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Interactive Educational TV Applications Based on the Multimedia Home Platform (MHP)

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Abstract: This paper presents the use of interactive television (TV) for learning purposes. Due to the increasing international support for the Multimedia Home Platform (MHP) as open standard for interactive, digital TV the development of interactive TV applications is gaining momentum. However, there are only very few educational interactive TV applications so far. In order to support the development of educational interactive TV applications it is investigated, how the technological possibilities of MHP can be used to develop educational applications. The research described focuses on an application developed for a public broadcaster in Germany. The integration of interactive functionalities into a traditional educational TV programme are demonstrated. In the case study special attention has been given to a user-centered development process as well as to the usability of the application to support end-user acceptance of this future technology for learning.

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1 Introduction

Interactive TV is being considered as new technology for education and learning [TLS03]. Different technological platforms for interactive TV exist (e.g. OpenTV, MediaHighway, Liberate, Multimedia Home Platform). The Multimedia Home Platform (MHP) developed by the Digital Video Broadcasting (DVB) consortium is the open standard for interactive, digital TV and is increasingly being supported by the international broadcasting industry as well as by governments worldwide [DVB, MHP]. Broadcasters are beginning to develop interactive, digital television applications based on MHP, e.g. digital teletext, voting, quiz, personalized news, TV shops, interactive games and educational applications. However, it is still open if MHP will become the accepted industry standard. End-users would benefit very much from this by being able to view and use all MHP-based interactive TV applications using only one set-top-box. Today different set-top-boxes are needed to receive all interactive TV services due to the different technological platforms. E-learning providers of both computer-based and web-based training as well as producers and broadcasters of traditional educational TV programmes can benefit from the development of interactive TV. Interactive educational TV has great potential for public broadcasters as well as for corporations. As part of a corporate e-learning strategy interactive educational TV can be used e.g. as instrument for technical and management training [BuBr97]. Different interactive educational TV applications and prototypes based on the MHP open standard have been developed by the Technical University of Ilmenau, Germany to demonstrate the potential of MHP for education and learning, e.g. children education, political education, language learning and advise giving programmes. In this paper one application is presented in detail.

2 User-oriented specifics of interactive TV applications

In order to support a learning experience interactive TV applications need to be easy to use. For desktop-computer based Elearning applications much knowledge exist about user interface design in order to develop easy to use applications [Shn98]. For interactive TV applications some fundamental specifics need to be considered. Interactive TV applications are being displayed on a TV screen using a set-top-box to decode the application. Only in the near future MHP applications might be used on a desktop or laptop computer equipped with a DVB-card as well as on mobile devices, like personal digital assistants (PDA) or mobile phones. User interaction with interactive TV applications on the TV set usually happens via the TV remote control, especially via the four colour keys (red, green, yellow and blue), the four arrow keys and the confirmation key. Viewing distance is several metres and the screen resolution is low. The user is looking primarily for entertainment, is laid-back and user engagement is relatively low. Interactive TV applications can generally be divided into two groups: Applications that are attached to a dominant video-stream and those that are not. Especially those applications which are intended to support the reception of the TV program must not destroy the dramaturgic flow of the programme. Therefore existing software usability knowledge cannot be applied to these applications directly. Specific user interface design guidance for interactive TV applications is needed.

3 A case study for interactive educational TV

In close cooperation with the German public broadcaster MDR the Technical University of Ilmenau, Germany, has developed a+ MHP application for the “LexiTV” knowledge magazine programme. The objective of the development on the basis of the MHP reference implementation of the Institut für Rundfunktechnik (IRT) is to demonstrate the potential of interactive TV for education and learning. For desktop-computer based E-learning application rich knowledge on instructional design exists [Ker01, Nie01]. In the project first steps have been done to transfer and adapt this instructional design knowledge to the new platform of interactive TV.

The LexiTV MHP application offers viewers a host of different supplementary items of information relating to the TV programme. Facts and background information on the broadcast and on the presenter, texts and pictures from a topical programme subject which widen the main focus, a topic preview, as well as the opportunity of taking part in a quiz can all be accessed and controlled by the remote control. The user can access additional time-sensitive information to the programme simply by pressing a colour key on the remote control. Technically this is done by integrating time-stamps into the DVB-stream. This ensures that the offered information is relevant to the user at any given moment and is not pulling away the user from the topic of video broadcast. A quiz lets the user control the learned knowledge in a playful way. The return channel offers the possibility to send the answer back to the broadcaster. The MHP application also includes context-sensitive help functionalities to support the user to understand and navigate the offered functionalities.

The linking of the “LexiTV” MHP application to the “LexiTV” website is particularly worth highlighting. The lexically oriented online magazine www.lexi-tv.de (Grimme-Online Award 2003) accompanies the TV programme. The website allows each user to register and open a personal area with individually chosen topic worlds (“my lexi”). It is also possible for users to file their own comments here. The MHP application uses an ISDN return channel. This enables viewers to store individual articles and topics from the TV programme in the “my lexi” area of the internet application while watching the broadcasting. The data is stored on the central web-server. The user can look up the saved topics incl. additional information in the personal zone of the website to continue and intensify the study of the subject after the programme.

Aufgabe 1 - Sendung:

Info

Studiogast:
Der Tierarzt Dr. Justus Oerther ist seit 1990 Geschäftsführer des Naturschutzbundes Sachsen.

Der NABU Deutschland wurde 1899 gegründet. Er hat seinen Sitz in Bonn und hat heute über 380.000 Mitglieder.

Ziel des NABU ist es, der Zerstörung der Umwelt Einhalt zu gebieten.

LexiTV Info Mein Lexi Quiz

Mein Lexi

Bitte geben Sie Ihre E-Mail-Adresse und Ihr Schlüsselwort ein.

E-Mail-Adresse:

Passwort:

Beitrag abspeichern

LexiTV Info Mein Lexi Quiz

Aufgabe 2 - Bildauswahl:

Aufgabe 2 - Bildauswahl:

Aufgabe 3 - Ordnen:

Aufgabe 4 - Lückentext:

Lernzettel

Ressort NATUR

Gelöste Aufgabenkomplexe: 5/6
Erreichte Punktzahl: 85%

Im Ressort Natur haben Sie reges Interesse gezeigt und viel Wissen erworben. Walter Sol Ihre Leittipps zu den einzelnen Sendungen

Lehrkomplex 1: "Der Urwald"
Lehrkomplex 2: "Der Leipziger Zoo"
Lehrkomplex 4: "Die Seewölfe"
Lehrkomplex 5: "Insekten"
Lehrkomplex 6: "Die Dinosaurier"

Lexi TV Info Mein Lexi Aktion

The development of this interactive TV application is being conducted in accordance with the principles of the usability engineering lifecycle, a user-oriented development process, which includes the end-users into the development process from the beginning [May99]. Empirical methods such as focus groups and usability tests were deployed for the project development and the evaluation of the application [Shn98]. The usability of the application has been evaluated by representative end-users in our usability lab using the thinking aloud method. The application has been developed in close cooperation with the TV editors and producers in order to use MHP to support the TV viewing experience rather than distracting the viewer from the expensively produced TV programme. A further development of the LexiTV MHP application is planned to realise full transmission capability.

3 Conclusion

The development and use of interactive educational TV applications is just beginning and many questions are still unanswered. This case study shows some interesting first results. Interactive functionalities can support traditional educational TV programmes. The MHP standard is a suitable technological platform for interactive educational TV. Much potential for learning in training lies in the combination of interactive TV applications and associated websites. Content from existing websites can be reused partly in interactive educational TV applications. However, existing content has to be adopted to the specifics of interactive TV. The joint development of interactive educational TV applications with end-users as well as TV editors and producers has proven very important for the success of the application, both within the organisation of the broadcaster as well as with end-users.

Further research is needed in order to investigate if and in what way interactive educational TV can support the individual learning process of the user. The adaptation of existing instructional design knowledge for interactive TV applications is another interesting research question. Newly created educational TV programmes that are integrating user interactivity into the programme concept from the beginning might benefit even more from the technological possibilities offered by interactive TV in general and by MHP specifically. The use of interactive TV to enhance educational business TV programmes is another promising field of implementation for this future technology for learning.

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