



MCCSIS 2012

IADIS MULTI CONFERENCE
ON COMPUTER SCIENCE
AND INFORMATION SYSTEMS

Lisbon, Portugal
17-23 July 2012

Proceedings of the
IADIS International Conferences
Interfaces and Human Computer Interaction 2012
and
Game and Entertainment Technologies 2012

EDITED BY
Katherine Blashki



iadis

international association for development of the information society

Copyright 2012

IADIS Press

All rights reserved

This work is subject to copyright. All rights are reserved, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, re-use of illustrations, recitation, broadcasting, reproduction on microfilms or in any other way, and storage in data banks. Permission for use must always be obtained from IADIS Press. Please contact secretariat@iadis.org

Volume Editor:
Katherine Blashki

Computer Science and Information Systems Series Editors:
Piet Kommers and Pedro Isaías

Associate Editor: Luís Rodrigues

ISBN: 978-972-8939-75-5

SECTION I

IADIS INTERNATIONAL CONFERENCE

**INTERFACES AND HUMAN
COMPUTER INTERACTION 2012**

part of the

**IADIS MULTI CONFERENCE ON COMPUTER SCIENCE AND
INFORMATION SYSTEMS 2012**

ADEQUATION OF A PROTOTYPING TOOL FOR THE INTERACTIVE DIGITAL TV PLATAFORM: A CASE OF STUDY FOR EDUCATIONAL APPLICATIONS

Antonio F. L. Jacob Jr.¹, Edvar da L. Oliveira¹, Natália M. Lopes¹, Á. L. Santana¹,
C. R. L. Francês¹, João C. W. A. Costa¹ and Celso M. Hirata²

¹Laboratory of High Performance Networks Planning - LPRAD, Federal University of Pará – UFPA
Augusto Corrêa St., 01, 66075-110, Belém, PA, Brazil

²Aeronautical Institute of Technology - ITA
Praça Marechal Eduardo Gomes, 50, 12228-900, São José dos Campos, SP, Brazil

ABSTRACT

The applications of interactive Digital TV (iDTV) appear as a new tool with the ability to improve different sectors. For example, the development of interactive applications can provide an important complement in the educational area. Allied to new possibilities, new concerns also arise regarding the best use of resources provided by iDTV. In this context, this paper proposes the creation and use of prototyping techniques as a mechanism for developing iDTV solutions. We present a focused case of study on the creation of an educational application to digital TV for children.

KEYWORDS

Digital TV, Prototypes, GINGA, t-learning.

1. INTRODUCTION

Television (TV) is one of the greatest sources of information and education in the world; its reach outdoes even computers with internet in households. In this scenario, the interactive Digital TV (iDTV) provides a wide range of possibilities that go far beyond the mere improvement in image quality. It provides a strong impact on the way that people watch television. With interactive applications, the user becomes more active, being able to browse the schedule, send and receive information, among other possibilities (Cesar, 2008).

The use of TV for education (t-learning) arises with a new problem, especially for children, since the TV is used predominantly for entertainment. In this case, educational applications for this environment must focus on functions that do not disperse the children's attention. Besides this, there are some errors inherent to applications, caused by traditional software design process (Preece, Rogers and Sharp, 2005).

Trying to solve these problems, this paper proposes the use of a prototyping tool for DTV applications for educational purposes, in order to enable the user to contact with the features of a future application. This propose allows to identify difficulties in the development process, gaps in requirements, and answer questions for both developers and stakeholders, among others.

2. T-LEARNING

E-learning is a formal way of promoting education using the internet. In the last few years, this technology has contributed to improve the learning environment, making it more dynamic and interactive, as it provides tools that enable both teachers and students to explore the web and share knowledge (Santos et al., 2006).

Educational television, named as *t-learning*, has the same objectives of e-learning with some differences. Among the differences, there is the concept of edutainment (“education and entertainment”), which adopts a position that directs applications to prioritize a less formal learning process (Buckingham, 2002).

From this concept, Pazos-Arias et al. (2006) conducted an analysis of TV programs and e-learning to demonstrate the scope of t-learning. This study shows that the concept goes beyond a mere translation of e-learning services that already exist. T-learning emphasizes a less-formal learning process that allows the user learning with fun.

3. ADEQUATION OF A PROTOTYPING TOOL FOR THE INTERACTIVE DIGITAL TV PLATFORM

The value of prototyping is widely recognized in many aspects, since it allows an early demonstration of interface behavior in development and test designs with real users (Rettig, 1994). In the context of iDTV, no examples of prototyping tools were found in literature for this purpose.

In this case, we adapted the Pencil Project¹, an open source tool that enables the construction of prototype applications and allows the creation of custom components for platforms not supported, e.g. iDTV.

The demand for the construction of a custom component was required after the creation of the first prototype (Figure 1). In this creation, we identified some deficiencies, especially regarding issues in the intuitive environmental of digital TV, such as the background color of the prototype must be adapted to the dark background of the TV screen; adaptation of the colors of action buttons for the colors used on the remote control; replacement of form elements (such as combobox, checkbox, etc..) by colored buttons, change the used characters (guardians).



Figure 1. First Prototype Created on Pencil Project®.

These observations led the definition of necessary elements for build prototypes to iDTV:

- Association of the buttons to the colors on the remote control: green, yellow, blue, red;
- One or more characters to help children throughout the application.

With the definition of these elements, a generic library for prototypes was implemented to interactive digital TV applications, such as menu options, remote control, Digital TV, and others (Figure 2).

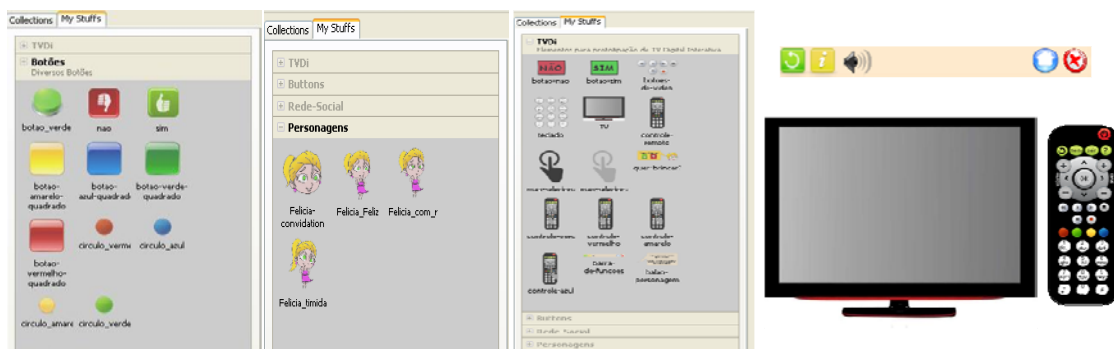


Figure 2. Generic library with elements of iDTV to the Pencil Project®.

¹ <http://pencil.evolus.vn>

With the collection created, it was possible to build some prototypes of educational applications for iDTV. One of which is shown next.

4. CASE OF STUDY - PROTOTYPE "GEOMETRIC CONSTRUCTOR"

The prototype created aims to teach geometric shapes and assist the child in the construction of several drawing composite of geometric shapes such as square, rectangle, triangle, circle, among other (Figure 3).



Figure 3. The Initial Screen (Left) and the Screen to Creation of the Rocket From the Geometric Shapes (Right).

For the construction of this prototype, usability techniques were applied according to the guidelines outlined by Cesar (2008), such as: the default screen of 720 x 576; font type Tiresias font size 18px minimum, the pattern of the information available in the "L" form, and reduce on-screen the programming.

To aid learning, the metaphor of a tutor, called "Felicia", is used. The character invites the child to participate of a game, while the TV programming continues as defined by Cesar (2008).

5. CONCLUSIONS

This work highlighted the need for the use of prototypes in order to improve the quality of applications. From this need and in the context of interactive digital TV, we performed an adaptation of a prototyping tool, since no tools were found in the literature for this specific purpose.

This adaptation occurred with the creation of a generic library for the tool Pencil Project® and it was tested with the construction of a prototype called "Geometric Constructor".

REFERENCES

Book

Buckingham, D. and Scanlon, M., 2002. *Education, entertainment and learning in the home*. Open University Press, Maidenhead, UK.

Preece, J., Rogers, Y. and Sharp, H., 2005. *Interaction design: beyond human-computer interaction*. Bookman, Porto Alegre, Brazil.

Journal

Pazos-Arias, J. J. et. al., 2006. ATLAS: a framework to provide multiuser and distributed t-learning services over MHP. *Software: Practice & Experience*, v. 36, i. 8, pp. 845-869.

Rettig, M, 1994. Prototyping for tiny fingers. *Communications of the ACM*, v. 37, i. 4, pp. 21-27.

Conference paper or contributed volume

Cesar, P. et al., 2008, Social Interactivity and User Participation in the Television Lifecycle: creating, sharing, and controlling content. *Proceedings of International Conference on Designing Interactive User Experiences for TV And Video*, California, USA, pp. 125-128.

Santos, D. T. et al., 2006. Digital TV and distance learning: potentials and limitations. *Proceedings of ASEE/IEEE Frontiers in Education Conference*. San Diego, USA.