An Examination of the Effect of the Contextual UI Design Quality of Mobile Shopping Applications on the Loyalty of Users to the Applications

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Abstract. Because the typical display space of today's mobile devices is so small, most mobile applications have not provided users with enough information or UI (user interface) design components, ever since mobile devices were launched back in the late 1990s. According to a related literature review, the UI design of applications, done from a design perspective to provide users with enough UI design components to deliver data, is of a high contextual UI design quality. Yet, there is very little research in the information systems (IS) field on the effects of contextual UI design quality on the ease of use of mobile shopping applications, or on the loyalty of users to the applications. The main research goals of this study are as follows: (1) to examine the direct effects of the contextual UI design quality of mobile shopping applications on the ease of use of the applications and on the loyalty of users to the applications and (2) to find the relationship between the ease of use of shopping applications and the loyalty of users to the applications. After conducting a survey, this study analyzed the data with Structural Equation Modeling (SEM). The results showed that the contextual UI design quality of mobile shopping applications have significant direct effects on the ease of use of the applications and on the loyalty of users to the applications. In addition, the relationship between the ease of use of such applications and the loyalty of users to the applications was identified.

Keywords: Contextual · Quality · Loyalty · Use · Shopping · Application

1 Introduction

Recently, the display size of mobile devices has gradually increased to secure not only proper interactivity with the devices, but also enough mobile application user interface (UI) space to provide users with needed information and new functions. Nevertheless, up to now, the display space of most mobile devices was not large enough to show different types of data, information, menus, functions, and other content in one display screen. Accordingly, the UI design of mobile applications can be significantly affected by the display size of devices [1, 6].

J. J. Park et al. (eds.), *Advances in Computer Science and Ubiquitous Computing*, Lecture Notes in Electrical Engineering 474,
https://doi.org/10.1007/978-981-10-7605-3_1

To solve this problem, most mobile applications deploy various UI design components, such as drop boxes, text boxes, option buttons, or radio buttons, on a pop-up window to present information and functions that users need in order to use the applications properly. When this option is not available, the UI of applications limits the amount of content and functions as much as possible. In such cases, the completeness of the UI design could be damaged by a lack of critical information and functions. On the other hand, when too much content is presented in a small UI display space, the content may become too small to be readable. This could also have a negative effect on the completeness of application UI design.

Securing an appropriate amount of UI design components is quite important for both design and usability. UI design components are widely used and are essential in the UI of most mobile applications. Not only do UI design components present data, information, and functions in a way that helps users easily understand the content presented to them, but they also guide users in the right way to use applications [5, 12]. Furthermore, UI design components can also simplify UI design to maximize user convenience [2, 3]. They free the small UI display space from hundreds of thousands of words and numbers, leading to better use of the display space. Some UI design studies have dealt with the simplicity of UI [7]. The advantages obtained from using various UI design components could increase the UI design quality of applications.

Meanwhile, when the UI design of mobile shopping applications does not deliver enough of the information or functions needed for shopping, then the applications can be ambiguous, so that users may be confused about how to use them or misunderstand the information or functions presented in the UI design. Consequently, users could have difficulty using and interacting with the applications. At worst, they could abandon shopping. Therefore, the UI design of mobile shopping applications must be complete in conveying all the information and functions needed for shopping.

The importance of contextual UI design quality has been addressed in past studies. Some researchers asserted that the completeness of an application's UI design is critical and has a significant impact on the usability of an application [2, 7]. Other researchers have also noted that the completeness of UI designs enables users to use applications easily and to eventually adopt the use of applications [3, 12]. Some studies in the e-learning field have asserted that educational applications need to exercise various UI design components so that users can better understand the information presented by the components, as well as use the applications, which in turn ensures interactivity with the applications. Based upon the studies above, it can be inferred that the completeness of the UI design of mobile shopping applications and having enough UI design components help users formulate not only their knowledge and experiences in the use of the applications, but also their loyalty to the applications [4, 6, 8].

To explore the effect of the UI design quality of mobile shopping applications, it is necessary to understand what UI design quality means to the users of applications. A data-quality hierarchical framework developed by Wang and Strong [11] captures the aspects of data quality that are important to data users. There are four dimensions in the framework: intrinsic, contextual, representational, and accessibility. According to the authors, contextual data quality means that data quality must be considered within the context of the task at hand. That is, data must be complete and sufficient in order to add

value. This study employed the attributes of contextual data quality, completeness, and sufficiency of data in order to explore the effect of the contextual UI design quality of mobile shopping applications.

The ease of use of information technology is one of the variables in the technology acceptance model (TAM), referred to widely in the IS field, and is well known for determining users' intention to use information technology [9, 10]. The effect of the ease of use of information technologies on users' intention to use the technologies has been verified by many IS empirical studies. Based upon the TAM and studies discussed above, it can be expected that the users of mobile shopping applications form their loyalty to the applications based on their experiences with the UI of the applications. When the contextual UI design quality of applications is high, that is, the UI design of applications is complete enough to deal with all kinds of processes for online shopping, as well as provide users with enough UI design components to present various kinds of data and information, users could be better able to not only easily understand how to use applications, but also become loyal to the applications. On the other hand, when users are not satisfied with the contextual UI design quality of applications, they would not use them or be loyal to the applications.

Therefore, it seems that ensuring the high contextual UI quality of mobile shopping applications will directly affect not only the ease of use of the applications, but also the loyalty of users to the applications. It also seems that the ease of use of mobile shopping applications can affect the loyalty of users to the applications. However, since the UI design of mobile shopping applications is quite diverse, these suppositions are not certain. Based on the literature review discussed above, this study will attempt to verify the following hypotheses:

Hypothesis 1: The completeness of the UI design of mobile shopping applications positively affects the ease of use of the applications.
Hypothesis 2: The appropriate amount of mobile shopping application UI design components positively affects the ease of use of the applications.
Hypothesis 3: The completeness of the UI design of mobile shopping applications positively affects the loyalty of users to the applications.
Hypothesis 4: The appropriate amount of mobile shopping application UI design components positively affects the loyalty of users to the applications.
Hypothesis 5: The ease of use of mobile shopping applications positively affects the loyalty of users to the applications.

2 Research Methodology, Data Analysis, and Results

This study empirically investigated the effects that the contextual UI design quality of mobile shopping applications has on the ease of use of the applications as well as the loyalty of users to the applications. This study also examined the relationship between the ease of use of the applications and the users' loyalty to applications. To examine the effects and relationship, this study conducted a survey. A total of 283 college students and practitioners participated in the survey. SPSS statistics and AMOS ver. 18 were used to analyze the data. As predicted in the hypotheses, the completeness of the UI

design of shopping applications had a significant influence the on ease of use of the applications ($\beta = .299$, $p < .0001$) as well as the loyalty of the users of the applications ($\beta = .303$, $p < .0001$). Thus, the hypotheses 1 and 3 were supported. The appropriate amount of UI design components also had significant effects on both the ease of use the applications ($\beta = 311$, $p < .0001$) and the loyalty of the users of the applications ($\beta = 292$, $p < .0001$), supporting hypotheses 2 and 4. Finally, the ease of use of the applications also had a direct significant impact on the loyalty of the users ($\beta = 328$, $p < .0001$). Therefore, the hypothesis 5 was also supported. Table 1 shows the results in detail.

Table 1. Hypothesis test

	Paths	Coeff.	Stand. coeff.	P value	Results
H1	UI Completeness → Ease of Use	.299	.317	.0001	Accept
H2	UI Design Components → Ease of Use	.311	.305	.0001	Accept
H3	UI Completeness → Loyalty	.303	.322	.0001	Accept
H4	UI Design Components → Loyalty	.292	.300	.0001	Accept
H5	Ease of Use → Loyalty	.328	.303	.0001	Accept

3 Discussion and Conclusion

This study empirically investigated the effects that the contextual UI design quality of mobile shopping applications has on the ease of use of the applications and on the loyalty of users to the applications. It also examined the relationship between the ease of use of the applications and the users' loyalty to applications. The results showed the significant direct effects that the attributes of the contextual UI design quality of mobile shopping applications, the completeness of UI design, and the sufficiency of UI design components had on the ease of use of the applications and the loyalty of users to the applications. This study also showed significant direct effects of the ease of use of the applications on the loyalty of users to the applications.

These results address the importance of the contextual UI design quality, especially for mobile shopping applications, in understanding the factors that influence the ease of use of applications and the users' loyalty to the applications. That is, this study addressed how important it is for the users of mobile shopping applications to be provided with both a completely designed UI and enough UI design components. The attributes of contextual UI design quality allow applications to deliver enough shopping-related information and essential functions to the users. When developing mobile shopping applications, UI designers and developers may refer to the findings of this study to improve the contextual UI design quality of their mobile shopping applications, as well as improve the users' mobile shopping experience and thus increase their loyalty to the applications. On the other hand, if the UI design of mobile shopping applications is incomplete or insufficient in UI design components, users are left confused, which not only leads to reluctance to use the applications, but also decreases their loyalty to the applications.

References

1. Bostrom, R.P., Olfman, L., Sein, M.K.: The importance of learning style in end-user training. MIS Q. **3**(1), 101–119 (1990)
2. Black, M.: More about metaphor. In: Ortony, A. (ed.) Metaphor and Thought. Cambridge University Press (1988)
3. Chu, C., Chan, B.K.: Evolution of web site design: implications for medical education on the internet. Comput. Biol. Med. **28**, 470–472 (1998)
4. Johnson-Laird, P.N.: Mental Models. In: Posner M.I. (ed.) Foundations of Cognitive Science. MIT Press, Cambridge (1989)
5. McWilliam, G., Dumas, A.: Using metaphor in new brand design. J. Mark. Manage. **13**, 265–284 (1997)
6. Moran, T.: An applied psychology of the use. ACM Comput. Surv. **13**, 1–12 (1981)
7. Moshagen, M., Thielsch, M.T.: Facets of visual aesthetics. Int. J. Hum. Comput. Interac. **68**, 689–709 (2010)
8. Rouse, W.B., Morris, N.M.: On looking into the black box: prospects and limits in the search for mental models. Psychol. Bull. **100**, 349–363 (1986)
9. Schmidt, K.E., Liu, Y.L., Sridharan, S.: Webpage aesthetics, performance, and usability: design variables and their effects. Ergonomics **52**, 641–643 (2009)
10. Szajna, B.: Empirical evaluation of the revised technology acceptance model. Manage. Sci. **42**(1), 85–92 (1996)
11. Wang, R.Y., Strong, D.M.: Beyond accuracy what data quality means to data consumers. J. Manage. Inf. Syst. **12**(4), 5–34 (1996)
12. Wolfe, C.R.: Plant a tree in cyberspace: metaphor and analogy as design elements in web-based learning environments. CyberPsychol. Behav. **4**, 67–76 (2001)