

Relevance of Prior Experience in MHP Based Interactive TV Services

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Abstract. Despite its rising success, interactive TV (iTV) has found very little attention in the field of HCI. Therefore, the aim of this paper is to investigate the usability of iTV services. It presents the results of a usability test and discusses the implications for further developments. The results show, that prior knowledge of Internet and mobile phones supports the usability of iTV services regarding navigation and text input, while the lack of it leads to great difficulties. Difficult tasks, such as writing a text message, had a success rate of only 20%, while guided tours proved to be more usable with a success rate of 70%.

1 Introduction

Interactive television (iTV) has taken off with extensive field tests in the US in the late 1970ies and is now slowly paving its way to TV households all over the world with the UK as precursor [4]. The HCI community started to pay attention to the design of user interfaces for iTV in the mid-1990ies [5, 7, 10] but since then the topic has received relatively sparse attention. Evaluations took place largely in industrial environments and led to the development of guidelines for iTV services [1, 9], but few publications originate from research in scientific environments. Therefore, we are aiming at filling parts of this gap by reporting usability issues on iTV discovered in a usability test within the scope of a 4 months field test.

2 Field Test

The iTV Salzburg field test ran from December 2004 to March 2005 aiming at the investigation of the technical feasibility of interactive TV with DVB-C and the acceptance of interactive services based on the MHP standard. 80 households were equipped with a galaxis set-top box and a cable modem (back channel). They were provided with a bundle of services containing news, real video on demand, e-mail and SMS communication, games and online shopping (ticket reservation and food ordering). The design process was partly based on a user-centered approach [3] doing heuristic evaluation based on guidelines [1, 9] and paper prototyping. Online questionnaires, interviews and event logging of all households accompanied the field test phase. The results from usage statistics of 80 households are expected in May 2005. While the latter mentioned activities partially dealt with the issue of acceptance,

we conducted a usability test to further explore the usability of the MHP-services. This article focuses on the results of the usability test carried out in February 2005 using the same iTV set up as in the households.

3 Usability Test

The usability test focused on the investigation of several factors influencing user-acceptance. We explored the following relationships:

- task completion rate in text input tasks and prior experience with similar text input on other media
- task completion rate of services with strict (guided) navigation and prior media experience
- relation of long waiting times and real system failures

Participants

11 persons agreed to participate on a voluntary basis. Due to technical problems one participant had to be excluded from the analysis as only a small part of the test could be conducted. Thus six male and four female users took part (age $M=30,6$ $SD=4,6$), which is an appropriate sample size for the purpose of usability testing for our target group of young, technophile users [8]. The participants all owned a cell phone and a TV. To be able to determine the influence of prior knowledge we surveyed the users' media use. Users watch TV $M=1,6$ hours per day ($SD=1,2$), send $M=5,5$ SMS per week ($SD=7,8$) and have a high usage rate of computers with $M=37$ hours per week ($SD=40$) including 11 hours per week mean usage of the Internet ($SD=8,3$).

Table 1. Tasks of the usability test

#	Task	Service
1	Select the latest news item on the iTV Portal	iTV Portal
2	Read through the news article about the new BMW Formula One car and find out its horsepower	News Service
3	Play the weather forecast video clip of yesterday's news program	Video on Demand
4	Login to the TV-mail service and read the latest mail message	TV-Mail Service
5	Send a text message to your own mobile phone	SMS
6	Order two tickets for the André Rieu concert	Ticket Service

Procedure and Material

All participants were tested individually. We tried to overcome the reported shortcomings of artificial iTV test settings [8] by equipping the usability lab with comfortable furniture to give the impression of a domestic lounge. Sweets, drinks and magazines were placed on a coffee table. A loose conversation by participant and instructor should lead to a relaxing atmosphere.

The test began with a questionnaire, followed by a short introduction to iTV and the request to the participants to give us feedback whenever they thought they would decide to stop the task. We guided the participants to the so called iTV Portal (first and main page bundling all iTV services) and carried out the actual usability test. The usability test consisted of 6 tasks, ordered by difficulty (see table 1). After filling out a post-test questionnaire, the participants were asked to wait approximately 10 minutes for a first data capture (this was the official reason for the break). During this time they had the free choice either using iTV or reading the newspaper in front of them. After this free exploration phase the participants could tell us their impressions on iTV.

The setting used two cameras for monitoring the participants: first in full perspective, second with a focus on the remote control. All key strokes and events of the interactive service were additionally monitored by the iTV System (database-logging).

4 Results

The estimated difficulty of tasks was reflected by the task completion rates. Overall only 55% of the tasks were completed successfully without the help of the instructor. 90% of the participants could successfully read the news entries (task 2), but only 50% handled watching a video clip.

Even more problematic were the e-mail and SMS services: only two from ten participants succeeded in reading an e-mail. Most of them struggled when being asked to input their user ID and user code. The text input was designed according to a multi-tap used on cell-phones. The two successful users had the highest SMS usage rates on cell phones (about 20 per week). Here higher usage of SMS services on cell phones helped the user to successfully accomplish the task. The same two users were successful in writing a text message. The task completion rate in text input tasks is thus closely related to prior experience with similar text input on other media (like cell phones).

Computer usage seems to support a strict (guided) navigation. Buying tickets in a guided sequence of screens was successfully accomplished by seven participants. The successful users did have a mean computer usage time of 39,3 hours per week, not successful users had 33,0 hours mean computer usage per week.

The mean perceived system failure per participant was 1.34 times, which is identical with the mean real system failures gained in the log file analysis. Thus long waiting times (more than 30 seconds) do not lead to misinterpretations of system state. From a technical point of view fast loading times and quick feedback in MHP-services is very difficult to achieve. Technical induced waiting times for MHP-services are thus not related to the system stability perceived by the user.

During the waiting time at the end of the test half of the participants decided to use and further explore iTV, while the other half preferred reading a newspaper or a magazine.

5 Discussion and Conclusions

The usability test indicates that the successful accomplishment of tasks seems to be partly influenced by prior experience. In the case of sending short messages participants with high SMS usage (about 20 SMS/week) were successful; all others failed to accomplish the SMS task. When designing text input, the prior experience of users from other media use must be taken into account. Therefore the design of

services building on text input should clearly focus on a specific target group. Generally, particular services for specific target groups and contexts seem to be a seminal direction for iTV [11]. For services addressing a broader audience we encourage the use and development of alternative and more easy to use text input methods than multi-tap, e.g. TNT [6], when no keyboard is available.

Most of the participants stated, that they would not pay for any of the services except Internet access and personalized services and news. Furthermore 50 % of the users prefer an ordinary newspaper instead of reading news with interactive services. Thus a further goal for the future must be to develop new kinds of services. Such services should not aim at the remediation [2] of the Internet on TV. Instead they should make use of and contribute to the specific strengths of the medium TV.

The analysis of the usage statistics will be used to further validate the findings of the usability test and we will take all three discussed issues as an agenda for further research in a follow-up project. Firstly we will investigate the design of alternative interaction techniques, secondly we will investigate specific user groups in ethnographic studies and finally we aim at the development and evaluation of new interactive services.

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