Elements of user experience of kiosks in public places

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Abstract

The purpose of this study is to derive the factors related to the user experience of kiosks as the use of digital kiosks became popular. So we went through 3 steps, literature investigation, analysis on big data of social media and expert interviews, and came up with UX measurement index which can be applied to kiosk, and conducted statistical verification.29 kiosk UX items were created such as usability, reliability, sustainable value offer, usefulness, superiority of information quality, convenience, economics, logicality of information structure, expectation, uniqueness, amusement, interest, novelty, newness, harmony with environment, charming, concsistency, attractiveness, openess, popularity, security of information, suitability, stability, distinction, interaction, aesthetic, diversity, [1]approach possibility and adaptability. In addition, 29 user experience items finally converged to four factors: practicality, emotion, popularity, and aesthetics. The results of this study can be effectively used in the evaluation and improvement of digital kiosks installed in the city center and providing various information. It will also be useful as a guideline for public information kiosks to be developed in the future.

Keywords: *User Experience, Kiosk, Affective Design, Public Contents.*

1. Introduction

The main users of kiosk would be determined according to the purpose of installation. Because users in public places are different in age, gender, job, the standard of living and region, kiosk contents design should reflect their own differences and features. Furthermore, digital contents in public spaces could deliver the informational messages with visual image and realistic expression through empirical factors for inducing the participation of users and provision of information in accordance with the traits of locations.

Therefore kiosk needs to be produced to cause interests and meet user's needs, and the relevant customer satisfactions are also getting important. Kiosk has to present a good image as well as user's satisfactions by providing better experiences to customers.

However the previous studies relative to user experience were mainly based on web, web & software and mobile devices, so on basis of personal media it could hardly apply to kiosk for public uses because those subjects' features.

The purpose of this study was to set an integrated evaluation index via kiosk user experience factors in public locations, and to propose the direction of digital contents in public service design.

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2. Method

We established standards for drawing factors based on data of online and offline to acquire UX factors of kiosk in public spaces. We conducted a survey on basis of the standards and extracted those factors.

This study examined the preceding researches in many different fields about factors organizing user experience in order to draw kiosk UX factors, as shown in [Figure 1]. We also analyzed big data in social medias by using 'SOCIAL metrics' solution from Daum soft company. 'SOCIAL metrics' is the solution applied by one of data analysis techniques, opinion mining, which is an efficient way to obtain sufficient data and insight for finding out patterns for fast-changing users' needs. Lastly, we interviewed some experts in UX, and collected opinions regarding things to be considered for kiosk UX.

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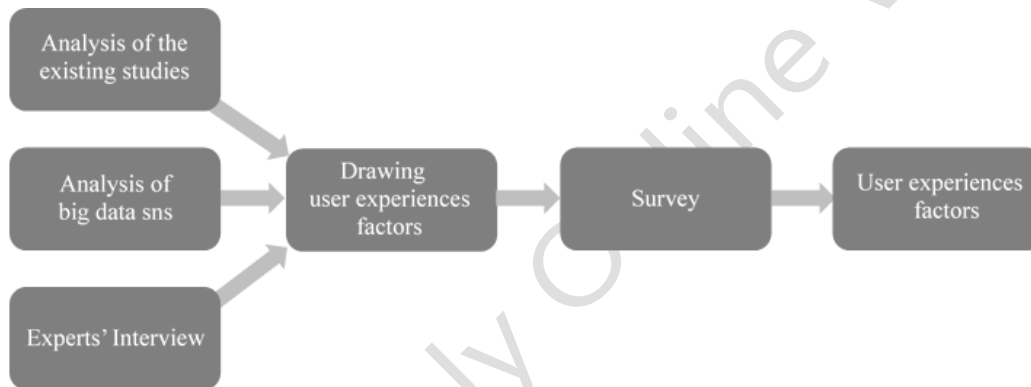

Figure 1. Procedure to extract ux factors of kiosk

3. Theoretical discussion

3.1. Kiosk as public service

Kiosk used at several spaces with various purposes was introduced at "Daejeon International Expo" in 1993, since then multimedia-using kiosk now can be seen in many different places after going though much progress.

kiosk is delivering the necessary information according to the spaces that they are located in and now is trying to expand its range of use, via differentiated information as well as charging for information[1]. Multimedia-type of kiosk interacts with users in a more sophisticated way, and brings entertainment and curiosity rather than pursuing usability only. As focusing on users' convenience using text with graphic, movie and sound, it has developed by reflecting users' requirement as much as possible based on UX[2].

The provided information from kiosk for giving users information and cultural experiences may differ depending on each environment. This is because different kind of spaces make different expected information. Namely, the information differs by the features of spaces(characteristics, roles, functions and etc.), then the relevant contents should be composed differently.

The kiosk as a two-way communication channel has expanded its role in from just offering information to providing various contents which promote leisure and cultural life, thereby the

availability of kiosk has been increased. Therefore kiosk needs to be produced to cause interests and meet user's needs, and the relevant customer satisfactions are also getting important. kiosk has to present a good image as well as user's satisfactions by providing better experiences to customers.

3.2. Concept of user experiences(ux) and its factor

UX was mentioned from "User Experience With the Cyber Graphics Terminal" of Edwards and Kasik(1974), at the first time, afterward the relevant studies has continued as mainly trying to make positive empirical values through mutual consensus between human and machine in a context of Human Centered Design[3].

UX's meaning could be slightly different due to academic backgrounds or viewpoints.

McMullin(2003) said that user experience could not be realized at once, but could be acquired through series of process connected with expectation, proximity, awareness, connection, action, response and evaluation. At this time, experience of process and expectation would be compared by users, if they regarded their experience as a positive one, then users went back into the cycle of experience and kept doing it. As this was the analysis about behavior of using or buying products or service consistently, it implied that the attribute of experience within all process of UX should be understood for getting success through UX[4].

Whereas UX factors for the optimum experience vary. If you look at the opinion of academics who studied those factors, the factors can be picked out as usefulness, usability and affect.

Specifically the claim of scholars who studied UX factors was the following. First, UX factors were defined as perceptions, emotion, attitudes, thoughts and behavior in the study of Russell[5].

Peter Morville(2006) suggested that the traits of UX design are useful, usable, desirable, findable, accessible, credible and valuable, which can also be used as a major elements for scale analysis of UX recently[6].

Mikahiltunen, Markku Laukka, JariLuomala(2002) proposed 5 different types of UX factors. The relationship among factors could be expressed as multiplication (UX = utility X usability X availability X aesthetic X offline issue), and each elements could not complement each other perfectly.

First, utility indicates "recognizing the provided service as the worthy." Being aware of the value about utility of service could make UX much practical and valuable.

Second, usability as already defined in a various way was said as "usability means ease of use that presents that it is easy for users to learn how to manage, how to input and to read output of factors" by Institute of Elecrical and Electronics Engineering.

Third, availability defined the fundamental element about whether or not service can be provided when uses want. This factor was as important as service's stability, so if users couldn't operate digital devices whenever they want, it could be very negative on UX.

Fourth, aesthetics induced user's interest by service's form or impression, which could be a first attraction to let people get interested in products. Aesthetic parts of products and internet service could spark an interest and affect the way we experience. In addition, it could determine the entire impressions or images about the goods.

Fifth, offline issue had company brand, back-end process and trustworthiness as major influencing factors, and this includes brand or supporting business process[7].

UX framework of Hassensahl(2006) had two different attributes, product-oriented aspect and people-oriented aspect. In product-oriented aspect, he discussed the shapes of experience such as manipulation in a practical way, stimulation in a pleasurable way, identification and evocation. In people-oriented aspect, experience appeared as appeal, pleasure and satisfaction. However he insisted that the user's expectation in mind was important the most, because those results could be totally different if users stayed at task-based goal mode or entertainment-based behavior mode[8].

According to study of Kaisa el al (2009), academic area had Hedonic aspect, Co-experience and Dynamic of experience about UX, while business area approached on user experience by Functionality, Usability and Novelty. There were the gap between two areas, so they presented the necessity of an effective UX evaluation method that embraced two different accesses[9].

Therefore, this study pursued to bring up the diverse and comprehensive UX factors that had an effect on user's behavior pattern. In other words, we tried to get empirical factors which reflected from the macroscopic environment around users to a specific situation and indivisual's mind.

4. Results

The collected 30 items were consisted of survey questions and the hardly understandable sentences were modified to make it easier for participants. The survey was set by web system and 5 likert scale was used. Items with "a little" for more than 3 points were to be in kiosk UX factors items.

The target of survey was men and women in twenties who are familiar with digital media and total 138 of questions were collected.

The data from survey for extracting kiosk UX factors was processed in descriptive statistic and factor analysis by SPSS.

As shown at [Table 1], total 29 items which recorded more than 3 points except 'efficiency' were extracted among 30 chosen UX factors measurement items. 'Efficiency' with average 2.99 points was not validated, so we determined that it was not adequate for kiosk UX factors and excluded it.

Table 1. Mean value of kiosk ux factors questions

(N=138).

survey number	questions	mean
1	usability	3.57
2	sustainable value offer	3.41
3	efficiency	2.99
4	charming	3.54
5	usefulness	3.59
6	approach possibility	3.65
7	reliability	3.49
8	superiority of information quality	3.47

9	security of information	3.28
10	concsistency	3.45
11	economics	3.57
12	stability	3.30
13	aesthetic	3.20
14	interaction	3.22
15	expectation	3.28
16	convenience	3.68
17	diversity	3.39
18	logicality of information structure	3.36
19	newness	3.37
20	novelty	3.52
21	amusement	3.38
22	uniqueness	3.33
23	popularity	3.47
24	adaptability	3.54
25	interest	3.42
26	harmony with environment	3.31
27	openess	3.72
28	distinction	3.28
29	suitability	3.59
30	attractiveness	3.57

Acknowledgements

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