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Human Centred Research and Design: User-Independence in Recycling by Visually Impaired Persons

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ABSTRACT

In recent years, more people have urged that the persons with special needs are necessary to participate in more public affairs. However, research on how to meet this goal is still deficient. Many of the studies are shallow in exploration and with very little voice and view from the persons with special needs directly. Among all persons with special needs, visually impaired persons (VIPs) still have little chance to participate in public affairs and services. Per the recycling participation, research results have shown that VIPs face a lot of barriers, in particular it is very difficult for them to carry out the recycling activities independently. Moreover, many of the studies have not looked from the perspective and preference of the VIPs. Since 2022, a case study on the recycling need and participation of VIPs has been conducted in Hong Kong. The study aims to promote human centred research and design. It consists of two major stages, i.e., design direction, and detailed design. This paper mainly presents the first stage of the study. In this stage, through design workshops, the visually impaired participants gave their valuable opinions and working with the researchers to identify key considerations and directions for the promotion of recycling by VIPs. These findings are being used for the detailed design to meet different physical living environments, i.e., not only for Hong Kong but also other densely populated cities.

Keywords: Human centred design, User-independence public design, Recycling, Visually impaired persons

INTRODUCTION

To be successful, waste recycling requires the support and participation of different levels and groups of stakeholders. The government, professionals and other stakeholders can take a proactive role in achieving this by encouraging the wider public participation of various user groups as part of their local sustainability goals.

However, studies focusing on methods of promoting equal opportunities in recycling to persons with different capabilities, in particular those with special needs, are limited. Among all, few design researchers have examined the physical and perceptual barriers of visually impaired persons (VIPs) face in such participation, or their specific requirements. Evidence that can inform sustainability-oriented environmental management and planning through the participation of VIPs is also limited.

Since the mid of 2022, a case study on the recycling need and participation of VIPs has been conducted in Hong Kong. The study aims to promote human centred research and design. It consists of two major stages: (a) design direction, and (b) detailed design. The entire two-stage research process focuses on review and promotion of the participation of VIPs in recycling. The promotion aims the self-initiation and decision of the recycling based on the social, cultural and physical preferences and needs of VIPs.

The first stage of the study (as mentioned above, aiming at generation design directions) was completed in the late of 2023. Besides general social and design research methods collecting the views and choices of the VIPs, the key research activity was to invite VIPs to participate in field visits and workshops. To promote the high level of user-participation, the entire plan and execution of this stage of research was solely or mainly planned and decided by the researchers. Instead, VIPs introduced by the NGOs (note: the researchers worked with the NGOs for the VIPs for over 20 years) were expected to work as initiators and researchers to lead the research project with the researchers (i.e., research facilitators).

The findings of the research were insightful in design policy, implementation and management. One of the key findings was the importance of user-independence in recycling. Instead of expecting more on-site human assistance or specially designed and targeted environment and facilities, the finding indicated that the visually impaired participants preferred an inclusive design for their preferences and needs. At the end of the stage of study, some directions were generated for detailed design which is expected to be further explored and executed from 2023 to 2025.

BACKGROUND

The rights of people with special needs have gradually been recognised by policy makers, researchers, activists, engineers, designers and the public, on the basis that fundamentally all people should be treated equally and be free from discrimination. Both direct and indirect forms of discrimination can occur (EOC, 2007, 2013; Siu, 2009a; United Nations, 2011, 2015). According to the United Nations as well as many organisations responsible for equal-affairs, "direct discrimination" occurs when a person with a disability is treated less favourably than someone without a disability in similar circumstances, and "indirect discrimination" occurs when a condition or requirement is applied to everyone but in practice adversely affects those with disabilities.

These definitions apply not only to individuals' rights in terms of welfare but also to their right to contribute to and participate in society (The Government Equalities Office, 2011/2021). However, discrimination against persons with special needs is still worryingly common, even in developed countries and cities with robust economies and advanced social welfare systems (EOC, 2007, 2012; Nussbaumer, 2012; Siu, 2009a, 2013b; Siu & Wong, 2015; Wong et al., 2020).

Inclusive Design

Inclusive design refers to design outcomes (e.g., products and environments) that can provide diverse spatial qualities and opportunities for multiple uses by all, regardless of ability or age. More design researchers have advocated that user involvement and iterative assessment are incorporated throughout the design process. Inclusive design represents a strategy that denotes social equity and promotes equal access through design (Heylighen, Van der Linden & Van Steenwinkel, 2017).

The focus of this strategy has shifted from regarding typically marginalised groups as 'special cases requiring special design solutions' to 'integrating them into the mainstream of everyday life' (Dong, Keates, Clarkson, 2003). Inclusive design is thus considered sustainable and can contribute to reducing social inequality (Heylighen et al., 2017). However, research indicates that the active inclusion of non-professionals in the process of inclusive design 'remains an aspiration, rather than a regular achievement' (Watchorn et al., 2021).

Need and Importance of VIPs Participating in Recycling

Social engagement, such as contributing to environmental initiatives, has been proven to be strongly associated with improved health and well-being, and is particularly valued by persons with special needs. Any level of active social engagement, however limited, can positively contribute to their life satisfaction (Jang, Mortimer, Haley, & Graves, 2004; Wong et al., 2020). Per the issue of recycling in particular, many policies and the design and management of recycling facilities in most cities do not currently meet the needs and preferences of those with diverse capabilities, and particularly VIPs (Siu, 2013a).

Taking Hong Kong as a case study, reducing and recycling waste is crucial in this densely populated city which is a cramped city with a huge population and limited land and with rapidly filling disposal facilities. The Hong Kong government recognises recycling as a pillar of the latest climate action plan and has set the goal of 'waste reduction, resources circulation, zero landfill' in its new "Waste Blueprint for Hong Kong 2035". The aim is to involve the whole community in environmental initiatives such as reducing waste.

EXPLORATION OF DESIGN DIRECTION FOR THE PARTICIPATION OF VIPS IN RECYCLING

Research Design and Settings

Four groups of VIPs introduced by NGOs were invited to participate in the study. Each group has two male and one female participants (totally $N = 12$). They were with different ages (from 20 to 65 years old). They also had different types and levels of visually impairment.

They were invited to participate in an in-depth qualitative study. The design research activities included an introductory meeting, four field visits and two group in-depth discussion workshops. The key aim of the activities were to identify key considerations and generate design directions for the

need based on the *views*, *preferences* and *needs* of VIPs. It is expected this stage of the study (i.e., 1st stage) to generate insight for detailed design and further exploration on the topic.

The places for the visits included a park, a transport terminal, a governmental building (public space), and a library. During the visits, the environments were introduced and described to the participants. They were expected to provide their views on the needs of recycling to and in these kinds of public spaces. To prevent the dominance of particular participants, the researcher working as facilitators put attention and effort to encourage all participants to raise their views. Individual questions were also go to different participants separately during the workshops. After that, small group discussions (called, sharing) were conducted. A representative of participant was selected by the entire group members to lead some discussion based on their interested topic and present the results to other groups.

Key Findings

Similar to some of the findings of the studies conducted by the researchers since 2015, the participants stated that there were very limited consideration and support for them to participate in recycling. A majority of them agreed that, instead, they were more than expected to participate in recycling.

Per the summary of the 1st stage of the study, the key notes of the views, preferences and needs are as follows:

- VIPs were rarely able to participate in environmental initiatives and contribute to society due to their distinct special needs;
- VIPs face numerous barriers to participating in public recycling;
- Inclusiveness is not seriously considered in the planning, design and management of public recycling facilities (see also Siu, 2013a; Wong et al., 2020).

The participants identified *four* major aspects necessary for attention for detailed design and further exploration:

- Availability of recycling facilities for VIPs;
- Identification (being informed; accessibility of information) of location of recycling facilities;
- Way of approaching the location of recycling facilities;
- Way of accessing (using) the recycling facilities.

The two most important views agreed by *all* participants were that they expected the recycling facilities:

- High inclusiveness
- High user-independence

Regarding the availability of recycling facilities for VIPs, the participants suggested that the recent IT technology could give some help, in particular via the mobile phone technology and information provision. On the other hand, the participants also stated that it was important to take care of those who might not easily or able to access this kind of facilities, such as those who were

not familiar the current mobile-phone uses. Among all, the governmental information facilities available in governmental places and venues might give big help. For example, computer and web support in the libraries, community centres, public institutions and/or privately owned public facilities were good place to allow VIPs to access digital information. Specially assigned or trained staff in these places might give help to VIPs to access the information.

For the identification of location of recycling facilities, the participants had the similar views mentioned above. Digital information today could give big help. They further suggested to have some standard locations of these facilities. For example, it would be a good practice and convenient for the VIPs if the facilities were available at the entrance of the location (e.g., government buildings, parks, schools). They further stated that such kind of provisions was expected to have a high safety consideration and arrangement.

For approaching and accessing the recycling facilities, the participants expected to have some *simple*, *direct* and new designs. Many of them complained the current so-called good designs for VIPs were not from their perspectives. Such as many tactile maps available at the entrances of buildings were with very limited uses. It was difficult for a VIP to remember and recognise all of the routes and locations of a newly visited building. Regarding "new" designs, they further expressed that new technology might be a good way, in particular these years increasing number of VIPs had accepted technological matters and products with a more positive view and manner.

All of the participants, as mentioned above, indicated that they did not want to create trouble to other people. Instead, regarding recycling practice, they were more willing to carry out it by themselves. They also wanted to use the same kind and nature of facilities with persons without visual impairment. They did not want other people to look at them or consider them as a kind of monsters or those always taking advantages from others.

Finally, the findings indicated that the most difficult part/issue in recycling participation for VIPs was that they needed to do the recycling in a "new" place. For some daily places VIPs were familiar with and commonly accessed, they did not have much difficulties in general, unless there were some changes in the environmental settings or provision of facilities without any prior notice. For VIPs, "new" place means that there was uncertain in availability, location, accessibility, and other support, help and assistance.

CONCLUSION

To facilitate and design for VIPs in recycling practice, according to the study findings and research experience, the most important point is to respect and understand their views, needs and preferences. In fact, many of the poor designs (or non-human-centred design) are only from the perspectives of designers (not-the-users). According to the study, high degree of inclusiveness and independence are the key expectations and preferences of VIPs. There are four major directions for detailed design and further exploration (also, 2nd stage of the project): (a) availability of recycling facilities for VIPs; (b) identification (being informed; accessibility of information) of location of recycling facilities; (c) way of approaching the location of recycling facilities; and (d) way of accessing (using) the recycling facilities.

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REFERENCES

Clarkson, J. (Ed.) (2003). Inclusive design: Design for the whole population. London: Springer.

Conner, N. (2009). Living green: The missing manual. Sebastopol, CA: O'Reilly.

Dong, H., Keates, S., Clarkson, P. J., & Cassim, J. (2002). Implementing inclusive design: the discrepancy between theory and practice. Paper presented at the ERCIM Workshop on User Interfaces for All.

Equal Opportunities Commission (EOC). (2007). Disability Discrimination Ordinance & I. Retrieved October 20, 2021, from http://www.eoc.org.hk/EOC/GraphicsFolder/showcontent.aspx?itemid=4790.

Equal Opportunities Commission (EOC). (2012). The EOC promotes equality and inclusion at the 8th Session of the United Nations Committee on the Rights of Persons with Disabilities. Retrieved October 22, 2021, from http://www.eoc.org.hk/eoc/graphicsfolder/ShowContent.aspx?ItemID=10687.

Equal Opportunities Commission (EOC). (2013). Disability Discrimination Ordinance. Retrieved October 22, 2021, from http://www.eoc.org.hk/eoc/graphicsfolder/showcontent.aspx?content=ordinance_ddo.

Heylighen, A., Van der Linden, V., & Van Steenwinkel, I. (2017). Ten questions concerning inclusive design of the built environment. Building and Environment, 114, 507–517.

Jang, Y., Mortimer, J. A., Haley, W. E., & Graves, A. R. B. (2004). The role of social engagement in life satisfaction: Its significance among older individuals with disease and disability. Journal of Applied Gerontology, 23(3), 266–278.

Nussbaumer, L. L. (2012). Inclusive design: A universal need. New York: Fairchild Books.

Siu, K. W. M. (2009a). Research for the disabled: Action, participation and inclusive approaches. The International Journal of the Humanities, 7(4), 81–94.

Siu, K. W. M. (2013a). Innovation for diversity and fairness: Inclusive design of recycling facilities for visually impaired people. The International Journal of Community Diversity, 12(1), 51–65.

Siu, K. W. M. (2013b). Accessible Park Environments and Facilities for the Visually Impaired. Facilities, 31(13/14), 590–609. Emerald.

Siu, K. W. M., & Wong, K. S. L. (2015). Flexible design principles: Street furniture design for transforming environments, diverse users, changing needs and dynamic interactions. Facilities, 33(9/10), 588–621.

The Government Equalities Office. (2011/2021). Equality Act 2010: Equality Act guidance. Retrieved October 2, 2021, from https://www.gov.uk/government/publications/equality-act-guidance.

United Nations. (2011). End poverty 2015: Goal 7: Ensure environmental sustainability. Retrieved October 10, 2021, from http://www.un.org/millenniumgoals/environ.shtml

United Nations. (2015). United Nations Environmental Programme (UNEP). Contribution to the United Nations ECOSOC Integration Segment. Retrieved November 2, 2021.

Watchorn, V., Hitch, D., Grant, C., Tucker, R., Aedy, K., Ang, S., & Frawley, P. (2021). An integrated literature review of the current discourse around universal design in the built environment – is occupation the missing link? Disability and Rehabilitation, 43(1), 1–12.

Wong, Y. L., Siu, K. W. M., & Lo, C. H. (2020). Reliability of recycling facilities for the visually impaired persons: A case study of Hong Kong. In J. F. Silva Gomes & S. A. Meguid (Eds.), Proceedings IRF2020: 7th International Conference Integrity-Reliability-Failure (pp. 399-404). Lisbon, Portugal: FEUP-INEGI.