

The Discussion of Innovative Concept for Icon Display on Elevator's Indicator

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Abstract. In this paper, we focus on the researching innovation of open-close button of elevator by questionnaire. The text of native language is found the best cognition for button indicator of open-close on the attributes of observability and relative advantage in elevator. The conclusions are: (1) Chinese glyphss “開 (open)” and “關 (close)” are the most easily observable and the highest relative advantage. So the text of native language could be the best for open-close button in elevators. (2) The complex symbols are the thick stroke with multi-element. (3) Important indicators of elevators could not only need thick black and slender arrows, but also it is non-highlighted.

Keywords: elevator, button indicator, caring concept, diffusion of Innovations.

1 Introduction

An elevator (or lift in the Commonwealth excluding Canada) is a type of vertical transport equipment that efficiently moves people or goods between floors (levels, decks) of a building [1]. After 150 years, a set of doors kept locked on each floor to prevent unintentional access into the elevator shaft by the unsuspecting passenger when the lift working, the safety and control has great promotion. There is innovation in the manipulation control, some button controls, which are generally inaccessible to the public, include: Fireman's service, Switch to enable or disable the elevator. Especially, there is a pair of open and close switches or buttons to control the doors for passengers.

There is evidence that arrows are special over learned stimuli which are processed in a favorable way. Several studies have provided evidence supporting the notion that gaze acts as a special attention cue that reflexively triggers attentional shifts [2, 3]. These studies applied a spatial cueing paradigm, first introduced by [4] and reviewed by [5]. There is a issue to discuss the gaze acts to utilize in efficient control. [6] found indicate that predictive arrows produce attention effects that greatly exceed the individual or summed effects of reflexive orienting to nonpredictive arrows and volitional orienting to predictive numbers.

[7] proposed diffusion of innovations is a theory that seeks to explain how, why, and at what rate new ideas and technology spread through cultures. It is a adequate

proposal to search a new design from several attributes. Diffusion of an innovation occurs through a five-step process. This process is a type of decision-making. It occurs through a series of communication channels over a period of time among the members of a similar social system. Ryan and Gross first indicated the identification of adoption as a process in 1943 [7]. Rogers defines several intrinsic characteristics of innovations that influence an individual's decision to adopt or reject an innovation. In the diffusion of innovation, Rogers' 5 factors which cognitive attributes of the innovation are different importance, can be divided into: (1) Relative advantage: How improve an innovation is over the previous generation; (2) Compatibility: The level of compatibility that an innovation has to be assimilated into an individual's life. The innovations and value system of past experience; (3) Complexity: the degree of difficulty of the understanding and use of an innovation, If the innovation is perceived as complicated or difficult to use, an individual is unlikely to adopt it. (4) Trialability: How easily an innovation may be experimented. If a user is able to test an innovation, the individual will be more likely to adopt it. (5) Observability: The extent that an innovation is visible to others. The consequences of the innovation can let others observe [8].

The elevator has become necessary machine for high-rise building, the most frequent operation is selecting floor button, next is open or close button, conveying a significant switch button can be accurately operated by passengers. The door will automatically close after 6-10 seconds when passengers entered elevator. If the passengers find outside ones who are galloping, they always hastily reflex to push open button, unfortunately, they occasionally and mistakenly push the close button, getting a disservice. We can distinguish that it is a instantaneous error judgment, causing from unclear enough key indicator icon display, leading to identify problem of open and close button. Simple and obvious icon design conveys clear meaning become importance of passengers. If the passengers can not properly recognize the icon display of "open or close" key button, they will miss action from hesitation, even mistakenly push the opposite switch, causing to embarrassment. The appropriate icon display can convey proper meaning to avoid misunderstanding.

Although, the mistakenly push open button to close door, it did not hurt passenger but also enough to scare them. To avoid mistaken open-close button is a main issue of taking elevator, so trying to focus on researching icon display of open-close button to recognize more innovative display of indication icon which has become the research purpose.

2 Methodology

In order to search innovative concept, two factors determine what type a particular decision is: Whether the decision is made freely and implemented voluntarily, and who makes the decision. Based on these considerations, three types of innovation-decisions have been identified within diffusion of innovations. The collective Innovation-Decision: This decision is made collectively by all individuals of a social system.

We tried to collect Innovation-Decision, used Rogers' 5 factors of diffusion of innovation. According to the characteristics of icon display, the triability attribute is not suitable for researching innovation of button indicators. Therefore, we choosed 4 factors as questionnaire items; (1) Relative advantage, (2) Compatibility, (3) Complexity, and (4) Observability, with the Likert 7 scale.

Accepted a high degree of innovation, is recognized as a high relative advantage, compatibility, observability, low complexity [9]. We Depended on this innovation theory to research indicator of "open and close", followed three steps to find the innovative concept of icon display on elevator's key button.

2.1 Collecting Samples

(1) Collecting photos: to collect photos of open-close buttons of elevator, taking pictures from several Asian countries such as Taiwan, mainland China, Malaysia, Hong Kong from 2009-2012. Then to discuss groups of their characteristics from collected photos.

(2) Selecting representative samples: Take representative samples from the collected photos, and then excluding similar ones.

(3) Depicting contour of indication icon: In order to have clear image of button key indication icon for investigation, each indicator will ignore material and light to concentrate on contour display. The collected photos were depicted into Bezier curve as icon display by drawing from CorelDraw13.

2.2 Sample Evaluation

(1) Descriptive statistics of key indication icon display: The value of each sample of open-close buttons is verified by descriptive statistics.

(2) Innovation description: Cognitive attributes of the innovation is recognized as a high observability, relative advantage, compatibility, and low complexity. We can discuss which indicator is adaptive value of 4 attributes.

3 Result

There were 113 questionnaires from Internet survey, and were statistical analyzed by SPSS PASW 18.0. Through descriptive statistics has 48 males (42.5%) and 65 females (57.5%), and reliability test found that the survey showed significance of gender and background.

3.1 Collected Testing Samples

Collected Photos. There are 103 photos of open-close key indication icons from Asian countries such as Malaysia, China, Hong Kong, Taiwan travel, then deleting the same or similar ones, and 56 photos were left.

Material of Key Indication Icon. After finishing found a relationship between the buttons and icons, can be divided into two categories: the separation of buttons and icons, and the synthetic one, a total of two forms, as the main way to synthesize one.

Selecting Representative Samples and Depicting Contour of Samples. In order to simplify forms and ignoring material, the kept photos were depicted to be white-black key indicator by software of CorelDraw, then removed the similar one, 18 kinds of key indication icon (see table 1) are left to proceed the following study.

Table 1. Diagram of key indicator of open-close button

	Open	Close	Open	Close	
1			10		
2			11		
3			12		
4			13		
5			14		
6			15		
7			16		
8			17		
9			18		

3.2 Creativity Evaluation

One participants were deleted from the data set because of excessive missing data, resulting in a final data set of 117 participants. Female comprised 56.8% (n= 67) of the sample (male, n=50). Participants' Educational level comprised from senior high school (5.1%, n=6), undergraduate (65.8%, n=77) and graduate (29.1%, n=34). The majority of field of education were Design (38.5%, n=45), and the other were seven fields as table 2.

Analysis progressed from 4 attributes for evaluation: relative advantage, compatibility, complexity, observability. According to descriptive stastics, the button icons of open and close have been evaluated as below, and recognize which is the better or worse disply of indication design. They are significance of all key indication icon of open-close with 4 attributes from one sample T-test, therefore they are reliable to discuss.

Table 2. Participant's background

Basic information	Description	No (n)	Percentage (%)	Cumulative percentage (%)
Gender	male	50	42.7	42.7
	female	67	57.3	100.0
Educational level	Senior high school	6	5.1	5.1
	undergraduate	77	65.8	70.9
	graduate	34	29.1	100.0
Field of education	Humanities and Social	13	11.1	11.1
	Design	45	38.5	49.6
	Art	7	6.0	55.6
	Management	18	15.4	70.9
	Science	4	3.4	74.4
	Engineering science	16	13.7	88.0
	Medical science	3	2.6	90.6
	Natural science	2	1.7	92.3
	other	9	7.7	100.0

Indicators Evaluation on Relative Advantage. In this section, we discuss the relative advantage, it means that the old things as opposed to being replaced, the extent of the advantages of innovations.

1. *Indicators evaluation of open icons on relative advantage.* The old things as opposed to being replaced, the Chinese glyphs “開 (kai)” (Fig. 1) is the first place of relative advantage. The second place indicator is the no.11 which has obviously opposite direction and 粗黑 arrow. The last place is the no.2 which has opposite arrow and two vertical lines to represent a door but feel complex. The second last one is white opposite arrow and on black background.
2. *Indicators evaluation of close icons on relative advantage.* In this attribute, the first place is no.11 which has obviously same direction and thick black arrow (Fig. 2). The second place indicator is Chinese glyphs “關 (kuan)”. The last place is no.9 which has white opposite arrow and on black background.
3. *Indicators evaluation between open and close icons on relative advantage.* The Chinese glyphs ‘開 (kai) and 關 (kuan)’ own the highest relative advantage (Fig. 3). It means that the native language character owns advantage of innovative cognition from mental image. We can obviously find out the icon display of open and close button that they own near cognition.

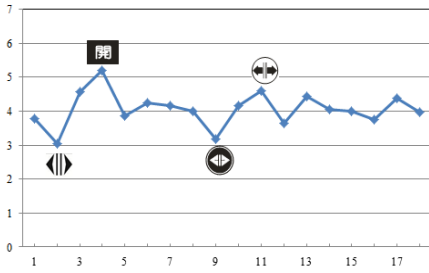


Fig. 1. The evaluation of relative advantage in open button

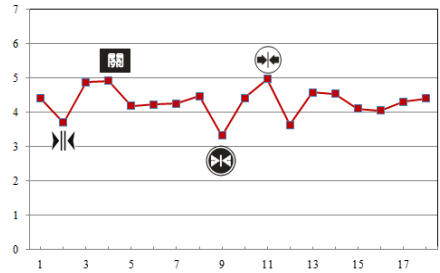


Fig. 2. The evaluation of relative advantage in close button

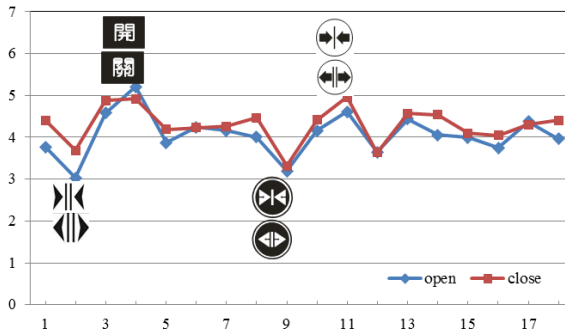


Fig. 3. The evaluation of relative advantage between open and close button

Indicators Evaluation on Compatibility. Compatibility means that the innovations and value system of past experience in diffusion of innovation. In this section, we can recognize the compatibility to win innovation.

1. *Indicators evaluation of open icons on compatibility.* All key indication icons are high compatibility (Fig. 4), it could know that they are well designed and selected from company, and have been verified by marketing research, but also appear fitnest difference in diffenet country. The first place of compatibility is no.3 which has simple triangle white arrow, square black background and vertical thin line to display starting location, it has a clear opening image. The second place is the Chinese glyphs ‘開 (kai)’. The last two places of compatibility are same as the attribute of relative advantage.
2. *Indicators evaluation of close icons on compatibility.* The first place os close-button is no.11 (Fig 5), thick and black arrow have higher attraction which could be important symbol of directional icon. The simple triangle arrow (no.3) has the second place. However, no. 9 has thick arrow, owns the worst compatibility, it may have highlight to affect sense of sight.
3. *Indicators evaluation between open and close icons on compatibility.* The pair of no.2 wins high evaluation of open and close icon in this attribute (Fig 6), it could cause from the squre shape to match the elevator's space image. The pair of no.9 has lowest, it could cause from the fragments to lose evaluation.

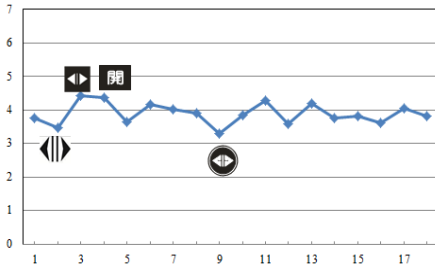


Fig. 4. The evaluation of compatibility attribute in open button

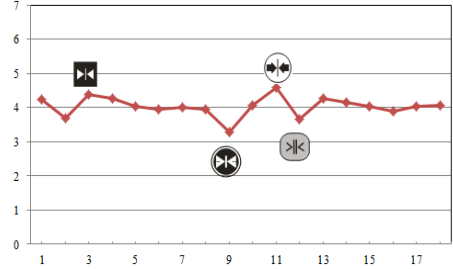


Fig. 5. The evaluation of compatibility attribute in close button

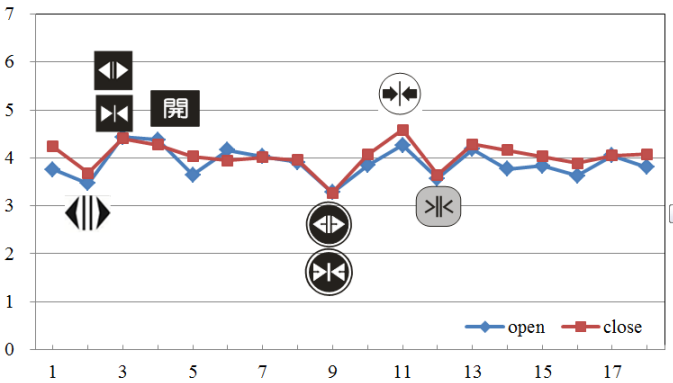


Fig. 6. The evaluation of compatibility attribute between open and close button

Indicators Evaluation on Complexity. In this section, we discuss the degree of difficulty of the understanding and use to recognize the innovation.

1. *Indicators evaluation of open icons on complexity.* The most complex key indicator of open button has a humanoid between a pair of reverse arrow (no. 5) in Fig. 7 the little less complex is no.3. On the contrary, simple and reverse arrow is recognized lower complex direction icon display.
2. *Indicators evaluation of close icons on complexity.* The no.9 (Fig 8) is the same as open-button that this pairs is the most complex indicator, the Chinese glyphs “關門 (guan-men)” (door close) in Fig. 8 is the second complex. It can be said that the thick stroke arrow, and two small Chinese glyphs are congonized to be complex.
3. *Indicators evaluation between open and close icons on complexity.* The no. 9 pair is the most complex icon, it could cause from the conflicts between circle and triangle. The no.3 pair and no. 13 pair have the least complex, they have simple triangle arrow to win the better reputation (Fig 9).

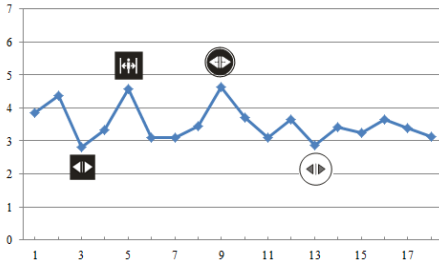


Fig. 7. The evaluation of complexity attribute in open button

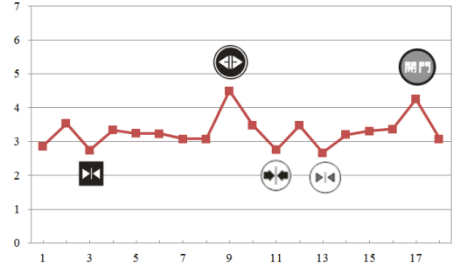


Fig. 8. The evaluation of complexity attribute in close button

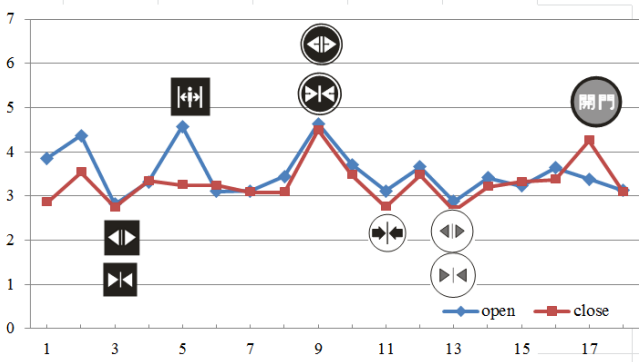


Fig. 9. The evaluation of complexity attribute between open and close button

Indicators Evaluation on Observability. In this section, we judge the consequences of the innovation of icon display can let others observe.

1. *Indicators evaluation of open icon on observability.* Although the common indicators of opening are the reverse arrow, but the no.4 “開 (kai)” (Chinese glyphs) (Fig. 10) is the most easily observable. Although the Chinese indicator is not suitable for Non-Chinese-speaking countries, but it can be said that open button with the native language text is the most easily observed in elevator.
2. *Indicators evaluation of close icon on observability.* The no.11 (thick arrow) (Fig. 11) is the most observable in close button icon, the Chinese glyphs “關 (guan)” (close door) is also the second observable place. Although, the Chinese glyphs is not easily observable for none-Chinese, but it is popular and recognizable.
3. *Indicators evaluation between open and close icons on observability.* From this section discussion, we can find out the better pair (no.4, no.11) and worse pair (no.2, no.9) for open and close button icon (Fig. 12). The icon display has obvious perception with native language text and thick directional arrow which are better, the other are multi-turn and crushing the arrow which cannot be easily observed.

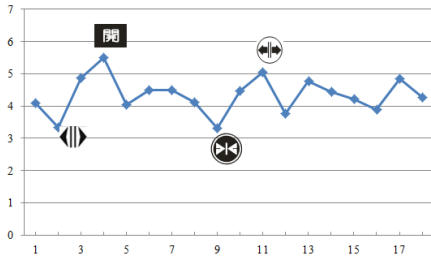


Fig. 10. The evaluation of observability attribute in close button

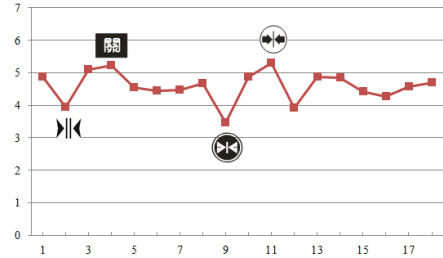


Fig. 11. The evaluation of observability attribute in close button

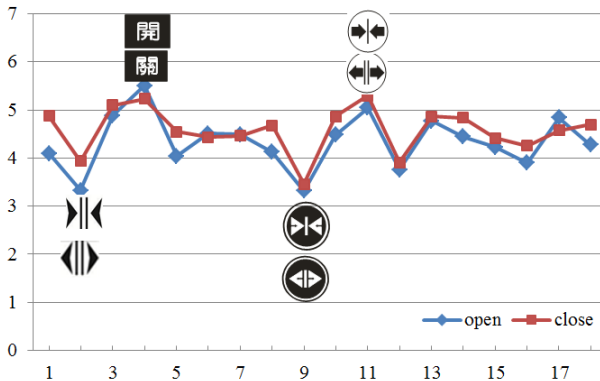


Fig. 12. The evaluation of observability attribute between open and close button

4 Conclusion

From the discussion, one may conclude that the button indicator has several important recommendations to care users. (1) Chinese glyphs “開(open)” and “關(close)” are the most easily observable and the highest relative advantage, so the text of native language could be the best for open-close button in elevator. (2) The complex symbols are the thick stroke of arrow indicator, small and many strokes of Chinese glyphs. (3) Important indicator of elevator could not need thick black obvious arrow, but also it is non-highlighted.

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