

Association for Information Systems

AIS Electronic Library (AISeL)

ICEB 2014 Proceedings

International Conference on Electronic Business
(ICEB)

Winter 12-8-2014

Modeling Online to Offline E-Business User Experience

Juo-Wei Chen

Lai-Yu Cheng

Cheng Jhe Lin

Jing-Ming Chiu

Hui-Ling Yuan

See next page for additional authors

Follow this and additional works at: <https://aisel.aisnet.org/iceb2014>

This material is brought to you by the International Conference on Electronic Business (ICEB) at AIS Electronic Library (AISeL). It has been accepted for inclusion in ICEB 2014 Proceedings by an authorized administrator of AIS Electronic Library (AISeL). For more information, please contact elibrary@aisnet.org.

Authors

Juo-Wei Chen, Lai-Yu Cheng, Cheng Jhe Lin, Jing-Ming Chiu, Hui-Ling Yuan, and Chih-Siang Joe Lin

MODELING ONLINE TO OFFLINE E-BUSINESS USER EXPERIENCE

Juo-Wei Chen, National Taiwan University of Science and Technology, pootitan@gmail.com

Lai-Yu Cheng, National Taiwan University of Science and Technology, k6842051@ms34.hinet.net

Cheng-Jhe Lin, National Taiwan University of Science and Technology, robert_cjlin@mail.ntust.edu.tw

Jing-Ming Chiu, Institute for Information Industry, jmchiu@iii.org.tw

Hui-Ling Yuan, Institute for Information Industry, kellyyuan@iii.org.tw

Chiu-Siang Joe Lin, National Taiwan University of Science and Technology,

chiuhsiangjoelin@gmail.com

ABSTRACT

Complex business patterns from providers and diverse needs of customers in E-commerce necessitate constant and rapid modifications of services for new business models. The online-to-offline (O2O) business model is one of newly developed models where smartphones, tablets, e-readers and digital signages provide mobility and entertainment that ordinary people have never experienced before. Business opportunities are brought forth by O2O from cyberspace into daily reality. User experience (UX) evaluation is thus getting more and more important for user-centered design. In the literature, UX evaluation methodologies were designed for usability and satisfaction of computers or consumer electronics. Their results, however, did not necessarily help design O2O smart business services in that UX constructs in O2O should differ from that in using computers or consumer electronics. Important constructs of UX in O2O such as usability, utility, adoptability and desirability should be considered in the design of service flows and activities. The current study proposed important UX constructs for assessing O2O design by analyzing O2O users. A rapid evaluation method for UX in O2O can be developed based on the constructs.

Keywords: O2O smart business service, user experience (UX), rapid evaluation method.

INTRODUCTION

In the digital era, consumer market changes with each passing day. To win consumers over, online and offline business opportunities need to be integrated instantly. Successful applications of online to offline (O2O) business models such as GrouponTM and OpenTable continually emerge and draw the public's attention. No matter network-origin brands opening physical stores or physical stores establishing online shops, O2O has become a popular marketing approach in either way.

The main concept of O2O is to induce online shoppers to physical stores. For example, food industries may encounter difficulties in developing online shopping because their products are perishable and require physical display in marketing channels. Using O2O online shoppers can be induced to physical stores through attractive promotion and ingenious advertisement. In the early stage of its development, O2O enabled consumers to complete transactions online and enjoyed services offline through computers. O2O was then diversified by the advance of portable devices with the Internet connections and the popularity of QR codes. An example is the "Pick n Play" active game provided by McDonald in Sweden. Users were live broadcasted when they played an interactive game of a public plaza. The liveshow on a big screen attracted other customers and coupons were issued to induce them to go to McDonald.

As the introduction of the O2O smart business and the interface for users of O2O services are getting mature, name brands invest enthusiastically to develop new O2O business models that are efficient in marketing. Manifold O2O services come with the tide of this fashion, but those newly developed services lack of quick and effective approaches to assure user experience (UX) in a constantly changing market. Existing premarket testing methods focused on operational fluency of application software (APP) used in O2O, but they were unable to predict UX obtained through interactions on the interface between the service system and its users. The O2O service system including hardware, software and commercial activities need to undergo user-centered UX testing and evaluation. Traditional user testing methods in which information is acquired from certain target users to improve UX are time consuming and incapable of shortening the service design phase in the system's life cycle.

Early UX research focused on design of web pages mainly, and was rarely applied to general product design which covers a broader spectrum. In recent years user-centered design has become the mainstream, and thus UX has been considered in product and service design. Figure 1 shows the classification for popular UX research methodologies. The horizontal axis in Figure 1 represents stages in the project while quantitative and qualitative methodologies were separated along the vertical axis. It is shown in Figure 1 that qualitative evaluation methods such as focus group and observation were mostly used at the early stage. They aimed at fostering development of conceptual design and exploration for user needs. Subjective opinions and thoughts from experts or target users diverge at this stage. Pre-designed products or services can be evaluated by those methods, but results vary with individuals, time and events without a general pattern. Furthermore, without prototypes, quantitative evaluation methodologies that can be carried out at this stage are pretty limited. At a later stage in design, representative prototypes are usually developed so that usable qualitative methodologies increase with formation of products or services. Eye tracking and data mining in the first quadrant of Figure 1, for example, are methodologies that focus on measuring objective data.

From previous research in literature review, it is obvious that qualitative evaluation methods were to discover user needs and those needs have similarities. Qualitative methods confirmed this finding by objective data. The goal of this study is thus to discuss general constructs in qualitative UX of O2O and to extract the most important ones so that UX in O2O services can be reconstructed. The important constructs in UX of O2O can be used to develop a rapid evaluation method with a quick checklist that can be applied at the early stage in development. The method is expected to reduce time and resources required in design evaluation.

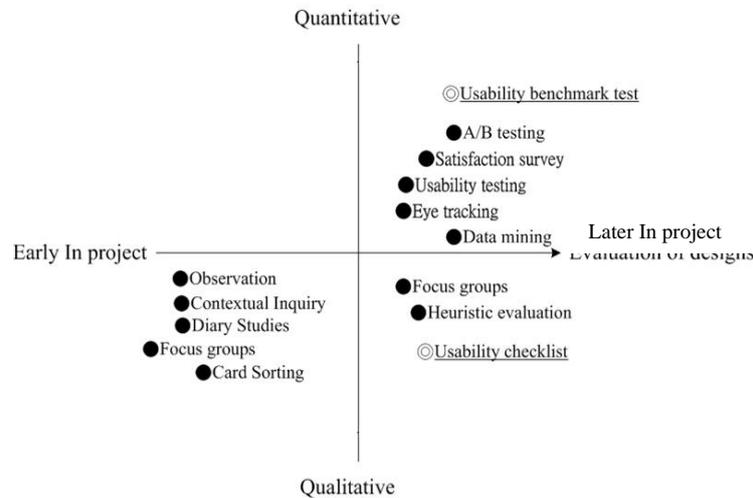


Figure 1. Classification for popular UX research methodologies

UX CONSTRUCTS

UX was applied to design of web pages. It was categorized into five levels in Jesse James Garrett's publication "The Element of User Experience" in 2002: visual design, skeleton (navigation and user interface design), structure, scope (of functions) and strategy. This categorization provided a convenient framework for web designers to discuss about and refer to.

Later on concepts of UX were extended to Human-Computer Interaction (HCI) and the entire service system. Peter Morville proposed a diagram to explain UX by seven principles: useful, usable, desirable, valuable, credible, accessible and findable[2]. From the diagram it can be known that Peter Morville emphasized values created by the system to its users, mental status of the users induced by the system, and availability of the system besides its usability.

To further confirm the meaning and scope of UX, Frank Guo proposed a simplified framework based on Peter Morville's seven principles so that constructs the framework can be measurable. Frank contended that four fundamental constructs are sufficient for covering needs in different applications[1]. Four constructs and their meanings are as follows:

- Value: to measure whether a system provides meaningful values to its users.
- Usability: to measure a system's difficulty to use.
- Adoptability: to measure the ease of access for a system to its users.
- Desirability: to measure users' emotion and degree of engagement after they used a system.

THE UX CONSTRUCTS OF O2O SERVICES

The aim of this study is to investigate the UX of O2O service based on Frank Guo's four UX constructs, which are value, usability, adoptability and desirability. These four constructs covered sufficient breadth for qualitative and quantitative analysis. After discussion with experts, value and desirability were believed to overlap at the psychological level to some extent. For example, positive mental state associated with desirability such as interesting and satisfactory performance can also be seen as valuable. To avoid the ambiguity, this study replaced value by utility, which is defined as: "saving substantial value for users, such as time, money, effort, physical strength", and can be distinguished from desirability. Therefore, this study considered the UX constructs as: utility, usability, adoptability and desirability. The following sub-sections explain the definition and composition of each construct.

Usability

Abundant research has been done for usability in the field of human-computer interaction interface. For example, Nielsen and Shackel have presented complete concepts of usability. Usability surveyed in this study referenced to 5 factors published by Nielsen in 1993, which are: learnability, efficiency, memorability, errors and subjective satisfaction[3]. In this study, however, subjective satisfaction was categorized into desirability. So usability no longer contained subjective satisfaction, meaning that this study only makes a judgment on usability of O2O service system from the objective side.

Utility

As mentioned previously, this study changed the construct – value, which originally proposed by Frank Guo, into Utility and defines it as: " saving substantial value for users, such as time, money, effort, physical strength." This construct could explain the core reason why users choose a certain O2O service. Utility was composed of value and information. Value referred to tangible money or services, while information existed subjectively at intangible level. All in all, if a service allowed users to feel that these two factors were provided, there is no need for users to perform extra actions in gathering information or in saving money, time, physical and effort.

Adoptability

Adoptability measures how easy the service is for users to use when they start using it. Starting to use the service seems like a simple concept, but it is important for users who do not even know the existence of the service. Its composition includes convenience, initializing time of using services, user characteristics and visibility. Convenience means a convenient and user-friendly environment for users to adopt this service so as to improve user's willingness to get started. Initializing time of using services is also an important indicator at the beginning of the application. If users find that initializing the service took too much time, they would be reluctant to try or quit using this service. Too much difficulty or too many initial steps would cause the same consequence. Users characteristic considers the types of customers who might adopt the service including the elderly, physically disabled persons, in terms of their convenience to use the service. Providing another language option for users who do not understand Chinese should also be considered in some circumstances. Visibility is not just prominent placement; adequate publicity and effective marketing is also a key. After all, if the user cannot perceive this service, they will not adopt it.

Desirability

The above three constructs have cover both subjective and objective aspects, but desirability tends to focus on subjective aspect. Desirability is defined as: " characteristics that make the user want to use, consist of emotions such as fun, satisfaction, fulfillment of social needs, etc.". The scope involves the user's feeling before and after using the service. Its composing factors are emotion, aesthetic and interaction among others. Emotion defined here is only for positive mental states that may arise by the service, such as interest, surprise, excitement. Aesthetic means attractive appearance that may draw people to use it, and also the graceful hardware and software, or pictures, videos and so on. Using social networking sites or chat software to interact with others are quite common public behaviors, and similarly O2O services rely on Internet community as their main marketing channel. Combining the offline service, however, will produce an additional advantage for users to interact with their friends in the real world.

UX questionnaire

The study developed a UX questionnaire for the importance of the abovementioned constructs (Table 1). The purpose of the questionnaire was to analyze factors in UX constructs and their relative importance based on which a rapid evaluation method can be proposed. Few examples of domestic and foreign O2O services were provided in the beginning of the questionnaire as depiction for O2O services under survey. The questionnaire consisted of 44 questions in four constructs and respondents can answer them based on a five point likert scale. The wordings were designed in a way that options reflected adjustable design features and ambiguous descriptions were avoided. In addition, the questions were generalized to fit most O2O services to reduce their specificity to a certain kind of O2O service. Detailed questionnaire results will be presented in the conference.

Table1 Excerpt of usability part of the UX questionnaire

	Importance				
	Very unimportant	Unimportant	Neutral	Important	Very important
Please follow your previous experience of using O2O services to answer the following questions about importance.					
* Usability					
To easily use the system, how important do you think the following items are?					
Provide clear and concise instructions	1	2	3	4	5
No abstruse jargon	1	2	3	4	5
Easy to understand narrative	1	2	3	4	5
Short waiting duration for feedback	1	2	3	4	5

CONCLUSION AND FUTURE WORK

The study studied evaluation of UX of O2O from both theoretical and methodological angles. Four general constructs: usability, utility, adoptability and desirability in UX of O2O were proposed and their impacts to O2O services were discussed. The proposed constructs in UX of O2O business can be used as the basis to develop rapid evaluation methodologies for collecting qualitative and quantitative data. The following rapid evaluation methodologies can be considered:

(1) Quantitative methodology: a benchmark test based on Donald Norman's mental model which permeates inner customers with user-centered thoughts can be developed in the form of a quick quantitative checklist[4]. This tool can be used by inner professionals to understand market positioning of products among competitors. It is conceptually similar to standardized tests in engineering such as CPU speed tests where testing procedure is specified and criteria for a pass/ no pass are solid. Examples of criteria in applications to mobile APP testing may include ten consecutive successes in scanning a QR code, or less than a half second latency of a response for each scan regardless of success/failure. The benchmark test does not consider merely software or hardware capability, but user acceptance should be considered for determining criteria for a pass. A set of such criteria becomes a benchmark for UX when various kinds of APPs are used. Winners are those who pass all criteria and perform better.

(2) Qualitative methodology: the checklist aims to assess parts of UX involving user satisfaction that cannot be quantified or solidified without tedious user evaluation. Questions such as whether a touch button is easy to click and agile in response or whether dragging can be performed smoothly are asked. The checklist is designated for developers' use or obtaining consent from the least number of users possible. Delphi method or expert review are alternatives to expedite results, and the results can be reused to validate qualitative evaluation. In this regard the results from benchmark test can be acquired from solidification of user characteristics evaluated in the qualitative checklist. The qualitative checklist is therefore used when no concrete characteristics or variables are available and can be an assisting tool when mechanisms behind phenomena observed are of exploration interests.

ACKNOWLEDGEMENT

This study is conducted under the " Online and Offline integrated Smart Commerce Platform (1/4) " of the Institute for Information Industry which is subsidized by the Ministry of Economy Affairs of the Republic of China.

REFERENCE

- [1] Guo, F.Y., & Principal, U.X. Not Just Usability—The Four Elements of User Experience.
- [2] Morville, P. (2004). User experience design. Ann Arbor: Semantic Studios LLC.
- [3] Nielsen, J. (1993). Usability engineering. Boston: Academic Press.
- [4] Norman, D.A. (1986). Cognitive engineering. User centered system design, pp.31-61.