Product Interventions and User Performance: Implications for Public Design to Achieve Sustainable Practice

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Abstract. This paper explains the practice-oriented approach to design and examines the relationship between people and products. A theoretical framework is proposed after reviewing the literature on product intervention and usability. Taking public facilities as a case study, this paper illustrates the ways in which people use them to make communities more sustainable for their inhabitants. The final conclusion is that public facilities should be designed by applying appropriate product interventions based on the social context and user acceptance.

Keywords: Design Strategies · Product Intervention · Practice-oriented

1 Introduction

The relationship between people and products has long been regarded as that of 'master and slave' (Bhamra et al. 2008). In recent years, some researchers and designers have suggested that a product should not only serve the user but also influence human behaviour and reduce the potential for error. The balance between products and users should be carefully configured within the social context.

Public facilities play an important role in daily life, from indoor areas such as shopping malls and metro stations to outdoor areas such as parks and roads. Indeed, these facilities offer not only convenience but also serve to control our behaviour to ensure social sustainability. Hence, to design high-quality public facilities, the interrelationships between products and users should be examined by studying user behaviour, needs and acceptance, and the social impact of the facilities (Siu 2005). To some extent, interventions can influence user behaviour. However, designers should carefully configure the balance between product interventions and user performance, because inappropriate or problematic interventions may be counterproductive and are often short-lived (Dan et al. 2010; Lille 2009). Moreover, in-depth studies on user practice are necessary to examine user responses and feedback on interventions.

Products provided with 'scripts' can steer user behaviour (regarding the definitions of 'scripts' 'affordances' and 'constraints', see Norman 1998; Crilly et al. 2004). However,

some researchers emphasise that changing human behaviour can be challenging, as users tend to be slow to accommodate sustainable practices (DeVries 2006; Scott 2004). In other words, trying to alter human behaviour in an inappropriate way may be deemed unacceptable and lead to annoyance and frustration.

Using railings in Hong Kong as a public facility case study, this paper illustrates how railings are used to maintain order in society, explores the relationship between product interventions and user performance, and finally discusses the design of public facilities by applying appropriate product interventions based on the social context and user acceptance.

2 Method

2.1 Public Space Facilities in Hong Kong

Hong Kong is a small but fast-paced modern city with a high population density. Compared with other developed cities, Hong Kong citizens are more reliant on public facilities such as buses and the mass transit railway (MTR) due to the convenience of public transportation and the high cost of private cars. Meanwhile, people from mainland China and countries worldwide visit Hong Kong for holidays. Every day, people interact with various public facilities and share them with others (both locals and non-locals). Therefore, public facilities are of great importance in providing convenience while also ensuring safety in society.

2.2 Research Method

This paper aims to investigate the potential for guiding human behaviour via product interventions and explores the role of the 'practice-oriented' method in the design process. To obtain various product design strategies and find the most effective way to design public facilities, we reviewed the literature on user perspective (experience, behaviour) and product design methods (usability, ergonomic engineering and sustainability).

Non-participant observation is a qualitative methodology that aims to gain in-depth insights into human behaviour without interacting with users (Marshall and Rossman 1998). Observation is a direct way to learn how people interact with (user or misuse) an existing product and then to establish appropriate (acceptable) forms of intervention. In this study, we conducted non-participant observations in streets, roads, metro stations, shopping malls, parks and other open spaces to examine the behaviour of users as they interacted with different forms of 'railings'. Through observation, we were able to uncover unexpected ideas that may have been overlooked and provide some guidance for the design of public facilities.

3 Results and Discussions

Instead of following the traditional way of 'separating space' by erecting railings, we could consider the use of signs, notices, chairs, pillars, trees, blocks, people, etc. for this purpose. Many kinds of interventions can be introduced to steer human behaviour. For example, they may be informative or compulsory, and tangible or intangible.

3.1   Tangible Interventions

In public spaces, tangible interventions can be seen everywhere. For instance, workers erect temporary railings during road repairs to prevent pedestrians from endangering themselves. Railings are sometimes set up in streets to guide people to behave appropriately. Bollards are often installed at the entrances to open spaces to prevent the entry of bicycles, even though this overlooks the accessibility and satisfaction of certain city users, such as people with disabilities, and especially those with visual impairment, for whom they are inconvenient or even dangerous (see Fig. 1).

Fig. 1. Tangible interventions set up to prevent the entry of pedestrians (left) and bicycles (right)

3.2   Intangible Interventions

In Hong Kong in most cases, an 'intangible railing' divides escalator space into two parts: the right side for people who are willing to wait in line patiently, and the left side for those in a hurry who want to move faster (Fig. 2). Hong Kong is known for its rapid pace of life and dense population. Hence, policies and measures are required to ensure social order in the city. Although interventions in the form of notices and information were enacted to encourage people to conform to this escalator etiquette, it took years for people to adopt it. However, once the rule became established, it has not been easy to change.

These types of intangible intervention have already become ingrained social norms among many local citizens, who apply them spontaneously through self-discipline (Fig. 3). People who obstruct the walking lane on escalators may be regarded as impolite and boorish. Nonetheless, people from mainland China and other countries may be unaware of these invisible 'railings' and unwittingly obstruct the walking lane, leading to misunderstandings and conflict with locals.

Fig. 2. An 'intangible railing' divides escalator space into two parts

3.3 Product interventions and user performance

Recently, for safety reasons, walking on escalators has been discouraged, yet citizens accustomed to the previous norm still provide a walking lane on the left while using escalators. User performance may change gradually from reluctant to spontaneous during the intervention period, because users are often slow to accommodate sustainable practices. Once a habit has formed, it may then be difficult to change. However, if we really want to alter user behaviour, persuasive product interventions and policies should be implemented. Users may then once again undergo the process of attitude change (reluctant-accepted-spontaneous).

In public spaces, we noticed that people waiting for a bus conscientiously stand in line at the kerbside, one by one, even if they are in a hurry. It was obvious that people have formed a sustainable practice of waiting in line, whether railings were set up or not

Fig. 3. The pillars are considered to represent 'railings' that separate the pedestrian bridge into two parts and avoid crowds becoming chaotic.

(Fig. 4 and Fig. 5). Indeed, as all individuals are involved in social relations, they quickly learn from each other via social norms and individual practice. In general, the bus stop sign is deemed the starting point of the 'railing'. No one would risk stepping over it, because those who jump the queue would be ejected for their unethical behaviour and severely criticized by others. Moreover, in Hong Kong, only a few buses share the same bus stop, enabling people to queue without crowding. In this case, product intervention is less necessary because people have achieved spontaneous sustainable behaviour (i.e., positive practices) without the need to impose restrictions. However, in some cases, such as a bus stop located in the middle of road, interventions are necessary to prevent people (e.g., children or the elderly) from accidentally entering the vehicle stream.

On some streets and footbridges in Hong Kong, the researchers noticed a phenomenon in which people would gather around a rubbish bin, smoking and relaxing (Fig. 6). Over the past three decades, the Hong Kong government has put considerable effort into preventing people from smoking in both indoor and outdoor public spaces such as public transport interchanges (Smoking Public Health Ordinance). With no designated smoking areas in the streets, smokers are willing to stand close to bins because it is convenient for disposing of their cigarette ash (smoking or carrying a lit tobacco product in a statutory no smoking area in Hong Kong is an offence carrying a $1,500 fine).

In this case, the rubbish bin and the small area nearby could be regarded as a 'railing' separating a smoking area from public space. Thus, a bin with a cigarette butt container,

Fig. 4. People standing in line to board a bus with the intervention of railings.

similar to a designated area with a sign stating 'smoking area', gives the impression that smoking is allowed in this area. Hence, to reduce the smoking rate in a specific area, we could deliberately remove the rubbish bin to increase the difficulty of accessing one. However, we would need to balance the relationship between intervention and user acceptance. Inappropriate controls (interventions) may lead to overwhelming annoyance or irritation. In these circumstances, decreasing the distribution density of rubbish bins may be considered a gentler form of persuasive intervention.

Although people have their own individual conscience and attitudes, they still behave similarly to others because they quickly learn practices from each other, such as waiting in line to board a bus. However, changes may not occur if people do not recognise the underlying issue. In that case, appropriate rules are needed to get everyone to follow the instructions and ensure social security.

3.4 Implications for in Public Design to Achieve Sustainable Practice

'Railings' are facilities designed to govern social order in public areas such as streets, roads, stations and parks. However, if we shift the focus from 'railings' to 'space separators', they can be viewed as ways of separating spaces to ensure social security. By focusing on 'separating', designers can identify a range of products that may be more suitable for a given situation.

Fig. 5. People standing in line waiting for buses, even in the absence of railings. They have clearly formed a sustainable practice of waiting in line with or without railings.

As both social contexts and human behaviour are complex and dynamic, designers should shift their focus onto practices rather than products. Nowadays, some researchers propose 'practice orientation', which focuses on investigating user behaviour in social practice as an effective approach to designing appropriate strategies to suit the dynamic social context. Although people learn from each other, the actions (i.e., practices) of individuals differ due to personal perspectives and attitudes. The variety of human behaviour demonstrates that it is impossible to insist on a static way to deal with a constantly changing situation. As user practices and social norms are not constant across space and time, flexibility should be considered as a form of sustainability in the design process. In other words, a product that was suitable and met people's requirements in the past may not serve the public interest in the present. Similarly, practices people previously rejected may be deemed totally accepted in the current situation, and vice versa.

'Practice orientation' may be regarded as an alternative approach to product design that adapts to social change and encourages users to participate in the design process and co-create the product along with the designers. Indeed, user participation is imperative, because those who are directly affected by a decision should have the greatest say in making the decision. Designers can identify appropriate interventions to alter inappropriate behaviour through user (practitioner) activities. Through the practice-oriented

Fig. 6. A rubbish bin, together with a small area nearby separating a smoking area from public space. Smokers are willing to stand close to rubbish bins because of the convenience of disposing of their cigarette ash.

approach, designers should aim to understand the complex and dynamic social interactions between users, objects and society, rather than focusing on individual products (Fig. 7). Simply speaking, 'product' is a 'noun' and practice is a 'verb'. For example, if we consider a product such as a cup, merely focusing on the shape of a cup, even when considering usability and user experience, will produce a design outcome that is no more than a utensil. If we focus on drinking, however, a variety of options arise, such as by hand, paper, a straw. As a result, an innovative straw with a filter, namely 'Lifestraw', was designed for some areas in Africa to drink water directly from a freshwater lake. This solution was by no means without foundation, but rather more reliant on the findings from everyday user practices. In other words, designers should shift their focus from 'product' to 'practice' to explore how people interact with public facilities in different situations (spatiotemporally), and then design appropriate interventions to influence user behaviour.

People are influenced not only by the social context (norms, culture) but also by the behaviour of others (actions). These elements (users, other people, products, society) influence each other in a systemic and integrated society.
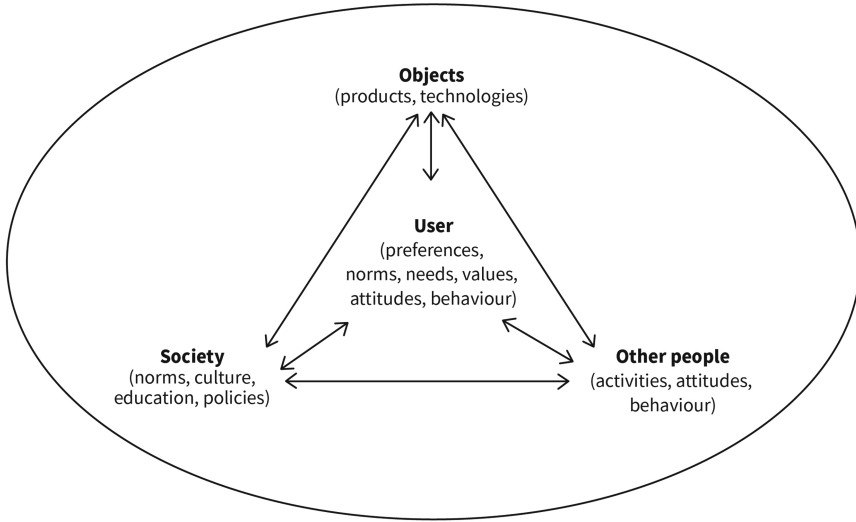
Fig. 7. Practice-oriented model

4   Conclusions

Public facilities play an important role in society. On the one hand, they provide us with convenience; on the other hand, they help to govern social order and security. In other words, a high-quality public facility is designed not only for user satisfaction but also to encourage sustainable practices. As some studies have shown, products have the potential to influence user behaviour. To ensure change and meet user needs, a sustainable approach to design is required that takes into account both product interventions and user performance. Furthermore, in terms of practice orientation, designers should shift the focus from products to practices to explore how people interact with public facilities in different situations (spatiotemporally), and then identify appropriate interventions that will influence user behaviour.

Taking public facilities in Hong Kong in the form of 'railings' as a case study, we examined how facilities influence user behaviour in daily life. We found that interventions may not be required to encourage sustainable user practices in every situation. Social norms, culture and policies can be combined to influence user performance. Thus, users generally experience a change in attitude towards different interventions from passive to active. The kind of intervention that is most suitable for a specific facility should be open to discussion.

This paper does not propose a solution for how to deal with every problem in public design, but instead offers a potential approach to the design of public facilities to influence sustainable user practices through effective and appropriate interventions. It aims to explore the potential of facilities to guide user behaviour, and proposes a direction and strategies for public design. Due to the complexity and dynamic nature of social contexts and user behaviour, the design of every public facility requires in-depth exploration.

Comprehensive and long-term studies should therefore be carried out in the design of public facilities to respond to the dynamic situation.

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