Mobile Internet usability: What can 'Mobile Learning' learn from the past?

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Abstract

'Mobile Learning' is a type of application/service that generally presumes to use mobile Internet technology for learning purposes. This paper focuses on discussing basic usability principles from Mobile Internet technologies in general. It is argued that part of the success of 'Mobile Learning' will depend on the extent to which current knowledge about best practice in usability are heeded.

1. Introduction

Since the introduction of Wireless Application Protocol (WAP), much interest has been sparked in the possibilities for mobile Internet applications. Some have expressed disappointment because of unfulfilled expectations that mobile Internet technology would deliver the same or similarly complex types of applications as the fixed Internet. However, as many commentators have pointed out, WAP was never intended to bring exactly the same kinds of applications from a desktop PC to a small device, but rather to bring a select set of applications and services to small devices.

This is not to say that the Mobile Internet seeks to remain distanced from the fixed Internet as a technology. On the contrary, the WAP Forum's standardization on XHTML is in line with W3C's recommendations for Device Independence Principles [1]. These principles suggest that for Web content to be considered 'device independent', it should be possible for a user to obtain a functional presentation associated with its Universal Resource Identifier (URI) via any access mechanism. This is not to say that the presentation will be the same on every device, but that users obtain a functional presentation that may vary depending on the device [7].

2. What do we mean by the term 'mobile Internet'?

Mobile Internet uses a broad range of technologies, from WAP, XHTML, Symbian, 3G, etc. Generally, the technical standard for Mobile Internet is the WAP protocol stack, with XHTML as the markup language, and either a proprietary operating system (OS) or some standard platform like Symbian. Each of these technologies may interface with each other in different ways, so the term 'Mobile Internet' encompasses a broad range of possibilities. For example, 'Mobile Internet' may mean a Nokia 9210 communicator (screen size 640 x 200, 9 rows of text), running Symbian OS or it may mean a Nokia 6310 (screen size 96 x 65, 4 rows of text) running a proprietary OS. Each device has different technical capabilities, and this should be taken into consideration in the service design. However, even in a 'best case' scenario, the screen size and bandwidth of mobile Internet is not equivalent to that of fixed Internet. The implications of these constraints are dealt with in the following section.

3. Best practice principles in usability and service design for mobile Internet

The research on readability and comprehension with small screens [2,3] shows that even for very small displays of only a few lines of text, users can read and understand information well. These findings encouragingly suggest that small devices can be used effectively for presentation of information. Nonetheless, there is also evidence that to a certain point, the size of the display will impact on the users' performance [4].

Apart from the smaller screens, mobile terminals are also constrained by a lower bandwidth. This affects both the display of output and the users' interaction with the application/service. Successful mobile applications are often goal-directed, like banking. Push messaging is also useful to provide just-in-time alerts.

In light of all these considerations, some general 'best practice' principles for developing usable mobile Internet applications are outlined in detail below [5,6,7].

3.1. Less is More. Only the relevant information should be shown. The most important information should be right at the top of the page. Empty rows may be misleading because the user may think there is no more content below.

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3.2. The user is mobile. Consider the possible variations in context. The user may be in a waiting lounge, taxi or with friends, so they may not appreciate noisy alerts. Also consider that the primary goal of mobile Internet is not necessarily to browse, but to get easy access to specific information. Moreover, the user may be paying on a time rather than data basis (e.g. with GSM), so they may not appreciate being distracted from their task by superfluous rich media elements.

Input of information on mobile devices is often more challenging and time consuming than with fixed terminals. Minimize the need for user input (particularly text).

3.3. Keep in mind the display size. Test your application on emulators with different display sizes. Interactive pages on mobile devices should be short and informative. Scrolling is more challenging, so interactive pages should not be too long. For example, users may not be sure if they have filled in every field on a long form.

Avoid wide elements and tables. Not all mobile devices are even capable of horizontal scrolling. Table width should not exceed the display width. The height of the table should not exceed the screen size, because the column titles are not visible after scrolling down the table.

3.4. Navigation. Provide a consistent navigation method. Each page should ideally contain links to the main page. Nokia Mobile Browsers provides a Back function in the right soft key. However, not all devices provide Back functions, so Back links are also useful.

3.5. Designing for fixed and mobile Internet. In designing an application/service for both fixed and mobile Internet, consider that it is generally easier to extend a mobile-oriented service to the fixed Internet than vice versa. If you plan a service for both, especially consider that ALT texts are often needed for images and to test how color images appear on a monochrome display.

4. What could mobile learning learn from mobile Internet usability?

Consideration of usability principles for mobile Internet applications suggest that mobile learning solutions warrant a specific approach. Mobile learning may be better suited to such specific content areas with very goal directed tasks for example. It may also be suited to particular aspects of e-learning courses, such as: quick reminders and alerts; daily tips; glossary information; searching for specific information within a topic and course registration.

These kinds of learning applications could be ones that would not require much user input, could be easily adapted to a small screen and can also be performed within a variety of user situations.

Another consideration is that Mobile learning would likely add value in particular areas in which the mobile terminal has an advantage over the fixed terminal (e.g. location-based services, interaction or ad-hoc/on-demand needs). For example: short messaging service (SMS) chat (where handsets share SMS messages in a "chat" session) might be useful for interacting with subject matter experts.

Preliminary case studies using WAP in e-learning show that there is a strong need to consider special needs of usability for mobile learning. One case study [8] for example, showed that despite 100% of participants responding that WAP access added value to the learning experience, only 57% of the participants believed that (with the exception of rich media elements), the course could have been delivered satisfactorily through WAP. Negative comments from learner's show common frustration with the design and usability of the information for small devices: for e.g. "Too much reading from a small screen." Such frustrations would be alleviated by following the guidelines outlined here. The fact that usable interfaces increase retention of information and accessibility should provide a clear justification for the value of designing usable interfaces for mobile learning.

In summary, the experience of general Mobile Internet has provided valuable experience to the mobile developer community for determining what applications are most suited to and how they can be best written for mobile devices. Further research could be focused on determining whether the usability principles outlined here are an appropriate basis for more formal instructional design strategies and principles for mobile learning.

5. References

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