solutions card activity assisted in presenting more concrete ideas to the slum community. Through observing other examples of solutions in a different context, participants were promptly encouraged to imagine whether such solutions could apply to their circumstances. The use of visual research tools has been proven to be quite effective, especially during the ideation process (TSENG, 2020).

Studies show that the design of WASH-related solutions has been addressed through several different approaches, such as the Integrated Behavioural Model (HULLAND; LEONTSINI; DREIBELBIS; UNICOMB *et al.*, 2013), Behaviour Centered Design (CZERNIEWSKA; MUANGI; AUNGER; MASSA *et al.*, 2019; TIDWELL; CHIPUNGU; CHILENGI; CURTIS *et al.*, 2019), and other innovative approaches (FARRINGTON, 2019; SCHMITT; WOOD; CLATWORTHY; RASHID *et al.*, 2021; SETTY; CRONK; GEORGE; ANDERSON *et al.*, 2019). A participatory approach has been successful in addressing WASH-related themes in the past (COLE; PINFOLD; HO; ANDA, 2014) and the integration of the participatory aspect into the HCD methodology enables the stakeholders to direct and guide the research, as well as the design process. This can inform the design process in a significant way and consequently avoid situations where designers offer solutions that no one wants. However, there remain several instances where the researcher or designer steps in to summarize findings and by doing so, adjust the course of the research. The reason for this is to keep focus and to save time. Otherwise, the participatory aspect will drag the research on without any time constraints. HCD, by delegating a large portion of research direction to the community ensures the creation of solutions truly desirable, feasible, and viable for the community. The most critical reason to select human-centered design methodology is its efficacy and efficiency in guiding a design process in the best direction that ultimately brings proper solutions for all stakeholders.

6. CONCLUSION

This paper presents how HCD methodology has been successfully utilized to extract real values from the slum community. First, we investigated the distinct characteristics that make the HCD approach unique. The results are summarized in the positioning of HCD among other design methodologies and its mapping in the spectrum of design for, with, and by the user. We answered the question of how HCD methodology could be used to address the health issues experienced by the urban poor in the Jakarta context by presenting findings obtained through various methods of HCD methodology. The HCD methodology was fruitful in identifying some of the issues experienced by the community, especially WASH-related issues. The insights presented in this paper may help inform designers in generating solutions for this particular demographic.

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