



DESIGN FOR PRIVACY IN PUBLIC SPACE

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Abstract

The role of public space in contemporary society is important to a person's well-being as it provides useful function. However, privacy issues is problem when user use the public space. This study aims at investigating the relationship between elements of privacy and the types of public space in order to better user experience in public space. A total 40 participants (21 males and 19 females, aged from 22 to 25) were invited to participate. This study used user picture interview and value mapping to investigate relationship between privacy and public space. There were differences of privacy important in public space and each privacy elements had different meaning according to public space type. Designers could utilize this framework to develop public space in terms of privacy. The privacy elements are interpreted by user's voice to elaborate specific meaning to protect privacy in public space.

Keywords: User centred design, Human behaviour in design, Design for X (DFX), Public space design, Privacy framework

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1 INTRODUCTION

The role of public space in contemporary society is important to a person's well-being as it provides useful function. It is hard to disregard public space as anyone is able to use it anytime and any-where. Also, there are various types of public spaces that are specialized for a particular purpose (Minton, 2006). However, personal space is reduced in public space. In modern society, this phenomenon might be influenced by two reasons; diverse kinds of people live together in the same space and there are human interaction spaces, distinguished by distances, which are destroyed by dynamic interaction in public space (Hall, 1969; Mitchell, 1995). Namely, personal space might be shared by others in public space and become ambiguous in public space. The fact that personal space should be shared by all people together can influence user satisfaction in a negative way (Carr, 1992; Mitchell, 1995; Hafiz, 2006). In other words, people might be annoyed not to have their own space in public space.

The privacy issue has become more and more important in public space as time has passed because people can encounter public space easily where they go (Mitchell, 1995). Specifically, this issue is related to people having either a positive or negative experience in public space (Cho et al., 2015). Numerous literature on privacy in public space have focused on physical perspective such as boundaries (Little et al., 2005; Zhao and Siu, 2014). This paper start by providing simple explanations of privacy, public space, and classification of public space. Subsequently, this paper is arranged to answer the issue of how to design public space for privacy. Then main study, we figure out difference of privacy elements according to contexts of public space.

This research aims at investigating the relationship between elements of privacy and the types of public space in order to better user experience in public space. Therefore, this study is available to contribute to devising a new design public space for designers or government when they suggest better public space for the user in terms of privacy. The main research question was how to design public space for privacy. There were two main key questions below. 1) What are differences of significant elements of privacy according to features of public space? 2) How do public designers design public space to consider privacy? In order to answer those research questions, this study investigated and established frameworks for design of public space in terms of significant privacy factors.

2 WHAT IS PUBLIC SPACE?

In order to address the research question, this study should clarify definition of public space. Public space has different meanings in different societies, places, and times, and its meaning is related to the contrast between public and private space (Low and Smith, 2013). Public space might be defined by diverse perspectives and functions. Other study defines public space as 'open to the public' and 'function', these criteria can distinguish spaces (Van Ooijen and Nouwt, 2009). First, 'open to the public' has no barriers in entering a place, so other people can enter it freely. Next, 'function' is the nature given to the place, in other words, public space has a special function such as park that offers relaxation to users.

The different definitions of public space contain component of space to connect, so it is component of a city (Papadakis, 1992). All spaces can be public spaces such as a square as well as public building. Public space is a special place, which exists in the city to be accessed easily and publicly.

Today nearly most space is owned by someone such as the places belonging to the government, private organizations, private individuals or financial institutions (Minton, 2006). However, people can use these public spaces without ownership. For examples, someone is able to take a rest or study in a cafe, and other people can wait for other people in a square.

In the aspect of urban space, public space can be divided to open-public space and open-private space (Shin, 2008). Open-public space can contain a playground, road, pedestrian passenger, and so on. An open-private space can also able to include in vacant land, which is located outside of a building, and lobby, which exists in the building, and so on (Shin, 2008). Therefore, the majority of unknown people can access these public spaces even in an ordinary day.

The perspective urban design contains public domains and private domains in public space (Shin, 2008). This concept of public space might be expanded to diverse space as public space by the user. Therefore, this study includes discussion of diverse spaces that people use for their purpose.

Ownership might be the key feature to classify public space from other places, because classification of public is too wide and comes in variety. The feature of ownership can be standard to decide whether a place is public space or not.

According to White, public space can be defined by social dimensions such as the ownership of public space, control over access to public space, and the designated uses of public space (White, 1998). Because diverse definitions exist to public space and define diverse characteristics, we can define the clear concept of public space as a place where people can use alone or with a company without ownership, and a place that is not private such as office, or laboratory.

Design for public space might be needed to enhance maintenance of public space such as increasing diverse satisfactions, solving absence of integration of public space, escaping from over speck design. (Shin, 2008).

3 HOW TO CLASSIFY PUBLIC SPACES AT DESIGN PERCEPTION

Two researchers list up public space based on the operational definition of this study through brain storming activity (Table 1). There are total of 22 public spaces in an urban area. Therefore, this study considers urban public space as human artifacts without natural public space.

Table 1. The types of public space

Types of public space			
Subway station	Train station	Airplane	Playground
Club	Bus	Bus terminal	Square
School	Gym	Museum	Bus station
Public institution	Street	Subway	Theater
Bank	Park	Café	Train
Airport	Hospital		

However, Public space has various characteristics or particular functions. In addition, people have different perception about the same public space because user perception accompanies sensory feedback when a user uses public space (Deckers et al., 2012). To classify public space, we need another approach with four perspectives such as “Dynamic”, “Static”, “Open”, and “Closed”.

3.1 Spatial feature about public space; Dynamic & Static / Hedonic & Pragmatic

To classify public space, this study considered the characteristic of space. Looking at this matter more closely, contexts are related to an experience of moods (Kahneman et al., 1999). This study brings the Desmet’s classifies contexts of basic mood type through using four mood categories (Desmet, 2015). This research shows the categories, which are ‘energized’ and ‘calm’, as one axis to divide public space. According to spatial moods and people’s movement, public space classifies two spheres; the first one is the dynamic space where people have a short time to stay. Therefore, the term energized should be redefined as dynamic in public space situation. The other is the static space where people stay for a long time. The term ‘static’ comes from the term calm.

The hedonic/ pragmatic model of UX is perceived by two different dimensions of user experience (Hassenzahl, 2007). In product design aspect, the dimensions of hedonic and pragmatic are used to classify the consumer of product. To illustrate, users divide hedonic type and pragmatic type into the characteristic of user, so hedonic type user like the form of product more than pragmatic user (Bae, no date). According to the dimension, there is difference in their features. This difference appears according to the features of public space. In other words, the hedonic/ pragmatic model is able to utilize distinguishing public space in terms of the purpose of use of public space i.e. a person might go to a theatre in order to enjoy his/her hobby through watching a movie; the theatre space is fun and a place for those seeking pleasure in watching movies. In contrast, an individual would need a medical care in a hospital so that he/she could check his/her health or have his/her disease cured; the hospital is practical space without enjoyment. Therefore, these categories are focused on the purpose of using place in terms of users’ purpose or goal; this study is able to classify public spaces as hedonic space and pragmatic space.

3.2 Classification of public space

The author classifies public spaces with two dimensions (Dynamic/Static-Hedonic/pragmatic). A total of four quadrants exist to the classification of public space (Figure 1) by “Dynamic/ Hedonic space”, “Dynamic/ Pragmatic space”, “Pragmatic/ Static space”, and “Static/ Hedonic space”. The types of public space are classified according to these categories (Figure 1).

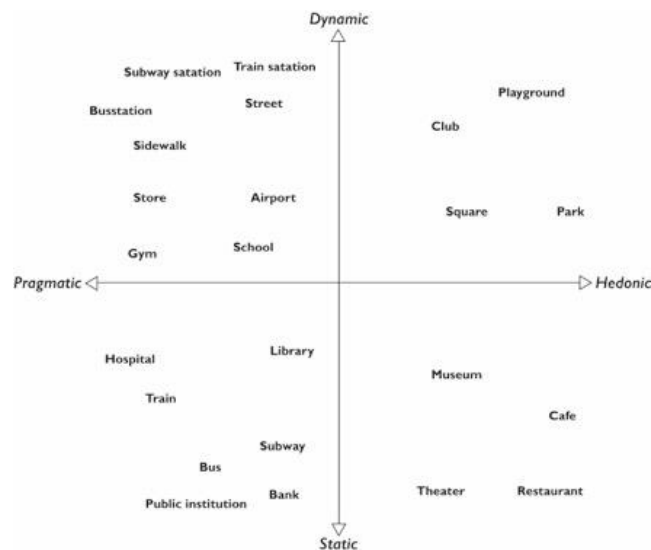


Figure 1. Classification of public space

The figure shows that there are four public spaces in a first quadrant such as playground, club, square, and park. The space of Dynamic/Hedonic has features of enjoyment and activity. Next, a second quadrant has public spaces such as station, street, sidewalk, store, airport, and gym. The features of Dynamic/ Pragmatic space can be used by diverse people who want to achieve specific goals. The third part shows are nine public spaces consisting of a hospital, transportation, library, elevator, public toilet, public institution and bank. The features of this quadrant show that people use public spaces with their specific goal and that the public spaces are with a calm context. Lastly, the fourth quadrant contains Hedonic/ Static space such as museum, café, theatre, and restaurant. The features of this quadrant are places with static context where people can enjoy.

4 WHAT IS PRIVACY

Privacy might be viewed according to many different views that come from the law, the citizens of right, and protection for consumers (Barnes, 2006). Privacy is defined as the condition of not having undocumented personal information about oneself known by others, so it is related to personal information extremely in the law perspective (Parent, 1983). In other views of privacy, Garfinkel describes it as self-possession, autonomy, and integrity because it is not about hiding things (Garfinkel, 2000). As our society transforms itself to adapt into a computerized world, he insists that privacy will be one of the most important civil rights. Because of this, people’s privacy might be exposed by government eavesdroppers, business marketers, neighbour and so on (Garfinkel, 2000). Urban people seem to be victims of invaded privacy; consequently, it is hard to protect privacy from others because people instinctively have their privacy even in computerized product, and the privacy is needed in any place. Hence, privacy is not only associated with social isolation. For example, people do not always choose to have isolation with an ATM because they might encounter a criminal issue and be considered unsafe in this situation (Little et al., 2005). The privacy issue could be also related to not only safety but also anonymity in citizen’s right.

In user experience perspective, privacy is not only limited to the invisible concept now that it co-exists with experience. Pallot and Pawaer give the different properties of all identified elements of experience in terms of user experience perspective (Pallot and Pawaer, 2012). Particularly, privacy contains properties such as personal data protection, anonymity, selective use permission, and one’s own data destruction. Personal information is regarded as an important element of privacy of user experience. Furthermore, privacy might be established within social interaction. Nippert-Eng mentioned that

“privacy is a socially gifted commodity” because diverse types of people grant privacy to an individual or withhold it from him in social relationship (Nippert-Eng, 2007). As the concept of privacy is influenced by other people, they might not think about their privacy that excludes the public. However, privacy might be contradictory on the concept of public. Frame, personal zone, and intimate zone are related to privacy among the four level of interaction zone (Hall, 1969).

4.1 Privacy elements

According to James, 800 people responded on the issue of what privacy is (James, 2012). It is related to the concept of the relationship between personal and public spaces. Generally, it consists of eight elements such as comfort, safety, no noise, anonymity, solitude, fewer crowds, freedom from judgment, and freedom of expression (Figure 2).

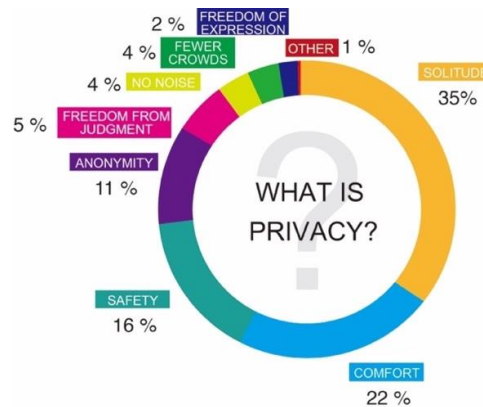


Figure 2. The element of privacy by James (2012)

A total of eight elements of privacy support the idea that ‘Comfort’ is synonymous to physical comfort or mental comfort in public space, so user feels comfort emotion from space. ‘Safety’ means protection from danger in other words there are no danger such as crime and accident in space, ‘No noise,’ as the term itself implies, means that people do not hear any noise in place. While ‘Solitude’ means distinction of space or separation, ‘Fewer crowds’ means a small number of crowds. It is related to population density in space. ‘Freedom from judgement’ means lack of interest from other people in place, namely judging other people, and ‘Freedom of expression’ means that people can do an activity and behave in whatever way they want in a particular place.

The original framework is concerned with the elements of privacy among participants, but this framework has one view of general public space. For this reason, it is hard to adapt diverse public space with the general perspective of users as well as to reflect every privacy element on public design. Therefore, through this framework, this study was conducted to measure privacy in public space in terms of UX perspective.

5 METHOD

This study used two methods to investigate relationship between privacy and public space.

First of all, user picture interview which combines aspect of photo ethnography and ethnographic interview was used to gather user voice in specific space (Kumar, 2012). Throughout interview, we utilized qualitative methodological which seemed more proper for collecting user experience about complex public space (Wänström Lindh, 2013). The purpose of it offered some benefits to distinguish private space and privacy elements into public space. Next, this study was conducted questionnaire to evaluate important privacy element into public space types. Therefore, it was easy to measure privacy elements for participants with value mapping which contained questionnaire because they might think eight elements at the same time.

5.1 Participants

A total 40 participants who are member of college of UNIST in Korea (21 males and 19 females, aged from 22 to 25) were invited to participate. They have had experiences of specific public space that they used twice a month.

5.2 Instruments

5.2.1 Instruction

Before interview session, participants received some instructions to take photos in four types of public spaces (Table 1).

Table 2. Protocol for user photo interview

Step	Task
1 step	Go to public space & Take pictures about whole scenery of public space
2 step	Take pictures about protecting privacy place in public space
3 step	Take pictures about invading privacy place in public space

Participants had to go to four representative place from each quadrant of public space classification such as Hedonic-Dynamic space (park or club), Pragmatic-Dynamic space (Street or train station), Pragmatic-Static space (hospital or public institution), and Hedonic-Static space (café or theatre). At least two places were selected from the classification of types of public space to consider the feature of space, and to avoided one-sided results about one particular space.

5.2.2 User picture interview questions

The following Table presents the examples of users' pictures based on the instruction. This data was used in interview session. The participant's own pictures were printed out accordingly before interview for the participants in order that they could describe their experience more easily. For the interview session of this study, the following structured questions were used. The interview questions were divided into 3 steps such as 1) what the participants thought about their experience of public space in terms of privacy, 2) how participants answered the questions related to public space that protects privacy, 3) how participants answered the questions related to public space where privacy is invaded.

5.2.3 Materials of value mapping

As an illustration, in the case of measuring the importance of privacy, the five Likert points were labelled: Always important +5, Sometimes important +4, Neutrally important +3 Rarely important +2, and Never important +1. y used the numerical scale of 1-5 to measure each privacy elements. This step used cards indicating the eight elements of privacy such as solitude, no noise, freedom from judgment, safety, fewer crowds, freedom of expression, comfort, and anonymity (James, 2012). Elements of privacy that were important in public space were asked to the participants as well as the factors that they thought were not important to them in public space. This step utilized tangible material instead of paper, because participants could change their opinion easily when they evaluated eight elements at once. Also, they could concentrate on this study even though they repeated the same tasks during the interview.

5.3 Procedure

Within 60 minutes, this study consisted of two individual sessions; user pictures interview and value mapping. The first session was about concepts of public space and privacy, and the general experience on privacy issue in public space. In the second step, participants talked about questions with pictures (i.e. How would you feel if your privacy was invaded in a public space?). They repeated this interview on four types of public space. Participants evaluated importance about privacy elements according to public space type. Also, they repeated four times about public space.



Figure 3. Interview with participants and taken photos (two pictures left side) and Participants measured importance of privacy elements (two picture right side)

6 ANALYSIS

Value mapping data was analysed to compare average score for relationship between privacy and public space. The interview data were transcribed and questionnaire data were gathered at once. First of all, this study was figured out the reasons why participants selected specific space in order to figure out important insight about privacy elements. This coding conducted with two researchers together in order to improve reliability of analysis.

7 RESULTS AND DISCUSSION

7.1 The framework of importance of privacy in four types of public space

This study figured out differences of privacy importance from Figure 6 to compare each element of privacy in order to verify the differences between the four types of public space owing to different shapes of diffusiveness in Figure 4. This study hypothesized that public space had different privacy importance because of different functions according to space. In these results, over three point two scale was considered as important elements of privacy according to value mapping. In this study, we considered important value over average score because value mapping could distinguish significant privacy element and insignificant it from the results.

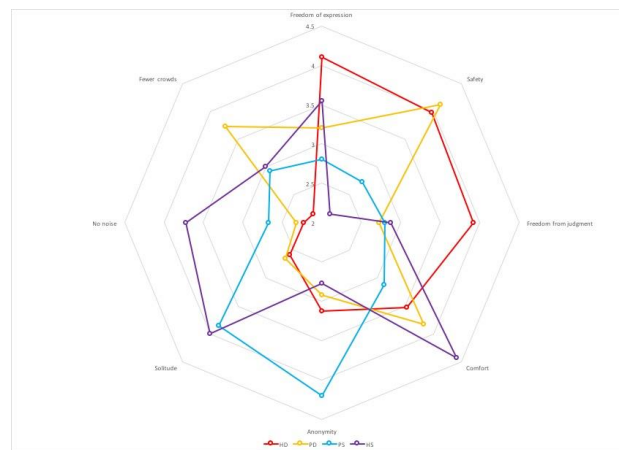


Figure 4. The mean values of importance of privacy, measured on a 5-point Likert scale

Table 3. The mean values of importance of privacy according as public space types

Element of privacy	Types of public space			
	Hedonic-Dynamic space	Pragmatic-Dynamic space	Pragmatic-Static space	Hedonic-Static space
Freedom of expression	4.10	3.20	2.80	3.55
Safety	3.98	4.13	2.73	2.15
Freedom from judgment	3.93	2.73	2.80	2.88
Comfort	3.53	3.83	3.13	4.43
Anonymity	3.13	2.93	4.20	2.78
Solitude	2.58	2.65	3.85	4.00
No noise	2.23	2.33	2.68	3.73
Fewer crowds	2.15	3.73	2.93	3.00

At Hedonic-Dynamic space, i.e., park and club, freedom of expression, safety and freedom of judgment was important elements to user, but other elements such as fewer crowds, no noise, solitude, and anonymity were not. The elements of safety, fewer crowds and comfort were important and other elements were not at Pragmatic-Dynamic public space, i.e., street and train station. Next, I might have regarded as being important elements like anonymity, solitude, and comfort in Pragmatic-Static public space i.e., hospital and public institution. Lastly, at Hedonic-Static public space, i.e., café and theatre, there were comfort, solitude, no noise, fewer crowds, and freedom of expression as important privacy

elements. To see results detail, this study analysed static data in terms of characteristic of space such as hedonic, pragmatic, dynamic and static.

Based on the results, we generated a framework that describes the relationship between privacy and public space. The Figure 5 below is the privacy framework in public space from 40 participants. The results which might be drawn from this study of the framework presents that 1) people regarded as important in elements of privacy such as Freedom of expression, Safety, and Freedom from judgement in Dynamic-Hedonic space, 2) The elements of Safety, Fewer crowds, and Comfort were significant elements of privacy in Dynamic-Pragmatic space, 3) The elements of Anonymity and Solitude were regarded as important elements of privacy in Static-Pragmatic space, and 4) there were four elements (Freedom of expression, Solitude, No noise, and Comfort) as important elements in Static-Hedonic space.

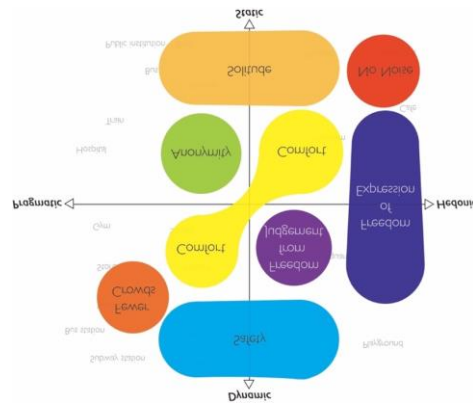


Figure 5. Framework of privacy in public space

7.2 The meaning of privacy elements based on user voice

The result to be drawn here was that protection of privacy in four types of public space in terms of privacy elements. These voices were presented what participants need in public space. It was back up data to support each element. Participants thought what privacy was not invaded or privacy would be protected well from user voice in four types of public space. The below Table 3 condenses participants' interview results based on their voices.

Table 4. User voices of privacy in four types of public space

Type of public space	Element of privacy	User voice
Hedonic-Dynamic space	Freedom of expression	Excluding other people's use when I use Blocking public eyes through tall something
(Park & Club)	Freedom from judgment	Dividing space with level of ground Covering other to install physical wall
	Safety	Considering direction not to invading territory Separating active space and relax space
Pragmatic-Dynamic space	Safety	Providing guideline like a flow line Requiring wide space in order to not invade external factors
(Street & Train station)	Fewer crowds	Not influencing to expand floating population Requiring 'minor space' for doing individual work
	Comfort	Insuring enough personal space
Pragmatic-Static space	Anonymity	Securing individual information Protecting person from other publics through screen
(Hospital & Train station)	Solitude	Being important to separating functional space according to purpose Considering direction of waiting space Minimizing sharing space
Hedonic-Static space	Comfort	Being comfortable personal space Not invading shifting people Customizing and modulating personal space
(Café & Theater)	Solitude	Prefer low accessibility space
	No noise	Requiring white noise to block my sounds
	Freedom of expression	Making sure of distance between personal spaces

In the case of Safety, dynamic space should be considered as the user might be exposed to diverse dangers in dynamic space. Many people might have different movements in this space, so it is possible for them to face danger. Accordingly, user seemed to protect privacy in this space. About Freedom of expression, it was related to hedonic space. In hedonic space, users enjoyed entertainment throughout diverse behaviors. As a result, users in this space did not feel that their actions were interrupted. Thus, they might feel protected privacy in hedonic space through freedom of expression. On the other hand, Solitude could be said that it was related to static space. In static space, people tended to have less movement than dynamic space; consequently, their feeling concerning privacy is secured. In the case of Freedom from judgment that it was related to Pleasure zone, user tended to consider others. In this situation, they might be unwilling to do what they want to do, why they use this place, and how they do it for fear of being judge or criticized, especially when others shower them with attention. Pleasure zone might be utilized by users whose enjoyment comes from diverse activities. Fewer crowds might be related to Dynamic-Pragmatic space. This space was used by linkage of other spaces, so it seemed to be accompanied by other movements like walking. Therefore, population density was important to protect privacy in this place. To continue with further understanding of this study, researchers could report that Pragmatic-static space was related to anonymity. People might use this place using personal information; hence, they could easily be exposed their information to unknowns. Similarly, when they protect their information, their privacy was protected in this space. The element No Noise was important to Pragmatic-Hedonic space. People tended to spend much time to enjoy entertainment in static space. This made them become sensitive about sound. As a solution for this, blocking noise can protect privacy of user. Unlike the other elements, Comfort was related to usage of space in Dynamic-Hedonic space and psychological comfort in Pragmatic-Hedonic zone. Spatial categories influence Comfort, but it is important role when people are placed in specific situation. In Hedonic-dynamic space, Comfort might be signified that people want to escape interruption among moving others when they do own business. For instance, people who wait friend in the street might just not be bothered by other walking pedestrian in terms of comfort. In contrast, in Hedonic-Pragmatic space, they might feel entirely comfortable related to emotional part. Even though there are many people at same space, user do not care about others and want to relax in his seat. Through the case of Comfort, this study could identify to shift meaning of privacy element according to space if different space types have same privacy element in common.

8 CONCLUSIONS

This paper investigates the relationship between privacy and public space as design framework to improve current problem. The main finding is about differences of importance of privacy elements according to public spaces types. Therefore, designers could utilize this framework to develop public space in terms of privacy. Next, each privacy element has different meaning to user according to space types. The privacy elements are interpreted by user's voice to enhance or to elaborate specific meaning to protect privacy in public space.

This study makes a framework of privacy in public space, but it has a limitation to adopt practical field because it might be ambiguous. In the further study, we will investigate to figure out guideline about design for privacy in public space to utilize this framework. This study might be utilized to develop user's privacy in specific public space. Applying privacy framework as the foundation of practical field results to deliver the public space that protects privacy or enhance public space role in our society. Moreover, using this framework would be highly efficient in that it contributed to focus on specific element in order to find proper solution for design.

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