



ELU – Enhanced Learning Unlimited

IST-4-027866

Deliverable D2.3 State of the Art - Learning using iDTV

Authors:	ORT FRANCE	
Version:	V0.1 - Draft	
Date:	8.06.2006	
Classification:	Restricted	
Contract Start Date:	01.01.2006	Duration: 30 months
Project Co-ordinator:	ORT France	
File Name:	ELU_D2.3_ State of the Art - Learning using iDTV	



Project funded by the European Community
under the "Information Society Technology"
Programme

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Document History

Version	Issue Date	By	Content and changes
V0.1	15/5/2006	ORT	Changes following partners contribution
V0.9	30/5/2006	ORT	Final version for internal evaluation
V1.0	8/6/2006	ORT	Changes following internal evaluation

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List of abbreviations

ADC	Application Development Completion
ADC	Accelerated Delivery Centre
ADL	<i>Advanced Distributed Learning ()</i>
ADP	Application Design and Prototyping
ADSL	Asymmetric Digital Subscriber Line
API	Application Programming Interface
ASE	Accelerated Solution Environment
ASP	Application Service Provider
BSD	Business System Design
CMS	Content Management System
COP	Communities of Practice
CPS	Content Packaging and Structuring
CS	Content Structuring
CSCL	Computer Supported Collaborative Learning
CSP	Content Service Provider
DASE	Digital Applications Software Environment
DC-Ed	Dublin Core Metadata Initiative Education Working Group
DP	Didactic and Pedagogical
DRI	Digital Repository Interoperability
DSL	Digital subscriber Line
DTV	Digital Television
DVB	Digital Video Broadcasting
ELU	Enhanced Learning Unlimited
EML	Educational Modelling Language
EPG	Electronic Program Guide
GUI	Graphical User Interfaces
HCI	Human-Computer Interaction
ICD	Iterative Custom Development
ICT	Information and Communication Technologies
iDTV	Interactive Digital TeleVision. Equivalent to iTV: interactive TeleVision
IPR	Intellectual Property Rights
ISP	Internet Service Provider
IT	Information Technologies
K12	Kindergarten through 12th Grade
KOD	Knowledge on Demand
KR	Knowledge Representation

LKR	Learner Knowledge Representation
LLL	Life Long Learning
LCMS	Learning and Contents Management System
LMS	Learning Management System
LO	Learning Object
LOD	Learning On Demand
LOM	Learning Object Metadata
LRM	Learning Resource Metadata
LSP	Learning Service Provider
LS	Learning Style
MHP	Multimedia Home Platform
MoE	Ministry of Education
MPEG	Moving Picture Experts Group
OWL	Online Web-based Learning
PDC	Package Development Completion
PDP	Package Design and Prototype
PDZ	Proximal development zone
PSD	Package System Design
PVR	Personal Video Recorder
RSW	Rapid Solutions Workshops
SCORM	Sharable Content Object Reference Mode
SDK	Software Development Kit
SKR	System Knowledge Representation
SME	Small and Medium Enterprise
SOA	Service Oriented Architecture
SOA	State Of the Art
SOC	System and Operations Concept
STB	Set Top Box
RC	Remote Control, for iTV end-users to interact with programs and applications
RLOs	re-usable learning objects

Executive Summary

The Interactive Digital Television (iDTV) has a potential to become an important tool of edutainment (i.e. integration of education into the entertainment environment of television), because of the familiarity of TV, its easy utilization using the remote control and especially because of the power of upcoming interactive technologies. To be able to reuse this potential, it is necessary to develop new formats, applications and methodologies for delivery of educational content to target users.

The Enhanced Learning Unlimited (ELU) project intends to develop and validate the use of Interactive Digital TV (iDTV) system for E-learning as one of the key application areas for the societal and economical development of the enlarged Europe. It may be argued that iDTV will emerge as the preferred platform for e-learning in all parts of Europe. The t-learning system will use an open platform, such as the Multimedia Home Platform (MHP). The project will research, develop and implement pedagogical scenarios for the use of iDTV at home, universities and schools. In order to verify its technology, the ELU project will develop the required tools to simulate iDTV for areas in which real deployment is not feasible at this stage.

ELU objectives are:

- Study the Pedagogical and Technological aspects of using iDTV as the medium for t-learning
- Develop new tools for creating content for t-learning to be used on iDTV.
- Develop enhancements to MHP to meet the t-learning needs.
- Share the knowledge in iDTV and t-learning with new member states

The main objective of this deliverable is to provide a detailed overview of the state of the art in the technologies of iDTV (interactive Digital Television) and methodologies for using iDTV for educational applications.

This state of the art analysis is necessary to understand the current technological and methodological landscape in order to apply the relevant one and to develop new technologies and theories that are the most efficient approaches for iDTV applications and solutions. This state of the arts aims at understanding the global vision in order to face the different themes and approaches that have to be considered in the project in order to have the best cross for obtaining the solutions.

The deliverable involves 4 major chapters that we list below:

IDTV STATE OF THE ART: this chapter analyses and discusses the state of the art of the technological platforms, tools and applications relevant for the design, development and test of an iDTV system. This part aims at catching-up the partner in order to understand which the starting point is and which the solutions are until now in the European context. In particular, it considers hardware and software systems and tools in the three main environments: broadcaster's side, user side (home), and production side (contents and applications). IDTV applications both from a commercial and research point of view, considering well established services and new paradigms for the future.

E-LEARNING TOWARD T-LEARNING: TECHNOLOGICAL FRAMEWORK: In this paragraphs the state of the art on learning content management systems and, more generally, on e-learning issues and available tools will be outlined. This will be helpful both for better understanding which is the starting point for the design and development activities in ELU and for highlighting the main differences between e-learning systems and t-learning systems. A brief but comprehensive overview of existing commercial products for content authoring is provided as well.

E-LEARNING TOWARD T-LEARNING: PEDAGOGICAL FRAMEWORK: This chapter aims at analysing the pedagogical theoretical framework underpinning T-learning. We identify Constructivism, as the privileged theoretical approach to design learning activities for interactive television. In order to design for iDTV we need to define the typical features that transform television in iDTV and study the context where learning can take place in a T-learning environment. Nevertheless, interactive television is the convergence between television and internet, we cannot think to just apply learning strategies already used through these two media. The results of this contribution would help to develop new strategies for

designing learning through iDTV and overcome the attempt to adapt the classical learning and teaching strategies to new technologies.

GAME-BASED LEARNING: Games are rapidly being adopted in a wide range of institutions, from educational environments to the military to the business world, as effective tools for learning and training. While the general belief is that games are an effective medium for learning, research into their effectiveness has been met with mixed reviews. It is widely accepted by researchers that games, or any media for that matter, do not teach. It is the instructional methods embedded within the media that teach. Therefore, if games are to become the new medium for learning, designers of game-based learning environments must become well-versed in the concepts and applications of instructional design and instructional methodologies. This section will give an overview on current solutions and models normally applied in the gaming industry, including some examples of existing games that can be accessed through a TV platform (both traditional and iDTV). Moreover, a preliminary outline on issues related to the actual pedagogical value of interactive games on a digital TV platform will be offered. More detailed, in-depth, analysis of both the technological and pedagogical aspects related to the use of gaming metaphors for supporting innovative learning processes on iDTV will be provided in other, more specific, deliverables to be prepared by the project.

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