The Effect of Time Orientation and Representation of Points of Interests on the Use of Mobile Tour Guide

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Abstract. This study examined the effect of users’ time orientation (polychronics and monochronics) and the display of points of interests (POIs) on users’ workload and satisfaction when using a mobile tour guide. The results show that individuals’ time orientation has a significant effect on users’ workload. People who have a tendency of polychronic perceived higher workload. The display method of POIs significantly affected users’ satisfaction. Categorized display was preferred by the users. For polychronics, display method had a significant effect, and altogether display was a better choice. Based on the findings, we suggest that mobile navigation interfaces design should pay extra attention to polychronic people as they tend to manage multiple activities simultaneously, which may add to mental workload. POIs in mobile navigation services should are displayed by categories, and an overall view with all POIs should be provided as well.

Keywords: Multitasking, time orientation, mobile.

1 Introduction

Mobile tour guide is becoming increasingly popular with new mobile devices embed- ded with GPS or other positioning system. Interaction with mobile devices is limited by its physical size, which results in restrictions on user interface and information presentation [4]. For mobile tour guide, a basic visualization task is to display points of interests (POIs) on the small screens of mobile devices. The selection of POIs being presented is critical because the limited space restricts how much information can be displayed on the screen.

Besides the limited size of screen, people’s limited cognitive resources also make it difficult to interact with mobile devices. In outdoor environments, physical surroundings, other people, and mobile computing devices compete for cognitive resources [12]. Continuous attention to the mobile device was found fragmented and broke down to bursts of just 4 to 8 seconds, comparing to over 16 seconds in laboratory condition, and attention to the mobile device had to be interrupted by glancing the environment [12]. This implies that interaction with mobile devices is naturally multi-tasking. Previous studies [2, 7] showed that people are different from each other in their ability in handling multi-tasks and managing time, which was summarized by Hall [7] as time orientation. Time orientation, generally speaking, reflects the
differences of people in managing time [7]. Some people tend to do one thing at a
time (monochronic), while some others prefer to do several things simultaneously
(polychronic). Will different styles of managing time influence people’ usage of mo-
bile applications? Shall special concerns be raised for designing interfaces for people
with different time management style? When designing a mobile application, these
issues should be concerned.

The aim of this study is first to examine whether the design of POI display will in-
fluence people’s usage of mobile tour guide, especially when they have multiple des-
tinations in their mind; second, whether there is any difference in satisfaction and
workload between people with different time orientation when they use mobile tour
guide. The interaction between time orientation and POI display is also investigated.

2 Related Work

2.1 Representation of POIs on Mobile Tour Guide

For mobile tour guides, one important visualization task is displaying a set of POIs.
Usually, a specific icon is assigned to each category and drawn on a map in a way that
visually maintains spatial relations among POIs. One major step to visualize informa-
tion on mobile devices is selection, which refers to present the information relevant to
the considered task [5]. Then how should we select the POIs to be presented in a mo-
bile tour guide? On one hand, visualizing insufficient data will lead users to make
suboptimal or plainly wrong decisions; on the other hand, burdening users with un-
necessary data will make it more difficult to reason about a given problem. Although
selection is an important aspect of any visualization, it is critical in mobile device
visualizations because the limited space restricts how much information the screen
can display. Chittaro [5] stated that the visualization should not simply draw all POIs
as if they were equally relevant to the user. Instead, a typical approach is drawing
only those POIs that satisfy users’ needs. A frequently used method is display POIs
by category.

2.2 Time Orientation

Time orientation describes the different ways people use in managing time. When
facing abundant information, people’s ability to manage time seems to influence their
behavior. Activities are sometimes performed together (parallel) while at other times
they are done one at a time (serially). This difference is summarized by Hall [7] as
monochronic and polychronic time use. Monochronic people percept time as linear,
they prefer to do one thing at a time; while polychronic people have a cyclic time
perception and tend to do many things at once [7]. Monochronics tend to regard un-
scheduled events as interruptions [3].

Time orientation has an impact on people’s behavior and preference. Bell et al.[1]
proposed that polychronics are more likely to multitask with technology than mono-
chronics. Ophir et al. [11] showed that heavy media multitaskers are more susceptible
to interference from irrelevant environmental stimuli and from irrelevant representa-
tions in memory, thus, performed worse on a test of task-switching ability. The study
of Huang et al. [8] revealed that polychronic users perceived lower level of interruption