Developing a Social Capability Model of Inclusive Public Facilities: A Case Study of Play Space in Hong Kong

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Abstract. Through a case study of Hong Kong, the paper presents how the Inclusive Design Cube (IDC) can be referenced to develop and evaluate inclusive play space in practice. While social activities take place frequently in play space, the paper advocates that it is essential to include social aspect in public design. Consequently, based on the IDC, the paper develops a model of Socially Inclusive Design Cube (SIDC) to investigate and identify the relationship among social, motion, cognitive and sensory capabilities in the context of play space. Through the development of the SIDC model, the paper raises a question about inclusive design approach. It is hoped that the further development and the application of the SIDC model will contribute to the discipline of inclusive design with social concerns.

Keywords: Inclusive Design Cube (IDC) · Socially Inclusive Design Cube (SIDC) · Play space · Public design · Children · Hong Kong

1 Introduction

Since few decades ago, researchers had already noticed the problem of defining play. There is no distinct definition to describe and explain its nature [1]. Sutton-Smith [2] claimed that this is the ambiguity of play. Some researchers were still attempting to resolve the issue. Scarlett et al. [3] concluded from the perspective of children that play is "about having fun, being outdoors, being with friends, choosing freely, not working, pretending, enacting fantasy and drama, and playing games" (p. 3). It is also central to children's physical, social, emotional and cognitive development that children often learn through play at home, school, playgrounds and outdoor playgrounds [4]. In order to protect children from bad play that is unsafe and threatening and facilitate them learning the skills and abilities, it is essential to provide suitable play facilities or objects for children.

Play facilities in public space provided by government are one of the most common play facilities that most children can come to contact with. In the recent years, their

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designs have been drawing more attention of designers and architects. As society advances and the concept of inclusiveness develops among the members, it is unsurprising to find that more inclusive facilities are provided for users with different abilities. The same should have happened for play facilities; however, this is not the case of Hong Kong, as well as many cities which claim that they have invested a lot of money and other efforts and resources on play facilities.

Despite the growth of other inclusive facilities, for example, most of the current play facilities in the play space of Hong Kong do not cater the needs of the disabled children. Based on the deficiency in Hong Kong, the paper presents how the Inclusive Design Cube (IDC) can be applied to develop and evaluate play space in practice. Based on the IDC model, it also develops a model of social capability, namely Socially Inclusive Design Cube (SIDC), for understanding the social aspect in play space. The SIDC model seeks to identify the relationship among social, motion, cognitive and sensory capabilities in the context of play space.

2 Inclusive Design Cube and its Application in Play Space

2.1 Inclusive Design Cube (IDC)

Considering the needs and preferences of the end-users is imperative for a successful design [5]. The IDC is one of the well-developed model focusing on the users. It advocates designing for the whole population [6]. The whole population means all users with different sensory, cognitive and motion capability (Fig. 1). The cube itself is used to explain how the population is divided into groups with different capability.

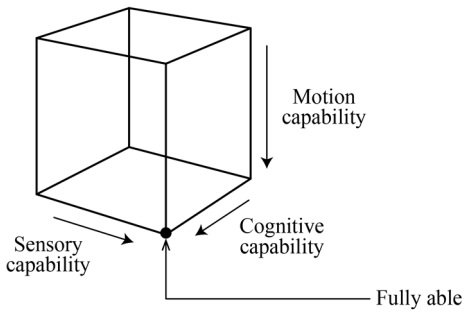

Fig. 1. The Inclusive Design Cube (a simplified diagram modified from the version of Clarkson et al.) (by authors)

The axes of the cube represent the motion, cognitive and sensory capabilities. The front corner of the cube represents the fully able user. In the illustration of Clarkson et al. [6], the cube is divided into different parts to represent populations using different designs: special purpose design, modular/customizable design and user aware design. The user aware design is widely accessible to the majority of the population. The special purpose design is catered for users with special needs and severe impairment.

The modular/customizable design, which is in between the two designs, features adjustable parts to make adaptation for some users. Apart from these three kinds of populations and their corresponding designs, the cube also includes population who need to be assisted by caretakers.

The IDC model suggests that people with different motion, sensory and cognitive capabilities may be served by different design approaches. Potential market can be identified and designs which suit a wider range of users may be developed. Inclusive designers can also make use of the cube to evaluate products' usability for different groups of population. They can use the cube with other quantitative data such as demographic and ergonomic data so that a more inclusive design can be produced.

It is noted that not only is the inclusiveness addressed, the exclusiveness of designs is also highlighted in the model of IDC. As the model illustrates the whole population, it is easy to identify which groups of population of end-users are being excluded. The IDC provides perspectives on the exclusion of end-users and addresses why some users are excluded [7].

2.2 Application of IDC in Public Play Space

In the example given by Clarkson et al. [6], a product (i.e., a kettle) was used to explain the application of IDC. Apparently, the IDC model is applicable across various design disciplines, as it is not designated in any specific contexts. Any designers dealing with inclusiveness and exclusiveness can apply the model. The IDC can be applied in any public play space attempting to be inclusive for children with different capabilities.

A possible way to apply the IDC in play space is to use it as a method of idea development (see Fig. 1). Designers can select the population with lower capabilities as end-users in the cube and design customizable/modular designs for them. For instance, in order to create play space allowing wheelchair users with lower motion capability, the width of the pathways may need to be wider. A play space that is able to cater children with exceptionally high cognitive capability may need to include some adventurous or creative problem solving elements in the play facilities. Being inclusive for children with sensory disability may need to choose colors carefully or introduce auditory elements in the play space. Using the IDC as a method of design development is to focus on the inclusiveness. This increases the accessibility of the play space for a specific population of end-users, or includes more end-users in different populations, depending on the level of its design inclusiveness.

The IDC can also be a method of evaluation. Instead of focusing on inclusiveness, exclusiveness is the emphasis (see Fig. 2). In other words, populations who are excluded by a design are of concern [7]. For instance, play facilities of a certain play space may be unable to cater the needs of armless children, and children with this kind of disability are being excluded in the design of the play space. It may be primarily because climbing is a major play activity in the play space, and children without arms cannot play well. Children's with Down syndrome may be unable to play in a certain maze park individually. This group of children is excluded, and adult companion must be needed because the cognitive ability needed to solve the maze is too high for the children. Children with disability in spatial awareness may be unable to jump

from one stump to another one with different heights in play space. Play space with this kind of stumps design excludes children from enjoying play.

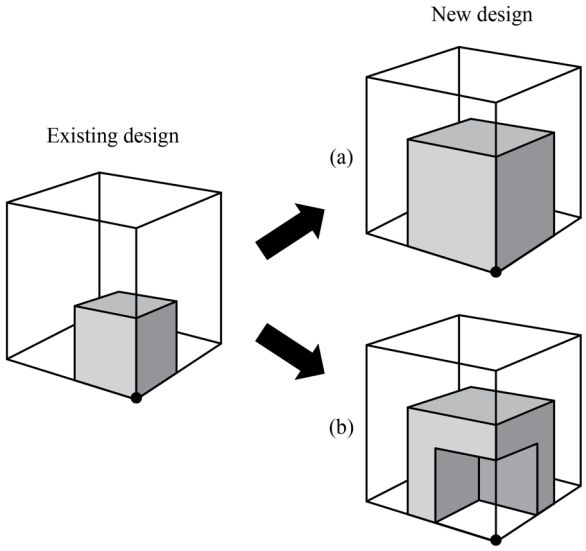

Fig. 2. (a) Increasing the population of end-users by including more end-users in the IDC model (b) designing for a specific population of end-users (the grey cubes present the end-users of whom a play space is designed for) (by authors)

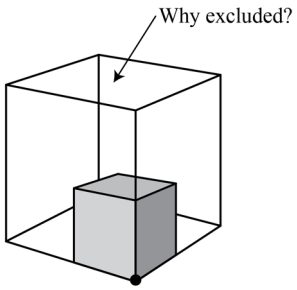

Fig. 3. Identifying the reasons of exclusion by focusing on the excluded end-users in the IDC model (the grey cubes present the end-users whom a play space is not designed for) (by authors)

From the above examples, design inclusion is the usual method used by designers to develop inclusive design for end-users, while design exclusion is able to understand why a population of end-users is excluded [7].

2.3 The Complication of IDC in the Case of Hong Kong Play Space

A joint-institutional and interdisciplinary research project has been implemented to explore the inclusiveness of public design. The research team attempted to apply the IDC model to understand Hong Kong (public) play space. Among all 18 districts in Hong Kong, the Kwun Tong district has the highest population density of children below 12 years old in 2011 [8]. The researchers then chose the play space in the Kwun Tong district for the investigation. There are 105 play spaces in total. These play spaces are actually playgrounds with play facilities and rubber safety mat on the ground. Fig. 4a and Fig. 4b show two examples of typical playgrounds and facilities in the Kwun Tong district of Hong Kong. The most popular facilities and structures include slides, swings, climbing frames, rocking chairs and seesaws.

Figs. 4a-b. Typical playgrounds in the Kwun Tong district of Hong Kong (by authors)

The research team visited the 105 playgrounds and studied the play facilities by using the IDC model. The process of preliminary observation revealed that the application of the model in playgrounds of Hong Kong is not as direct as it seems. The context of play space is more complicated, as it not only concerns a single design aspect but more than one.

Play space is one of the public facilities which covers the aspects of product (play facilities) and environment. When the IDC is applied in the context of play space, both play facilities and the environment may have to be studied separately. The level of accessibility of the two may be different, as the populations the play facilities and the environment served may not be identical. This mismatch is possible in the context of public play space. Fig. 5 illustrates an example of mismatch of accessible populations using play facilities and environment.

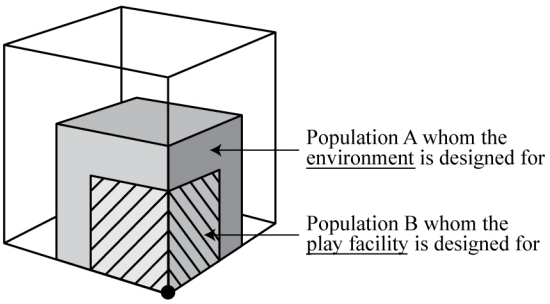

Fig. 5. An example of mismatch of the accessible populations using play facilities and environment (by authors)

In the example of Fig. 5, end-users in Population A have higher capabilities than those in Population B. A play space's environment is often able to cater the needs of Population A with the installation of lift or wheelchair path. However, the play facilities in the same play space may be unable to address the needs of Population A, and they can only serve the end-users of Population B. For instance, although a wheelchair path is built at the entrance of a play space, no play facility is provided accordingly. This kind of mismatch is common in playgrounds of Hong Kong.

In other words, while designing inclusive play space by using the IDC model, it is essential to consider the play facilities and the environment separately. It is undoubtedly the most preferable to synchronize the two accessible populations of play facilities and the environment and consider how to increase the population in the IDC model simultaneously. In addition, in the evaluation of play space, consideration should be taken for any populations which are excluded by either play facilities or environment. The evaluation should focus on both to get a more precise assessment outcome.

Apart from the mismatch issue discussed above, the research team, based on the preliminary observation, found that social activity is an important aspect in children's play in a play space [9]. After examining the environment and the play facilities of a playground, the research team would observe children's play. It is found that most children would play the play facilities and enjoy the fun that the structure could provide them but soon they would develop their own games with their peers or other children with similar age. Almost no children would play alone, and no children with disability appeared in the playgrounds. Apparently, social activities are essential. The interactions identified in the play space are not limited to child and playstructure but also child and child.

Consequently, inclusive play in this regard is not limited to motion, cognitive and sensory capability. The social aspect should also be considered. The IDC model should also include social capability, i.e., whether children is able to play with other children, in the context of play space. This calls for an inclusive design model through a social approach.

3 Developing a Social Capability Model of Inclusive Design

A social capability model of inclusive design is developed from the IDC model of Clarkson et al. In order to explain the possible interaction among the end-users in the IDC, each end-user of the population in the IDC model is illustrated by a small molecule (a sphere) in Fig. 6. Each molecule represents an end-user in the population analogically. The end-users are arranged in sequence based on their capabilities, and the front corner of the cube represents the fully able user (same as the IDC model described above in Fig. 1). The IDC model is used to develop the social capability model because the three capabilities in IDC are dispensable elements in considering inclusive design.

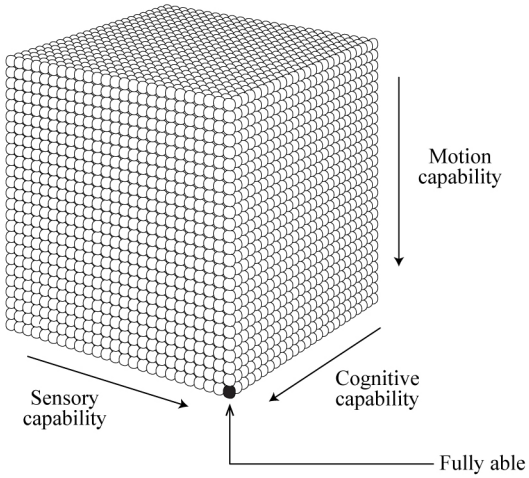

Fig. 6. The IDC model with individual end-users illustrated (a molecule represents an end-user) (by authors)

The social capability of an end-user is not represented by the three-dimensions as the three capabilities do. It is illustrated through the mobility of the molecules inside the cube. It is argued that being socially inclusive means that children with different capabilities can play together and engage in various activities. For instance, wheelchair children, children with Down syndrome, and visually impaired children can play with other children through some specially-designed games or facilities in a play space. The possibility of assimilating into other end-users groups with different capability becomes the key measurement of social capability.

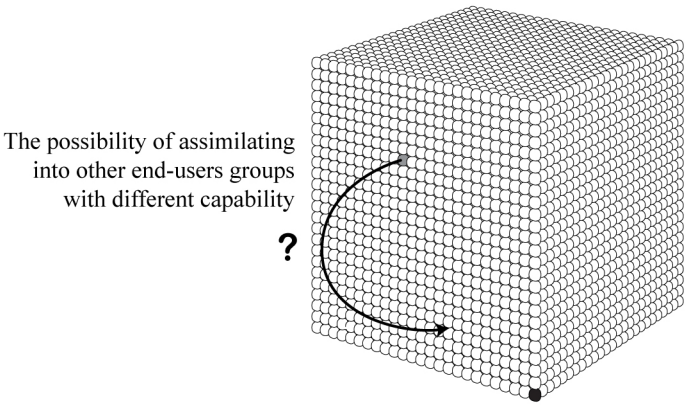

Fig. 7. The rigid and solid state of the Socially Inclusive Design Cube (SIDC) (by authors)

The concept of Socially Inclusive Design Cube (SIDC) is thus developed to include social capability. The social capability is independent from the motion, cognitive and sensory capabilities. It is regarded as another type of capability that it depends on various extrinsic factors such as environmental settings, and attitudes and responses of other end-users. Sometimes the caretakers may also create an impact to children's social capability [10]. The social capability is about the relationship between the end-users; therefore, it is measured by mobility and flexibility, and it is not norm-referenced.

The current rigid and solid state of the SIDC illustrated in Fig. 7 is unable to facilitate mobility and flexibility. Even the fully-able person may not have this kind of mobility. The molecules in Fig. 7 should have a certain level of mobility in order to assimilate into other groups. Ideally, *perfect social inclusiveness* occurs when the end-users use a *super design*. It disregards the motion, cognitive and sensory capabilities, and the *super design* allows the end-users with different capabilities (including the fully-able person) socially mixing together. This forms a 100% flexible and 'fluid' state of the SIDC (Fig. 8). The molecules are able to move around so that the end-users with different capability can mix and socialize with each other by using the *super design*.

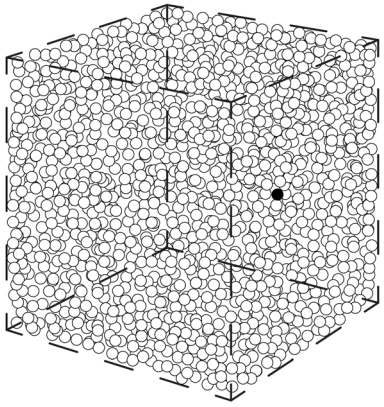

Fig. 8. The 100% flexible and 'fluid' state of the SIDC (by authors)

However, the state of the SIDC in Fig. 8 does not currently exist. Designs nowadays are still limited by the technology, and at the moment we are still unable to overcome the disabilities perfectly. In other words, *super design* is now just an imagination and does not exist also. The *perfect social inclusiveness* shown in Fig. 8 is not yet realized. In reality, the state may be 'viscous' or between 'solid' and 'fluid'. Different states may exist simultaneously in the cube. For instance, the molecules near the front corner are arranged orderly, while other molecules far from the front corner are more loosen and flexible to move (Fig. 9). This discourse of reality raises a question: what approach should designers take to attain social inclusiveness and at the same time retaining the capabilities of the end-users? The response to this question is central to any inclusive design with social concerns.

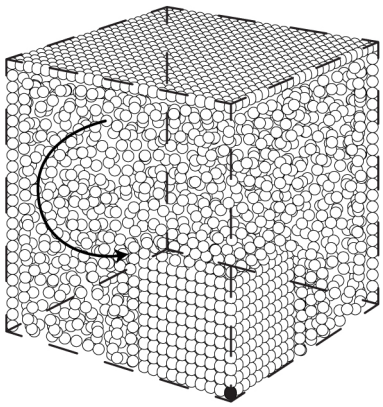

Fig. 9. An example of the SIDC with different states (by authors)

4 Conclusions

The IDC model is one of the well-developed models to develop and evaluate inclusive design. This paper does not have any intention to devaluate or underrate the original IDC model. Instead, it is a study focusing on the social inclusiveness based on the conception of the IDC model.

Through applying the IDC model into the playgrounds in the Kwun Tong district of Hong Kong, it is found that its application in play space is not straight forward as in other design disciplines. The public design nature of play space complicates the application of the IDC model, as public design is a discipline concerning product, environmental, and sometimes architectural designs. This paper also suggests that when public design is concerned, researchers may need to develop specific approaches to investigate into the topic.

The SIDC model suggested in this paper grounds a fundamental perspective to understand the relationships among the end-users in socially inclusive design. The different states of the model express the level of mobility and flexibility among the end-users. The model also addresses the issue of balancing the needs of socially inclusiveness and the concerns of capabilities. In order to put the SIDC model into real practice, practical application of the model is needed. Further adjustment and modification are needed afterwards.

Designing for social inclusion is exceptionally important in play space. Researchers and designers should shift the inclusive design approach from capability to diversity [11], so that children not only can use the facilities but also enjoy and share the real joy of play with others in public play space. Again, this paper does not any intention to provide a perfect or well-mature model for design application – at least up to the current research position. Instead, this paper wants to raise a critical question as abovementioned for researchers and designers to have more exploration and discussion.

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