Design Choices and Museum Experience: A Design-Based Study of a Mobile Museum App

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Abstract. The paper reports an experimental study of the effects of visual style, information access selectivity, and content-related challenge on user experience of a mobile museum app prototype. Higher visual richness and added content-related challenge were found to positively affect museum experience, while the effect of information access selectivity was negative.

Keywords: Museum apps, user experience, design dimensions.

1 Introduction

The study reported in this paper explores the effect of a set of design attributes of a mobile museum app on user experience of the app. With the widespread use of personal mobile devices, such as smartphones and tablet computers, museum guides can be implemented as mobile apps [4], which can be downloaded by the visitors. A wide range of museums can be expected to create their own apps. There is a need for HCI research to support this area of practice and help designers find the most efficient ways of using technology to enhance visitors' *experience* [1, 2, 6]. This paper aims to contribute to that effort by presenting empirical evidence about the relationship between certain aspects of a mobile museum app, which are under designer's control (thereafter, "design dimensions") and how the app is experienced by museum visitors. The design dimensions analysed in the study were as follows:

(a) *Visual style* reflected the difference between a refined, "professionally looking" user interface and a less refined, basic graphics design: white space served as the background and hyperlinks (underlined text) were used instead of buttons).

(b) *Information access selectivity* was a degree to which the users could select a concrete information fragment about a museum exhibit, as opposed to viewing all information about an exhibition displayed on one scrollable page.

(c) *Content-related challenge* was achieved by included a multiple-choice "mini quiz", as opposed to providing free access to all information about a museum artefact.

The selection of these dimensions was partly informed by Norman's [3] emotional design model: the selected dimensions roughly correspond to the visceral (Visual style), behavioural (Information access selectivity), and reflective (Content-related challenge) levels of information processing. Experiment 1 was dealing with the first two dimensions, while Experiment 2 focused on the third dimension.

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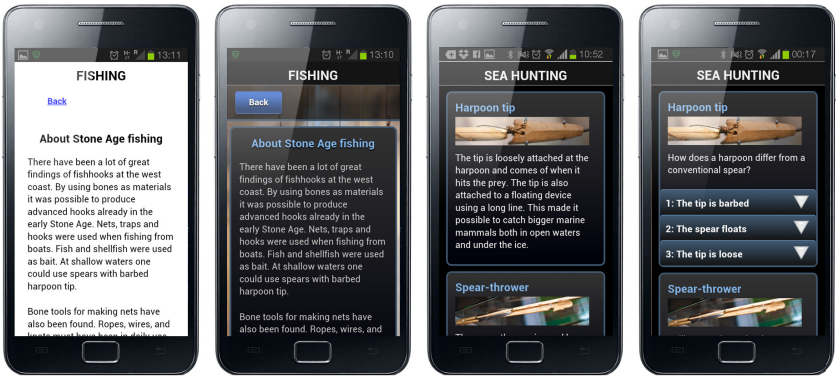
2 Experiment 1

2.1 Method

Eight university students, from 21 to 32 years old, native Norwegian speakers, took part in the study.

The study employed a two-factor within-subject experimental design. Four experimental conditions were produced by combining two levels of the Visual Style variable (Refined vs. Less refined), and two levels of the Information Access Selectivity variable (High selectivity vs. Low selectivity). Examples of user interface designs for the Low selectivity condition are shown in Fig. 1a and Fig. 1b.

The study was conducted at a cultural history division of a major Norwegian museum. The participants were asked to explore four exhibits, Hunting, Harpooning, Agriculture, and Rod Fishing, each comprising a number of stone-age artifacts.



(a) (b) (c) (d)

Fig. 1. Examples of user interface designs used in the study: (a) "Less refined, Low selectivity" condition, (b) "Refined, Low Selectivity" condition, (c) "No challenge" condition, (b) "Mini-quiz" condition. (Text in the images is an English translation of the original Norwegian text)

The participants were tested individually. They were provided with smartphones, which they could use to get access to information about the entire exhibit and individual artifacts. A sequence of four sessions, corresponding to four experimental conditions and involving all four exhibits, was selected for each participant individually according to a Latin Square plan. Each participant also took part in a short interview and completed a survey comprising a number of seven-point Likert scales assessing their experience. The most important scales were "Overall experience" and "Beauty".

2.2 Results

Table 1 shows average "Overall experience" and "Beauty" scores for four experimental conditions of Experiment 1. The results indicate that the "Visual style" dimension had a marked impact on both "Overall experience" and "Beauty" scores in both "Low

selectivity" and "High selectivity" conditions. The "Refined" condition was associated with higher scores than the "Less refined" condition for all four interface designs, with the average difference being about 105%. The advantage of the "Refined" condition was supported by the evidence obtained in the interviews.

The results also indicate that, contrary to our expectations, the "Low selectivity" condition was assessed *more* positively: both "Overall experience" and "Beauty" scores for that condition are higher for all four interface designs. The effect is less pronounced than the previous one: the average difference is 22%.

Table 1. Average scores for Experiment 2 conditions, on a scale from "-3" to "+3"

		Information access selectivity			
		Overall experience		**Beauty**	
		Low Selectivity	High Selectivity	Low Selectivity	High Selectivity
Visual Style	Not refined	+1,6	+1,4	+1,3	+0,9
	Refined	+2.6	+2.4	+2.9	+2.4

3 Experiment 2

3.1 Method

Eight university students, from 23 to 29 years old, took part in the study, which employed a one-factor within-subject design. Two experimental conditions corresponded to two levels of the Content-Related Challenge variable: "No challenge" (descriptions of museum artifacts were directly displayed next to pictures of the artefacts) and "Mini-Quiz" (users had to answer multiple-choice questions to get access to a description of an artifact), see Fig 1c and Fig. 1d. The study was conducted in the same setting and using the same museum exhibitions as Experiment 1.

The participants also took part in a short interview and completed a survey comprising a number of seven-point Likert scales. The main scales were "Overall experience", "Learning outcomes", and "Learning motivation".

3.2 Results

Table 2 shows average scores for two experimental conditions of Experiment 2. The results indicate that the "Mini quiz" condition was associated with higher scores than the "No challenge" condition. The difference is manifested in all three scales: "Overall experience", "Learning outcomes", and "Learning motivation", with the average difference being 74%.

Table 2. Average scores for Experiment 2 conditions, on a scale from "-3" to "+3"

		Overall experience	Learning outcomes	Learning motivation
Content-related challenge	No challenge	+1,6	+1,5	+0,9
	Mini quiz	+2,6	+2,2	+1,9

In individual interviews most participants (7 out of 8) stated that the mini quiz made the exhibits more interesting.

4 Discussion of Results and Future Work Directions

The findings from the study allow us to formulate some tentative advices for designers of mobile museum apps. First, the findings suggest that a refined, professionally looking graphical user interface is more important for creating a positive experience than any of the other factors we studied. Therefore, an effort to make the interface look professional can be well justified – especially given that the effort can in principle be rather low (e.g., it can mean choosing a pre-defined template or "skin"). Second, it was found that – as mentioned, contrary to our expectations – providing more advance interactivity, namely, a possibility to selectively choose a specific information fragment describing an exhibit, can be negatively experienced by museum app users. Third, using "mini quizzes" in a multiple choice question format, which required that museum visitors employed their knowledge or inference about museum exhibits, can make a marked positive effect on the experience of museum app users.

The above advices are specifically related to visitor's engagement with particular exhibits, and cannot be directly generalized beyond that scope. For instance, information access selectivity is likely to be associated with positive experience in cases when the user has to choose an information object from a long list of alternatives (e.g., selecting an exhibit to explore rather than a part of exhibit's description). Another limitation of the study is that it only involved a small and homogeneous group of participants, and that it only investigated a subset of design choices that can potentially make an impact on user experience. Further research is needed to understand the role of these factors.

References

1. Gammon, B., Burch, A.: Designing mobile digital experiences. In: Tallon, L., Walker, K. (eds.) Digital Technologies and the Museum Experience. Handheld Guides and other Media. AltaMira Press, Lanham (2008)
2. Kaptelinin, V.: Designing technological support for meaning making in museum learning: An activity-theoretical framework. In: Proceedings of HICSS 44, pp. 1–10. Computer Society Press (2011)

3. Norman, D.: Emotional design: Why we love (or hate) everyday things. Basic Books, NY (2004)
4. Oppermann, R., Specht, M.: Adaptive mobile museum guide for information and learning on demand. In: Proc. HCI International 1999, vol. 2, pp. 642–646 (1999)
5. Røtne. O. Smarttelefon i museet: Et studie av design for brukeropplevelse. Masteroppgave. Universitetet i Bergen (2012) (in Norwegian)
6. Tallon, L., Walker, K. (eds.): Digital Technologies and the Museum Experience. Handheld Guides and other Media. AltaMira Press, Lanham (2008)