Evaluating human-centered design methods as an approach for inclusive green design: Case study Kampung Kota Surakarta

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Abstract. Acceptable design by community is a significant indicator of success inclusive design and sustainable human settlement. There are many cases where programs initiated by the government to cope with specific issues or problems have failed to gather support from the community. The communities do not have a sense belonging to the design which leads to unsustainable program. The human design center (HCD) has been advocated as an approach for inclusive, participatory design in community programs. This study aims to investigate the key success of implementation of human centre design methods with Program Kampung Iklim (ProKlim) Surakarta as a case study. ProKlim is a national program to promote community actions to promote resilience to climate change impacts. Elaborating Human Center Design in the implementation of ProKlim program in Surakarta city, the collaboration process in design is discussed, placing emphasis on how to include end-users in the development process. The study shows that the same method would not necessarily produce the same outcomes in different areas. Despite scant evidence of its effectiveness to produce acceptable design, The study reveals that four pre-conditions need to be established in using participatory design approach implemented in community programs, that are knowledgeable community leaders, informed communities, social bonding and community acceptance regarding the program. Thus, this is crucial for the government to take into consideration community leader regeneration as a regular agenda.

1. Introduction
Knowledge of ‘the actual state of object design is needed. Participatory design has been widely admitted as a panacea to formulate decisions that can accommodate precision and inclusiveness at the same time [1]. Historically, it was developed as a response to the limitation of top down approach in designing process for community programs [2]. It focused on the democratisation of practices and equalisation of power relations [3]. In design, the Human Center Design (HCD) approach has been advocated as the best approach to scale participatory design despite scant evidence of its effectiveness to produce acceptable design [4].

In 2012, The Ministry of Environment (KLH), referring to the Regulation of the Minister of Environment Number 84/2016, has initiated the climate kampung programme (Proklim) as a national programme. The programme is aimed to encourage community participation in carrying out local actions
to increase resilience to the impacts of climate change and reduce emissions at sub-district level. Awards will be given to the community who has sustainable actions related to climate change adaptations and mitigations efforts. In Surakarta City, ProKlim Programme has been conducted in seven sub-districts with different characteristics. In 2015, Kadipiro Sub-district, one of seven sub-districts, was awarded its achievement in Province level. However, the award received did not guarantee the sustainability of the Proklim program initiated. These issues are common phenomena occurring in community programs. Most programs initiated by the government have failed to gather support from the community threatening its sustainability [5]. Without continuous process, it is unlikely for a programme to achieve its targeted goals. Therefore, acceptable design by community is a significant indicator for the success of inclusive and sustainable design for community programs.

The research is aimed to investigate how the collaboration process happened in the on-going ProKlim programs in Surakarta. The research looks into how the green design project action has been formulated by the community by using HCD. Given the different results in the implementation of ProKlim programs among sub-districts, factors influenced need to be identified to gain community participation and acceptance. As the interest in using participatory design is increasing, it is valuable to understand the key factors of the success for the collaboration process in community programs.

2. Methodology

2.1. Human-centered design process
Human Center Design (HCD) is the process where humans become the center focus. It concerns the character of the community and its behavior in the design process. There are three stages where the HCD take places [4]. First, exploration. In the exploration stage, observation and shadowing are conducted to understand. Second, creating ideas. In this stage, focus group discussion is conducted to understand (Figure 1). Third, implementation. This is the stage how the community implemented the idea they formulated. Understanding human behaviour and their interaction to each other, HCD serves as a tool gather data to elaborate the collaboration process in participatory design to identify the uniqueness and difference among cases leading to its success or failures.

![Figure 1. Human-centered design process.](image-url)
2.2. Case study: green design action intervention for proklim programme in Surakarta City

Proklim programme at Surakarta City has been initiated since 2013-2019 by the Department of Environment. Seven sub-district at different levels of RW have intervened. They are Kelurahan Kadipiro - RW 9 (2013), Kelurahan Sondakan (2014), Kelurahan Kadipiro - RW 23 (2015), Kelurahan Kestalan - Kandang Doro (2016), Kelurahan Mojosong - RW 37 (2017), Kelurahan Joyotakan - RW 05 and Kelurahan Karang Asem RW 09 (2018) and Kelurahan Mojosong (2019) [6]. The objective of this programme is to creating a community that understands the problems of climate change and its impacts and takes action on adaptation and mitigation of climate change proactively that contributes to the achievement of sustainable national development. The various programmes were implemented such as implementing green space at neighbourhood scale, solid and liquid waste management, and rainwater harvesting and utilization programme.

Four sub-districts have been chosen from seven sub-district where the ProKlim programs have been conducted in Surakarta since 2013. As slum areas are more vulnerable to climate change impacts, two different character areas are used as the criteria. They are Kampung Sangkrah and Kampung Ngemplak Sutan represent slum concentration areas in Surakarta while Kampung Kadipiro and Kampung Gajah Putih are not categorized as slum areas (Figure 2). They are selected as they are in Surakarta’s slum concentration areas.

![Figure 2. Cases studies Proklim Kampung.](image)

2.3. Research stages and data source

We conduct empirical studies to compare the collaboration process among ProKlim programs to understand the key success factor of participatory design for community programs. Figure 3 shows four stages conducted in our research.
Data was collected through observation, semi-structured interviews, and focus group discussions during the formulation of project green design in the selected sub-districts (Figure 4). Trying to understand the behaviour of the community and their leader in formulating green design actions, it focused on four factors which vary among cases, that are leadership, community knowledge related to the ProKlim program, community initiative and program sustainability. The role of leadership was observed by using community leaders as the respondents. Data was gathered to understand the level of information owned among communities. Furthermore, HCD process is evaluated in how initiatives formulated by the community and how its continuation after they are implemented. Those elements are important to evaluate the HCD’s process occurs on each case studies. The representative community leader, leader of Ibu-Ibu PKK become are the representative respondent. The duration of research takes almost 1 month also through focus group discussion for several time, workshop and the implementation design on site. The Leadership was observed with the leader of each case study. How the leader manages the programme of Proklim Kampung from government and also the process of implementation of green design with the academician. Educated community regarding Proklim Programme had been observed. Did the community know, how deep and far they know about the Proklim Programme from government. The community initiative had been observed. How the initiative produced in the community. The last criteria is sustainable Kampung Proklim Programme. Several programme of Proklim kampung’s had been done for almost 3 years involved the government. How was going on the site.
3. Results and discussion

Examining how the participatory design in the HCD process is deployed reveal on the four case studies of Proklim Kampung. We identify the process of HDC and key factors that influence these methods, revealing opportunities for conducting participatory design in urban kampung.

3.1. The element of human-centered design

The four criteria that had been observed in the process of HCD. The result are shows different of each case studies (Figure 5). Four criteria which are the significant factors for implementing Human Center Design requires further conditions to support the sustainability of Proklim Program. Leadership: passionate leader is needed instead of direct appointed leader. Leadership is important element. How the leader manages the green kampung’s activities. Such as Kampung Kadipiro on 2017 had been inaugurated as the successful Proklim Programme from Central Java Province. The reason is because they had good leadership community that very active. Educated community: the community need to understand not only about what the program is but also why and how it can benefit them. The knowledge about the proklim kampung that has been initiated by government and also the general knowledge regarding green design are important to observed. Most of four of Proklim’s Kampung cases studies, they community are already knowing about Proklim Kampung’s project from government. Kampung Community initiative and collaboration: creative community is strong social capital and collaboration with intermediate partner. Sustainable program: relationship between proposed program foster its sustainability, social bonding foster the involvement of the community in all process.
3.2. Key factor influencing of human-centered design

In the area which has passionate leader (Gajah Putih, Sangkrah and Ngemplak Sutan), the community is better educated and have more sustainable program. In opposite Kadipiro, even though in the previous day this neighborhood won the appreciation of PROKLIM programme in the level Ceneteral Java, right now the proklim’s programe is not sustain.

In the area which educated community (Gajah Putih, Sangkrah and Ngemplak Sutan), the community could realize the important of the Proklim’s programme for their neighborhood benefit. The collaboration with the intermediate actor seems work well in the area of Gajah Putih, Sangkrah and Ngemplak Sutan. The expert (university student) whom involved the action design project could make a trigger for them to develop more creative ideation and implementation regarding Prokim’s programme. In opposite, the area which no initiative it is difficult to triggering them to make a creative project. Creative community is associated with their social bonding during all design process (pra-implementation, implementation, pasca implementation).

| No | HCD Variabel                                      | Gajah Putih | Sangkrah | Kadipiro | Ngemplak Sutan |
|----|---------------------------------------------------|-------------|----------|----------|----------------|
| 1  | Leadership                                        | +++         | +++      | +        | +++            |
| 2  | Educated Community Regarding Proklim Programme    | -++         | +++      | ++       | +++            |
| 3  | Community Initiative and Collaboration            | -++         | +++      | +        | +++            |
| 4  | Sustainable Kampung Proklim Programme             | ++          | ++       | +        | +++            |

![Figure 6](image_url) Analysis the key factor of the Human-Centered Design Process.

ProKlim is a national program to promote community actions to promote resilience to climate change impacts. Elaborating Human Centered Design in the implementation of ProKlim program in Surakarta city, the collaboration process in design is discussed above, placing emphasis on how to include end-users in the development process. The study shows that the same method would not necessarily produce the same outcomes in different areas. Thus, new concerns and precautions arise especially when users refer to the community as human become part of the design team (HCD process), some of which are further addressed here.

3.2.1. Concern on the knowledge and experience of the leader. According to Light and Akama [7], the community leader becomes an important role in the process of participatory design. The author also points out that the knowledge and experience of the leader become the concern. The active leader at the community level could manage the initiative project Proklim with support funding from government or voluntary projects. The experience leader community could facilitate well participatory design on the field site.

3.2.2. Concern on informed community. Looking at the participatory development process demanded by a participatory agenda. The dangers of institutionalised participants are that this can place excessive demands on the time of all concerned. Government and NGO resources can be poured into activities that have little influence on key managerial decisions, and build only cynicism among their lay participants [8]. By contrast, when the dynamics of the local community are more supportive, the official moments participatory events can open up spaces of empowerment at the grass roots. The dynamics of the local community can be more supportive only when the community itself is well informed with the knowledge of Proklim Programme. It shows that from four case studies, Kampung Gajah Putih,
Sangkrah and Ngemplak Sutan have dynamic local communities. The Community not only understands what is the Proklim programme but also well informed with the benefit of Proklim programme if it is implemented in their neighbourhood.

3.2.3. Concern social bounding. Genuine participation can be defined as "the fundamental transcendence of the user's role from being mere informant to being a legitimate and recognized participant in the design process" [9]. The community is managed as a strategy to find common needs across various interests related to the Proklim Program. Common needs underlie community acceptance. It can be shown among the case studies that kampung that have a continuous project of Proklim kampung not only initiated by the government having sustainability program.

3.2.4. Concern community acceptance. When dealing with participatory design HCD, one has to bear in mind that the result of users involvement in product design may be either positive or negative for the design process as a whole. Among the expected positive outcomes, it is worthwhile mentioning: better team synergy and more focus on delivery design action. Therefore social bounding on community should be strong enough to. Creative community is associated with their social bonding during all design processes (pra-implementation, implementation, pasca implementation). The social bounding relation can be shown in Kampung Sangkrah and Ngemplak Sutan. On those kampungs the interaction between the people of kampung society and community design (academician). The role of community design (academician) only become a trigger [10].

4. Conclusion
The proposal in this paper is to propose a design method for effective Human Centred Studies become effective on the field site. Besides that, it wishes to suggest to urban planners and designers the possible measures to be implemented HCD method, to complement and strengthen existing guidelines in addressing the issue of acceptable design by community at urban kampung settlements. Acceptable design by the community is a significant indicator of success inclusive green design and sustainable human settlement in a disruptive era. We have used our four case studies to consider pre-conditions that need to be established in using a participatory design approach implemented in community programs that are (1) The knowledge and experience of the Leader; (2) Informed Community, (3) Social Bonding, (4) Community Acceptance.

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