ABSTRACT

This paper presents partial results of the research project "Educational content for digital-CONTEDI". Different sectors of society such as academia, should be prepared, learn, train and promote the development of applications and content for digital television (DTV). This paper sets out the general guidelines for the development of interactive educational content, identifying the advantages of TVD for inclusion in the educational field through the T-learning.

KEY WORDS

TVD, learning, t-learning, MHP.

INTRODUCTION

Television, telecommunications and computing and its convergence are the cornerstone for building the information society. The TV has long been a media easy to use and now has extensive coverage of digital terrestrial television (DTT). The application of this new technology offers many advantages and possibilities of the standard signal, for example, better image quality (high definition) and a higher quality sound as well as the possibility of developing new services and applications (t-commerce, t-government, t-health, t-games, t-employment and t-learning etc.) in convergence for the user.

Digital television is becoming important in teaching and learning has been called the four T-learning (Bellotti, 2008). That is, interactive and personalized learning through the TV, with a new approach to virtual education, complementary to the PC-based, where they have since informal courses to university degrees. In addition, digital TV offers another alternative for people who have no or giving them your computer hard drive, TV remains the most friendly and found in most households, thus contributing to digital inclusion.

In Colombia, most users and many sites have a TV, and since 2009 began gradually in the transition from analog to digital television. For this we must be projected to exploring future applications can be implemented. For over a decade the rapid growth of ICT and its use in education has generated a lot of changes in traditional educational structures as well as the interest in defining new models for the design of advanced learning. Many of the models that integrate ICTs face the problem of access to a computer, its management or low Internet penetration (Bellotti, 2008). Digital television penetration by high TV, interactivity, ease of use, among others, is a component of exploration that contributes solutions to the demand of the information society for education (Aarreniemi, 2006), which refer to: increased access to education for all, continuous learning throughout life, formal education, flexibility, availability of connections and interactions and particularly for promoting regional access to higher education in disadvantaged areas.

From the point of view of education policy emphasizes that in the last 10 years have made massive investments in ICT but have generated small changes in educational practices. It is emphasized that the model of knowledge transfer continues to be centered on the teacher. It highlights the
importance of introducing innovation in educational practices and for that we detected the need for focusing on practical skills acquisition and use tools that position the student in the core of the educational process such as social software tools (Castañeda, 2007). This paper presents the issues to be considered for creating educational content for TVDi, the problem statement and justification are presented in paragraph 1, the general concept and conceptualization of the proposal are set out in paragraph 2, the results are presented in section 3 and the future work and conclusions are presented in section 4.

1. APPROACH AND USTIFICATION

For over a decade the rapid growth of ICT and its use in education has generated a lot of changes in traditional educational structures as well as the interest in defining new models for the design of advanced learning (Garcia Gutierrez, 2005). Digital television is one such alternative development and the future promising research for teaching and learning. Digital television penetration by high TV, interactivity, ease of use, among others, is a component of exploration that contributes solutions to the demand of the information society for education, which refer to: increased access to education for all, continuous learning throughout life, formal education, flexibility, availability of connections and interactions and particularly for promoting regional access to higher education in disadvantaged areas.

This proposal seeks to move into teaching and learning processes based on digital TV, enabling the school to prepare, to project and develop applications for deployment.

2. GENERAL CONCEPTS

2.1 Digital Tv (TVD)

The TVD is considered the convergence of television and computing technologies, which meets three typical characteristics (Bellotti, 2008):

- Interactivity.
- Customization.
- Scanning.

2.1.1 Access Technologies: There are different models of DTV, depending on the medium and mode of transmission, which include the following access technologies (Miller et al, 2005):

- Waves Terrestrial (DTT: DTT).
- Mobile Devices. DVB-H
- Cable.
- Satellite.
- Trends online WebTV and IPTV

2.1.2 Standards for digital TV.

Globally exiten the following standards, Table 1, to broadcast digital television:

<table>
<thead>
<tr>
<th>Standards</th>
<th>Source Format</th>
<th>Middleware</th>
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<tbody>
<tr>
<td>ATSC (Advanced television standard committee)</td>
<td>Estados Unidos (ATSC,2009)</td>
<td>DASE (DTV application software environment)</td>
</tr>
<tr>
<td>DVB (Digital video broadcasting),</td>
<td>Europa (DVB,2009)</td>
<td>MHP (Multimedia home platform)</td>
</tr>
<tr>
<td>ISDB (Integrated digital broadcast system)</td>
<td>Japon (ISDB,2009)</td>
<td>ARIB (Association of radio industries and business)</td>
</tr>
<tr>
<td>SBTVD (Specification for the Brazilian Digital TV System)</td>
<td>Brasil (adaptado del Japones) (SBTVD,2009)</td>
<td>GINGA</td>
</tr>
<tr>
<td>DMB (Digital Multimedia Broadcasting)</td>
<td>China (DMB,2009)</td>
<td>T-DMB MATE API thinT-DMB</td>
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</table>

Table 1. Standards y middleware - TVD
The National Television Commission announced on August 28, 2008, the DTV system chosen for Colombia is the European (DVB, 2009) and its implementation began in 2009 (NTV, 2008). The standard defined by the organization Middleware DVB, is the MHP (Multimedia Home Platform) (MHP, 2010), used in digital receivers to run applications using Java procedural language. (ASEE / IEEE, 2008).

2.2 T-Learning

DTV provides a great opportunity to education. This comes as news to viewers and is the convergence of the education sector, telecommunications, and Internet in the same medium. This technology will allow the development of interactive educational platforms resulting in what is known as T-learning. The term T-learning is used to mean learning through interactive television (Pavlov, R. and Paneva, D. 2006). T-learning, is described as the convergence between iTV and the e-learning. The latter understood as the use of information technology to support educational and training activities. Other definitions of t-learning are: learning via interactive television or interactive access to rich educational content primarily in the home video through a TV (Bates, 2003). It is a subset of e-learning, the latter referring to any form of learning through a digital electronic device connected (King, Diaz and Fernandez, 2008). It is the convergence of technologies TVDi and e-learning (Damasio, and Quico, 2004). It is the convergence of television and computer technologies (and more specifically Internet) (Lytras et al, 2008).

T-learning includes other technologies like mobile and internet protocol (Internet Protocol, IP). However, the TV or device configured to view broadcast content is the main medium in T-learning and other devices are implemented as a means to support the learning side.

3 METHODOLOGY

STEP 1
Establish technical and pedagogical principles that support the development of content on television.

STAGE 2
Design and produce a theme of a unit of a regular course on a t-learning platform.

STEP 3
Testing to evaluate this product in terms of usability and didactic structure in a laboratory setting, using emulators or a TV.

4 RESULTS

4.1 Education using Digital Tv

One factor in favor of education through digital television, is that most users have a TV, and tend to trust what they see there. The TVDi also allows distance learning as an additional educational option to e-learning and computer-based educational programs for analog TV. Also some people do not have computers or do not use, others are difficult to manage the computer, or do not have internet access. Hence the challenge to define more interactivity and personalization to projects based educational television. (Zajc, M. 2009)

Among the types of interactivity in Digital TV is according to the degree of user participation and interactivity collaborative Hardware which can create
social community which is part of social software, as shown in Table 4. All these aspects and advantages of digital TV is what can make the most in academia.

<table>
<thead>
<tr>
<th>TYPES OF INTERACTION</th>
<th>BY THE CONVERGENCE OF SERVICES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Systems of low interactivity</td>
<td>Since receiving information to interact with text messages (phone line). Poor interaction.</td>
</tr>
<tr>
<td>Half Interactivity systems</td>
<td>Mejoras en las limitaciones de acceso. Desde un teclado, hasta sistemas de reconocimiento de voz.</td>
</tr>
<tr>
<td>High interactivity Systems</td>
<td>Improved access limitations. From a keypad, to voice recognition systems.</td>
</tr>
<tr>
<td>AS PART OF THE SYSTEM USED TV</td>
<td></td>
</tr>
<tr>
<td>local interactivity</td>
<td>Between the user and the content of the STB. Simple interactivity.</td>
</tr>
<tr>
<td>global interactivity</td>
<td>Between the user and the broadcaster or service provider. Full interactivity.</td>
</tr>
<tr>
<td>DEGREE OF PARTICIPATION BY USER AND HW</td>
<td></td>
</tr>
<tr>
<td>Weak interactivity</td>
<td>Using just the remote control</td>
</tr>
<tr>
<td>Hybrid interactivity</td>
<td>Composed of PDA, web cams and language interfaces..</td>
</tr>
<tr>
<td>collaborative interactivity</td>
<td>Create social community.</td>
</tr>
<tr>
<td>strong interactivity</td>
<td>Using multiple channels of communication between devices or between consumers.</td>
</tr>
</tbody>
</table>

Table 2. Types of Interactivity

To develop the project were purchased devices such as encoder, modulator, DTA-105 DVB card, computer, TV + STB, multiplexer, and the iTV software suite of educational Icareus (ICAREUS, 2010), for experimental tests in the laboratory. It is based on studies of t-learning models and recommendations for content development and was defined as a prototype and laboratory testing of a course module (computer issue, specifically on input devices, storage, and end!) figure 1 illustrates the interface of the software suite to develop iTV interactive applications.

Figura 1, interfaz del software iTV suite

4.2. T-learning case CONTEDI project

With the research project CONTEDI (Educational content for digital television), working in t-learning, as proposed teaching / learning based on TVDi. It explores the context of the TVD, to know the technical, educational, communication and content production. In addition the following:

• The context is under the DVB standard, chosen by Colombia on August 28, 2008 and as agreed in December 2010.

All this confirms that the T-learning allows a complementary option to e-learning education. In particular, education-based interactive television promises a high potential due to its ability to support interactivity. Within the project CONTEDI, T-learning is used as a proposal of the teaching / learning based on TVDi. It explores the context of the TVD, to know the technical, educational, communication and content production.
• Initially based in a research setting and use (exploration).
• Establishment of a small interdisciplinary group (professionals in IT, telecommunications and audiovisual communications).
• Some devices are acquired as an encoder, modulator, DTA-105 DVB card, computer, TV + STB, multiplexer, and the iTV software suite Icareus educational laboratory for experimental tests.
• It is based on studies of t-learning models and recommendations for content development made (Aarreniemi, 2006) (Moreno, 2010), (Hansen, 2005), (Arvid, 2009), (Inteco, 2009) (FSPUGT, 2008), (Karyn, 2005), and (Collazos, 2008).
• Defined as a prototype and laboratory testing of a course module (computer issue, specifically on input devices, storage, and output).

Figure 2 illustrates the first experiences with the iTV software suite to develop interactive applications.

On the survey, following are some of the results:
90% of respondents within the application if it provides information on activities and topics to be developed in the course.
Overall, the average of the responses with 85% mentioned that the application if graphically presents the specific items on the subject.
50% responded that the reference is not clear institutional application. This is important in so far as being in a formal educational framework, the application must show your corporate identity.
As to the content if appropriate, with 89% positive responses.
On use of the software errors, with 89% that are not errors, but with respect to the use of mechanisms of learning assessment suggests that 78% no.
On the use and application control, with the result that on average 89% gives a positive use and application control.
With regard to the presentation of information in a fun, 67% raises so.

One proposal is for a second phase of this project is to evaluate the application in a normal course, with a pilot group and a control and its application for use in the programs offered at a distance.

5. CONCLUSIONS

Technologies, such as DTV, is a more, where it is important to get the most benefit and to develop and deliver content, this in turn allows collaborative interactivity.

The universities or educational institutions have an opportunity to propose and develop applications and content for interactive digital television. CONTEDI
research project, still in the prototype phase of debugging and testing.

CONTEDI research project is a proposal as a platform to explore and develop educational applications from any area of knowledge in the environment TVDi. As for the application developed to be improved in the areas of interface, teaching and interactivity options and wait for the near future to implement and evaluate actual implementation with students from a normal course, and its application for remote use, and investigate more in customization, the return channel options and convergence with the internet. Also in each project must feed the technical, pedagogical, educational, language television, and content development.

Undoubtedly the development of content and applications for digital terrestrial television or other means, requires commitment and participation of different sectors from government, industry, television broadcasters, among others, to facilitate and have the resources to it. Furthermore, the development of content for TVDi requires a collaborative, multidisciplinary and to carry out the intended results.

7. ACKNOWLEDGMENTS

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