

A Framework for the Participatory Design of Interactive Media Façade

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Abstract: Media facade is considered as one major trend in designing building skin. The Interaction modes of media façade are categorized into three classes one-way, reactive, and interactive. Interactive media facade as a public display possesses a great social potential to interact with citizen. There are two approaches to participatory design by citizen: 1) for implementation of the facade is ‘design process’ to participate, 2) dynamic creation of media contents. This page focused on the creation of content especially interested in the method of contents operation design. We analyze previous cases to propose as framework of designing participatory in media façade. Also examine these cases understanding characteristics and then recognize effectiveness, and significances. In conclusion we provide a conceptual framework to contents design operation and use the framework presented here to draw a method for cooperation and coexistence of citizen.

Keywords: Participatory design, Media façade, Public display, Community interaction

Introduction

In contemporary architecture, media façades are considered as one major trend of building skin design. The building skin not only separates the inner from the outer space, but performs more extensive functions such as an independent subject which express concepts of modern architecture. Applying digital media technology to the building skin creates a media façade through which the skin can change and communicate with its surroundings. The interaction modes of media façade are categorized into three classes: one-way, reactive, and interactive. Interactive media façades are public displays with strong potential for citizen interaction. Large urban displays allow the simultaneous association of many people with the installation, thereby exerting affirmative effects on social engagement and co-presence in front of the façade (Fischer and Hornecker, 2012). Recently, researchers have recognized the potential of media facades to be seen or designed by numerous individuals simultaneously (Schoch, 2006, Seitingner *et al.*, 2009). Especially, interactivity scenarios can be designed for collaborative multiusers (Boring *et al.*, 2011). Media facades function as public displays that create a novel local communication media. Ultimately, these displays promote community interactions and intensify an awareness of location (Memarovic *et al.*, 2012).

Citizens can participate in media façade design in two ways: through “design process” or through “contents creation,” where participants offer contents. The current study focuses on the design of content creation. To realize such a participatory design, continuous activity, rather than a solitary reaction, must be ensured by “inducement of voluntary participation.” Therefore, we propose a methodology for continuous engagement that promotes public interests. To this end, we concatenate shared community issues, common goals, and local problems, and apply them to community development and social network promotion. We allow individuals to perceive their own problems and participate in resolution. The proposed design framework for media façade participation is developed from previous case studies. By understanding the characteristics of these cases, we can realize their effectiveness and significance. From the results of this analysis, we propose a conceptual framework of content design operation. Finally, we develop a method that encourages cooperation and coexistence of citizens.

Case Analysis

This section presents case analyses of voluntary participation in prominent installations. Through these cases, we explore inherent social interactions and communication methods. In each case, we analyze voluntary participation and motivation to enable self-activity. The results are used to develop a framework in the next section. The selected cases involve distinctive participation through multiuser interactive media façades in urban settings.

The interaction method is analyzed in terms of “levels of social interaction” presented by Ludvisen (2005). Ludvisen’s framework is based on Goffman’s concepts of behavior in public spaces (1963), namely occasion, situation, and encounters. Social interaction occurs at four levels: distributed attention, shared focus, dialogue, and collective action. Distributed attention occurs at the level of individuals, the “bubble” state in which passers’ by do not interact. During shared focus, several individuals observe and explore the same item. Dialogue occurs when individuals share their opinions and explore intensively. In collective action, individuals engage and work toward a shared goal. This form of interaction is observed in choreography and mass explorations. In Table 1, each case is mapped to an appropriate level of social interaction.

Table 1: Mapping of cases to “levels of social interaction”

Level	Karckrona2 (Karlskrona, 1999)	Face Your World (Columbus, 2002)	D-Tower (Doetinchem, 2004)	BBC world channel, Time Square (New York, 2007)	Aarhus by Light (Aarhus, 2008)
Distributed attention				●	●
Shared focus		●		○	●
Dialogue	○	●	●	●	
Collective action	●		○		

○ Partly relevant ● Directly relevant

Although Ludvigsen’s social interaction model is of limited use as a conceptual framework, it provides a useful scale of engagement. The different interaction levels reflect participants’ attention levels to situations, which are related to behavioral patterns. Consequently, this conceptual social interaction framework can be related to socio-cultural behaviors through the scale of engagement. Table 1 places each case within an equivalent socio-cultural category.

Participatory interactive media façades engage individuals at the uppermost social interaction level. As shown in Table 1, Karlskrona2 and D-Tower have achieved collective action. In particular, Karlskrona2 is programmed to engage citizens as virtual decision makers, permitting them to discuss and negotiate city development schemes. D-Tower informs the urban community about “feelings of the city” through a questionnaire on the D-Tower website. Various capsules allow individuals to state their impressions of the tower, and the most active participants receive a gift for their efforts. The tower enhances community intimacy by building emotional communion.

As shown in Table 2, “voluntary participation inducement” is a primary characteristic of participatory interactive media façades. To analyze voluntary participation, we should understand the purposes and provisions that inspire motivation. Therefore, we analyze the cases in terms of motivation, purpose, participation methods, and urban values.

Table 2: Cases analysis – concentrated upon the participation properties

		Karlskrona2 (Karlskrona, 1999)	Face Your World (Columbus, 2002)	D-Tower (Doetinchem, 2004)	BBC world channel, Time Square (New York, 2007)	Aarhus by Light (Aarhus, 2008)
Image						
Voluntary participation	Motive	Participating in decision making for their community	Redesign of their community	Expression of community feelings	Willingness to polling	Their silhouettes displayed on the facade
	Goal	Social community network	Interaction for the engagement in their local community	Social community network	Social community network	Entertainment
Reflecting local contents		High	High	Mid	Low	Low
Expression type		3D virtual model	Image	Colours	Picture and number	Moving silhouette image
Participation method		Internet	'Multiuser computer Game' equipment	Internet	Cell phone	Movements or Gestures
Value		Community reflection Mediation	Social Entertainment	Sense of community	Exchange of views	Playfulness Eye-catching

Among the analyzed cases, Karlskrona2 and Face Your World are characterized by sufficient community contents. Thus, they are inherently more likely to inspire motivation than Aarhus by Light and BBC World Channel. The motivation is provided by specific community actions that enable community development beyond superficial interests.

In conclusion, participatory interactive façades are moving toward socio-cultural relationships, where individuals cooperate to achieve a shared goal. Cases that achieve this level of engagement place high value on community concerns and encourage voluntary participation within the community.

Conceptual Framework

Participatory design can be perceived in two ways. First, collaborative creation, in which users intervene in the design decision-making “process” to arrive at a final completion. Second, using phase, in which persons are permitted to produce open-ended contents. In other words, users do not work toward an end goal in this form of participation. In this study, we are especially interested in designing a participatory using phase that allows users to engage in content provision and operation. In the public space, while individuals are socially connected through various media platforms, few interactive media façades are available for facilitating social interactions. The main barrier to interactive media façade development is the embedding of socio-cultural fabric into urban spaces (Brynskov *et al.*, 2009). As revealed by the case analysis, methods that apply local contents and pursue community goals can attract active participation. Thus, we propose a method that facilitates social interaction by promoting public interests. In community welfare studies, the community is the hub of individual or group activities. Personal matters are regarded as communal problems that can be solved through cooperation of residents and experts. In addition,

participation of citizens as the main agents of community welfare is important not only in professional manpower (Park, 2012).

According to Benkler, by focusing on content creation, individuals gain the psychological satisfaction of connecting with each other by creating contents. He regards social and psychological desire as a component of “motive structure.” If a social production satisfies the participants’ “motive structure,” it will be perceived as pleasurable even when it is challenging (Benkler, 2006). Therefore, one role of a media façade is to mediate social and psychological interactions with people and community welfare. The main elements of our framework are the individuals within the community, the interactive media façade, and its contents (Figure 1).

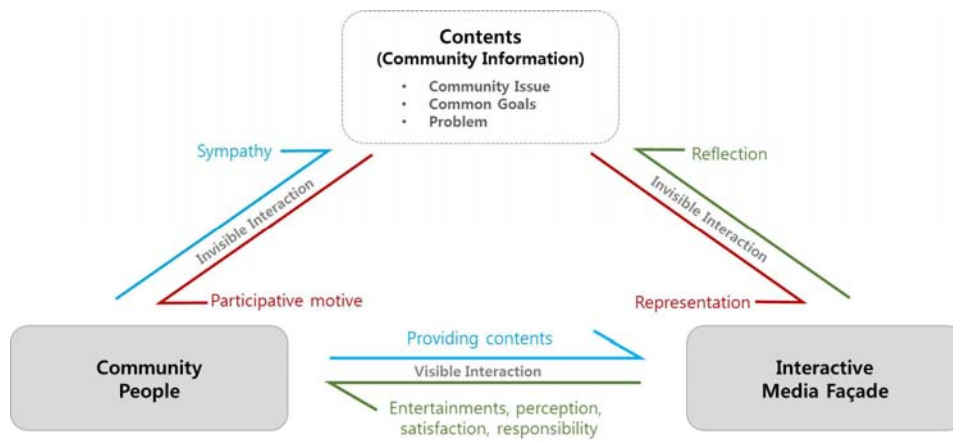


Figure 1: Interaction among the three main elements of the proposed framework

Each element links to other elements through visible and invisible interactions. Visible interactions occur between community people and the interactive media façade. While individuals transmit shared content through a device, façades send information by large displays. On the other hand, community contents are characterized by shared community issues, common goals, and problems that serve as invisible interactions between people and media façade. Figure 2 illustrates the intrinsic meanings underlying the streams of content between people and façade.

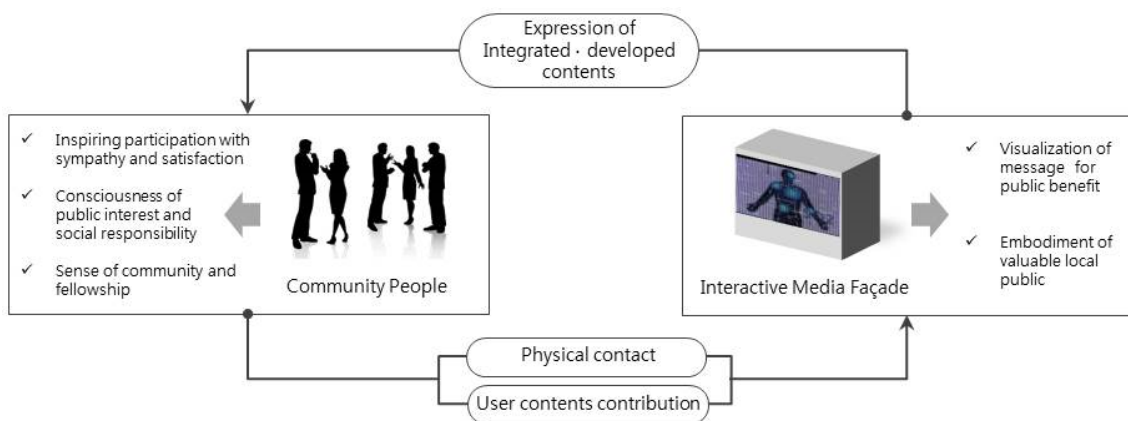


Figure 2: Relationship focused on intrinsic meaning

The media façade integrates and develops content provided by individuals into a visual display that embodies a valuable local public campaign. Individuals who encounter the worked content develop empathetic and satisfied feelings. They develop an awareness of responsibility, community belonging, and fellowship.

The methods through which people transfer contents can be variously designed, but are broadly classified into two large groups. One is physical contact with a previously installed object, which makes it possible interacting to lead human behaviors. The user benefits from an enhanced experience because an offline taction is added to online visualization. The latter embraces the easy dissemination of sketch, voice, picture, graffiti text, and behavior. Interactive media façades reorganize and integrate these methods to provide contents.

A multicultural family scenario

Target community

Ansan City in Korea is characterized by a high density of small- to medium-sized manufacturing firms. The number of immigrant workers is significantly higher than that in other Korean cities. In the Wongok district, the ratio of foreigners to natives is nearly 40 percent. Therefore, the Ansan municipality endeavors to embrace foreign cultures through measures such as special multicultural zone designation and establishment of community centers. However, in daily life, regardless of welfare assistance, children of multicultural families feel alienated from their classmates. They may be victimized by native children for various reasons such as language, nationality, and skin color. In addition, they may not adjust to school life or may leave school altogether. Because children tend to be intolerant of other cultures, immigrant children may experience lack of consideration and confused identity, besides being influenced by parental bias and the media.

Native residents are becoming increasingly cognizant of community problems associated with rapid influx of foreigners (Lee, 2008). Thus, our scenario aims to improve cultural awareness among native residents. The scenario comprises the three main elements discussed in the previous section: multiuser, media façade, and contents (Figure 3).

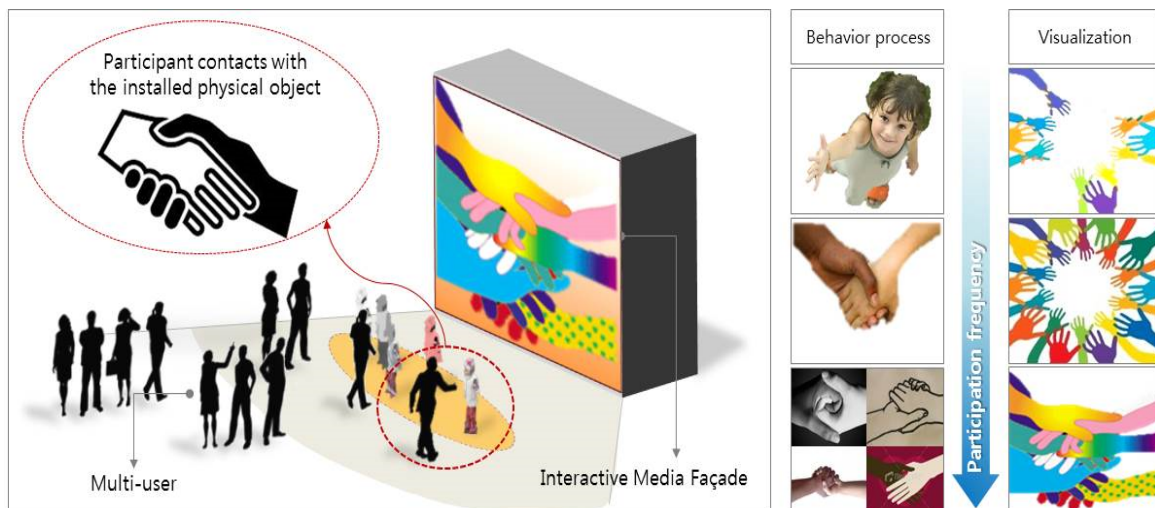


Figure 3: A scenario based on a multicultural family framework

Visible interaction between multiuser and interactive media façade

Providing contents by touch enhances the sensory experience. For example, a sense of “body temperature” is synonymous with “warmth - person in need of attention.” Installed physical objects, such as a temperature sensor attached to the hand, can supplement descriptions of children of multicultural families. When participants contact the objects, information about both body temperature and visual display is conveyed in virtual space. As a multiuser interaction mode, visualization is pertinent to achieve by accumulating the participation of multiple individuals.

Content-based invisible interaction

Media façades integrate and develop the contents provided by users. Such integration and development can be used to improve awareness of and reduce bias against multicultural families. In his book “Knowledge and Human Interest,” Jurgen Habermas posits that cognition and practice behavior are interrelated (Habermas, 1972). Since experience can build cognition, we expose the user to situations and renewed perceptions. This scenario seeks to change user perception by the following sequence of phased experiences.

- 1st experience: Touch-induced behavior design → forming emotional familiarity rather than seeing
- 2nd experience: dynamic experience of screen changing; the façade can influence action(touch) → arouse user’s interest by interaction of façade
- 3rd experience: perception that visualization can truly assist other community members.
- 4th experience: users gain satisfaction from realizing that their voluntary participation has assisted a neighbor → encouragement effect by feedback

Similar to the previous case analysis, Table 3 summarizes the participation properties of the proposed scenario. The user is motivated to participate by contacting a physical object such as a human hand. The goal of participation is to assist others within the same community, specifically, to facilitate a positive attitude toward multicultural families. Finally, this participation seeks to change intrinsic social attitudes toward multicultural families.

Table 3: Participation properties of the proposed scenario

Social interaction level		Collective action
Voluntary participation	Motive	Behavior affordance
	Goal	Helping hand for the community people
Reflecting local contents		High – Local problem recognition
Expression type		Visualization of the cumulative participation frequency
Participation method		Holding hands of physical objects in children shape
Value		Change in participants perception

Conclusions

As novel mediators of urban communication, the social potential of media facades is vast. Interactive media façades encourage interactivity between people and buildings, forming events in urban space, and promoting awareness. Media façades also disseminate entertainment and real-time activity, and encourage two-way relationships. Therefore, as mentioned above, media façades are currently regarded as a prominent social medium.

We have defined a conceptual framework for interactive media façades, on the basis of user participation. The real-world applicability of the proposed framework was illustrated by introducing a community scenario. This study aimed to investigate content provision by user participation. The framework was inspired by previous reports on social interaction levels and voluntary participation. From the analysis, we identified effectiveness and reorganized significance as important outcomes. Continuous voluntary participation is rendered possible by involving community contents in the media façade design and by configuring socio-cultural relationships as a collective action. In conclusion, our method facilitates social interactions through voluntary participation by community members who post contents or pursue common goals. The elements of the framework are people, interactive media façade, and community contents. The contents include people-related issues and local problems. The framework also conveys intrinsic meaning among the elements. By applying the framework to a timely scenario, we attempted to describe real-world content streams and relationships among the main elements. Although the proposed framework and scenario are constrained by the conceptual form, the framework will contribute to community enlightenment and will integrate social contents into various types of media façades.

Acknowledgements

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