

Guidelines for the content production of t-learning

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ABSTRACT

The iDTV technology is becoming a frequent topic in discussions within the scientific community due to the fact that it can provide differentiated resources in terms of technology and interactivity to its users. Its use in the distance education field shows its great potential towards the teaching/learning process, given the experience that the user has regarding the use of television. Thus, setting the guidelines for the content production of t-learning is essential for the development of content designed for iDTV.

Keywords

iDTV, t-learning, Guidelines, Production Process.

1. INTRODUCTION

With the development of Information and Communication Technology (ICT), Distance Education (DE) seeks to rely - in an increasing manner - on technologies that are emerging as a means of facilitating the access of students and especially their acceptance [1].

For [2], distance education is 'planned learning that normally occurs in a place other than the learning/teaching venue, requiring special techniques for creating the course and its instructions, communication through various technologies and special organizational and administrative arrangements'.

In this sense e-learning is defined by [3] as 'the use of new multimedia technologies and the Internet to improve the quality of learning by facilitating access to resources and services, as well as exchanges and collaboration through distance'.

On the other hand, t-learning is a subset of e-learning, as shown in Figure 1. According to [5], t-learning has been adopted as a way to identify the Interactive Digital Television (iDTV) based learning experience, by accessing valuable educational materials in video, through an easy-to-use device, which resembles more a TV rather than a computer.

The importance of this discussion for the scientific community is justified by the scarcity of studies regarding the use of iDTV as an assistive device for the DE experience, especially with regard to the guidelines for the content production of t-learning.

A guideline is referred as a "sketch, in outlines, of a general plan, project etc.; policy" [6]. On the other hand, the process of content production for the iDTV is understood by [7] as the activity of creation or conduction of contents, and is based on three phases: preproduction, production and postproduction, as stated by [8].

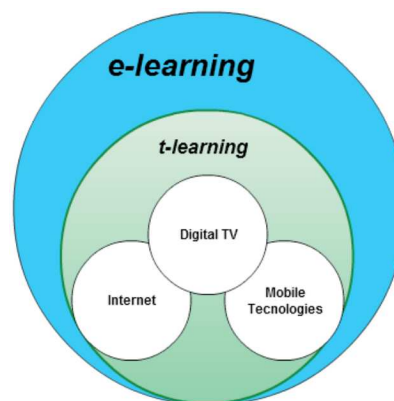


Figure 1. Convergence of technologies [4].

In the following sections the guidelines related to each phase are discussed. Further details of this study can be obtained in [4].

2. GUIDELINES FOR PREPRODUCTION PHASE

The preproduction phase corresponds to the stage of planning the necessary requirements for a course to be available on the iDTV platform. To this end, the challenges are adapting the content with less text than a webpage and motivating different audiences who watch television for entertainment purposes to also realize its potential for educational purposes. Three requirements are addressed in this phase: personal, technical and pedagogical.

2.1. Personal Requirements

The personal requirements relate to aspects regarding accessibility, motivation and expectations of the audience. As guidelines, we have:

1) Check students' accessibility to the t-learning course: it is necessary to determine the availability of iDTV services within the region in which students are immersed in the *geographic accessibility*. Regarding *human accessibility* is important to check students' ability to adapt (physical, motor, or sensorial) and study on their own. Finally, the *technical accessibility* refers to students' access to iDTV technology such as set-top boxes, television sets, among others, and also the ability to use these technologies.

2) Arouse motivation and expectations regarding t-learning use: This guideline is needed due to the fact that users are accustomed to using television as an entertainment device only. This way, it is necessary to extend the use of television for educational purposes, motivating students through applications that are attractive and easy to understand.

3) Identify and offer actions for the disabled, elderly and children: this guideline points to a reality in which people with special needs, elderly and children spend most of their time watching television. It is therefore important to identify and offer content ensuring that all users are able to use the interactivity resources autonomously. For that, it is important to assess conditions such as lack of dexterity of the elderly, sight and hearing conditions and color blindness, as well as children's age when planning t-learning courses.

2.2. Technical Requirements

Technical requirements are the elements required for the technological infrastructure in order to allow the creation, development and enjoyment of the content for iDTV. As guidelines, we have:

1) Have a transmission channel: the existence of a transmission channel is essential for iDTV as it is considered the leading technology in t-learning courses. The Internet can be used as a secondary resource, promoting accessibility.

2) Disclose the basic technology for the realization of t-learning courses to students: the user needs to have its own equipment and it should be compatible with the Digital TV standard adopted. In addition to digital signal - TV and antenna – the user will also need: a) for the case of set-top box, a middleware to run applications and, if possible, capable of recording (time shifting) content. The return channel, in case the user does not have one and the course requires it, can be hired through a telephone operator, b) for the case of mobile phones and other mobile devices, it is also necessary that these devices be enabled through middleware to run applications. Regarding the return channel for cell phones, the users' own telephone line could be used.

3) Design courses for multi-technology: In order to meet the needs of students, particularly in relation to mobility, the use of multiple technologies is recommended, thus allowing users to choose between fixed and mobile devices and the Internet the technology that best meets their needs.

4) Plan the learning environment: the learning environment for t-learning is what will support the interactions: a) student and teaching material, b) among the students, c) student and teacher / tutor and d) students and the learning environment. To this end, it should be safe in order to allow, when necessary, integrity, authentication and data privacy, as well as being reliable, fast processing, providing quick learning by the user and being self-explanatory. The learning environment should be able to support images, videos, texts, and animations, among others. It should allow the execution of activities by students as well as the provision of feedback to successful trials and errors when necessary.

5) Investigate tools for content production: this means the access to specific tools for iDTV content production - focused on education, and also laymen; tools such as audio, video, text, and image editors. There is also the need to investigate specific programming tools for developing systems considering the adopted middleware.

6) Allow availability and reliability of applications and data: television has been recognized for the reliability of services offered, which means that the programming is hardly interrupted by technical problems. This guideline indicates that the t-learning courses require high availability, that is, servers / ISPs used for storage and data access should be available without interruption or connection failures.

7) Plan applications that take full advantage of the capabilities of remote control and mobile devices: the remote control is a simple and limited device. For this reason, applications should be designed in such a way to fully exploit the features it offers. Due to the difficulty of entering text in fields where this might be a requirement, the use of the virtual keyboard is needed, which favors usability. On the other hand, for users who have cell phone technology suitable for iDTV, the challenge is to plan applications within the optic of multiple devices, facilitating individual interaction in environments where the use of television is collective.

8) Measure usability into t-learning courses: usability is directly linked to the dialogue between the user and the software, which should provide the meeting of interaction goals. Thus, this guideline points to usability in the following cases: when the TV is for collective use; when cooperation among students in the use of certain pedagogical materials is required; when users are away from the television screen. In these cases, it is important to use mechanisms that catch the attention of the user.

9) Assess the audience needs regarding technological issues: assessing the needs based on age and those with special needs, as indicated previously. Provide captions for the hearing impaired and audio description for the visually impaired. The basic and technical knowledge, previous experience and comfort of the target audience regarding the use of television as a medium for t-learning should also be considered.

Pedagogical Requirements

Pedagogical requirements relate to the content development for t-learning which hold, among other factors, educational objectives, methodology and pedagogical strategies. As guidelines, the following topics are presented:

1) Define the purpose of the course: this refers to the way the t-learning course will be structured and offered to students in order to achieve the proposed objectives: aiming towards formal, non-formal or informal education. In formal and non-formal education, there is greater control of content distribution and students' monitoring. Adversely, when it comes to informal education there are no requirements or monitoring and learning occurs on its own.

2) Know the audience in order to develop the pedagogical content: knowing what are the needs, motivations, attitudes or socio cognitive characteristics, social, financial, educational and cultural contexts regarding the target audience will assist content production in what comes to the definition of language, teaching/learning strategy and the technology used to mediate.

3) Set the course objectives: it means being aware of what will be taught during the course. Goals should be linked to the needs, interests, expectations and characteristics of the target audience. In order to do so, they should be clearly defined, aiming at identifying the skills, cognitive competencies and attitudes that are to be assessed throughout the course.

4) Select the course content: the goal is to deliver knowledge to a previously defined group of people, according to their needs. For that, based on the objectives listed, the teacher makes the content selection, whenever possible, addressing topics according to the course requirements and the target

audience interests. The composition of the course should include the study guide, pedagogical content and tasks.

5) Plan the study guide: the study guide planning brings the organization and structure of the course and also provides guidance for students. The study guide is traditionally distributed on printed version; but it can also be available online. It may contain information such as course objectives, schedule and planning, course structure, guidelines about the use of the tool, browsing the content, getting help and recommended reading.

6) Define the structure and accessibility of content: it means knowing what the student's level of knowledge - cognitive is and also regarding the capacity of using iDTV resources. According to these characteristics, the course may contain two structures: the first, a linear one in which the teacher defines the form and order of content presentation; and the second one, nonlinear, in which the student chooses how to browse the contents. It is up to the teacher to select which way will most effectively facilitate the student's understanding.

7) Determine the type of t-learning support for the courses: this means defining how the t-learning course should be designed and distributed to students. In this case, support can be provided in three ways: a) Supplementary: using the t-learning as a "plus" in a traditional education setting, b) Partial: as a support in classroom education, especially in activities and self-assessments, and c) Substitute or entirely at distance: classroom education is replaced by t-learning.

8) Provide actions aimed at interaction: understanding the nature of the interaction and how to make it easier through the use of technology favor the assimilation of knowledge by the student. These interactions occur between: a) student and pedagogical content, b) student and teacher/tutor, c) among students and d) student and learning environment.

9) Provide pedagogical mediation to assist the educational process: because the students do their studies on their own, they should often be motivated and encouraged throughout the educational process. This guideline highlights the need for the teacher/tutor to guide, mentor and support students through constant feedback, monitoring students to ensure that they follow the pedagogical content appropriately.

10) Analyze student performance: the assessment of the knowledge assimilated by students as one of the ways of guiding the learning process. This can be an in-person analysis or one that makes use of the learning environment itself with self-assessment, peer evaluation or summative evaluation.

11) Identify solutions that support the learning process: in order for learning to take place, first the willingness of the student to learn becomes necessary and second, the content should be potentially significant. The pedagogical content, tasks, tutoring, study guide, messaging, creation and sharing of knowledge and motivation to learn are fundamental to the process of knowledge acquisition.

12) Offer ways to customize the course content: The course distributed via iDTV may encounter situations in which the student does not have a return channel installed on set-top box. In this case, the content customization happens through the

construction of the t-learning course considering different ways of learning, adaptation of content to the student's needs and abilities and the creation of specific content to a particular region.

13) Associate the content of t-learning to a TV show: as iDTV is considered the main technology for the t-learning, content may be linked to a specific TV show or become available through an interactive service portal, which would allow users' access at any time as well as enable the uploading of updates by the broadcasting channel.

3. GUIDELINES FOR THE PRODUCTION PHASE

In the production phase, the various modules of the learning environment are built, along with pedagogical content developed through the planning done at the preproduction phase. Regarding this phase, the guidelines are the following:

1) Adapt the content to be displayed in a iDTV: the content should be built in a compact and meaningful way, tailored to the specifications of iDTV. The small size of the screen and memory to store content, mainly in mobile phones, are critical issues that must be considered during the content preparation.

2) Build the modules for the learning environment: The learning environment will enable geographically dispersed students to have the opportunity to interact within a variety of time and places. For this reason, the learning environments, through its tools and along with students, interact, thereby building knowledge.

3) Hire and train an interdisciplinary team to develop the content: due to the specificities that constitute the production of t-learning courses, training professionals who will work in the construction of the content is of fundamental importance. Engineers are needed to develop specific applications to middleware, and teachers/tutors to provide students' monitoring. In addition, speakers, actors, teachers, and others - who will directly work in the content development, are necessary. Thus, the team can perform the duties with greater efficiency, effectiveness and quality of services.

4) Use the interactive buttons on the remote control to content navigation: the colored buttons on the remote control have been developed specifically for iDTV interaction through a fixed device. The red button is used to promote the link to any content on the screen. The green button enables personalized access to communication tools. The yellow one can be flexible and used to replace controls that may be difficult to access. The blue button was designed to promote access to text information on-screen or the selection of some service. The navigation buttons on the remote control relate to quick access to applications. Also, buttons such as the up and down arrows, volume control and the right and left such as the channel switching buttons in iDTV applications should function as navigation options [9].

5) Provide course validation: this relates to conducting pilot tests with a controlled number of participants. The goal is to identify technical problems, motivation, usability and satisfaction, before it is distributed to a broader number of people. Besides that, problems related to technology may endanger the whole process of learning along with its acceptance.

4. GUIDELINES FOR POSTPRODUCTION PHASE

This is the phase when the packaging and distribution of the course to students occurs, as well as the monitoring - in case this is a course, requirement by teachers and tutors. The guidelines regarding this phase involve:

1) Promote the packaging and distribution of the course: this topic points out to the need of joining the materials used in the course such as video, audio, animations, text files and programming language files, in order to enable the distribution through the broadcasting channel.

2) Promote students' monitoring: if the course requires, the teacher/tutor should provide feedback and monitoring, encouraging and guiding students during the course.

3) Promoting the learning process verification: system errors, along with flaws in the design of a t-learning course affect the learning process. In this sense, constant monitoring and evaluation of the student, technology and pedagogical content become necessary for ongoing upgrades and improvements.

5. FINAL CONSIDERATIONS

Television is the electronic equipment of greatest penetration in homes. Thus, iDTV is essentially a tool for digital inclusion, which may lead to social inclusion.

The survey of guidelines for the content production of t-learning seeks to assist future production of courses for iDTV.

It should be noted that the human and technological requirements can be used for any application domain, be it t-commerce, t-government, t-health. However, the pedagogical requirements are specific for t-learning.

Regarding this domain, the design of any courses must take into account the target audience involved, taking particularly into account their motivations and interests along with the availability of access to technology.

Future studies are heading towards this direction, since different application domains can be considered regarding the specification of guidelines for content design.

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