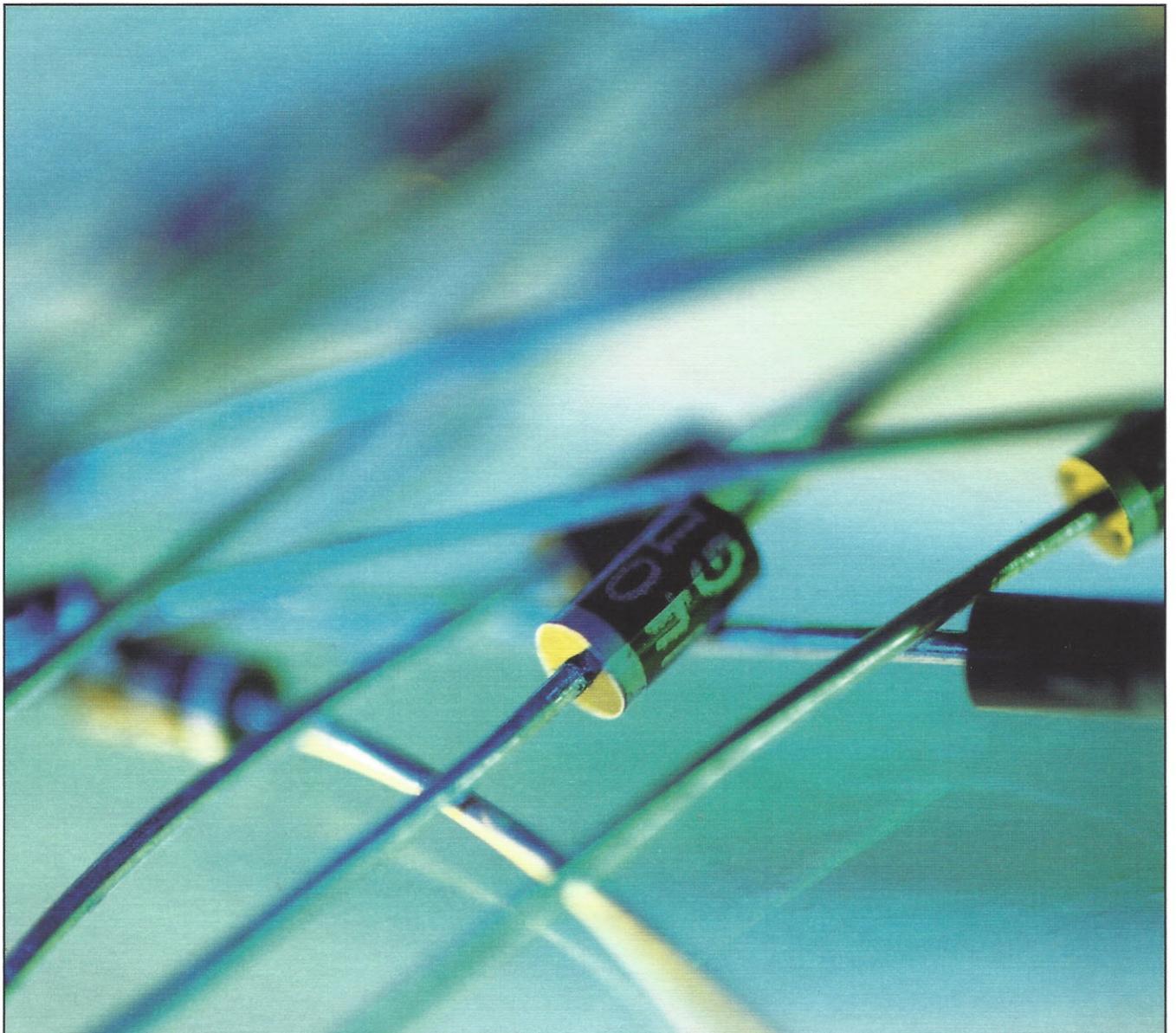


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Volume I

From E-Learning to T-Learning

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INTRODUCTION

The introduction of interactive television offers new potentialities to the television medium with the possibility of including e-commerce, programs on demand, games, and, last but not least, educational programs. Digital television will allow forms of lifelong learning to disadvantaged sectors of the population, namely those potential learners that have no possibility to improve their own knowledge caused by problems such as lack of free time due to working hours, family care, and so forth. Much of the interactive potentiality of this new medium will depend on the possibility of having a back-channel, connecting television to the Internet. A back-channel would allow the user to store choices, preferences, progress in learning units, and so forth, in the memory. In other words, there is the possibility of customizing the programs offered and the interface according to user preferences. The potentialities of this new medium are numerous, and it is necessary to explore, experiment with, and facilitate the new methods of available interaction. Every great technological change has also meant a change in perspective and mindset. What generally happens in the early stages of the utilization of new technological solutions is that the new tools available continue to be used while adopting an outdated mentality. It is necessary to propose a pedagogical model for the learning programs offered by new technology.

BACKGROUND

Learning Online

The Internet is shattering traditional teaching and learning styles. Most education today is information transfer from the teacher's mind to those of learners. This traditional delivery system is only one way to learn. What the Internet is doing is splitting the traditional teaching method into two parts: cognitive learning, which can be accomplished with online learning, and

affective learning, which can be carried out in a small-group discussion setting (Draves, 2000). E-learning has evolved from the first static Web sites to systems where the focus is now on content personalization. Researchers attempt to adapt didactic material to students' unique learning styles, trying to meet individual student needs. E-learning can be considered more a social than a technological phenomenon, since the main issue in e-learning is learning, and not the technological media employed (Santos, Vale, & Meloni, 2006).

There are several aspects that can make online learning better than classroom learning:

- A learner can learn during his optimal learning time during the day
- A learner can learn at his own speed
- A learner can focus on specific content areas
- A learner can test himself daily
- A learner can interact more with the teacher.
- Online learning is less expensive and thus more accessible
- One can learn from the foremost authorities and experts

Interaction between the participants and teacher, as well as interaction among the participants themselves, is at the heart of online learning.

NEW MEDIUM, NEW LEARNING

A few public service educational broadcasters and commercial broadcasters have started or are about to offer learning programs due to the increased capacity made available by digital TV. In some instances, it may not be appropriate for educational providers to offer interactive services via TV at this stage, as interactivity will best be achieved via the Internet. For example, a university-level course may involve broadcasting a TV program, but as most people taking a university course will have a computer for writing assignments, it is probably easier to offer interactivity via the Internet



(PJB Associates, 2004). However, where there is need to target people who would not normally participate in further education, interactivity becomes very important in transforming them from passive viewers to active participants. A new medium will require a new way of learning, as the learning setting, users, time, and goals will be vastly different from those of e-learning.

Interactive Television

Television is a medium central to people's everyday lives. It has developed its own grammar and structure, and the audience has established specific, well-defined interaction patterns unique to this medium. However, a literature review has revealed that the approach followed by most scientific publications is principally PC-centric and usually implicitly focused on the work environment (Chorianopoulos, 2003). New interactive television makes two cultures converge, two cultures that have thus far traveled on separate tracks: television and the Internet. On the one hand, we have television, with its entertainment characteristics, its ability to tell stories, to offer richly visual programs; on the other hand, we have the Internet with its democratic culture allowing diffuse participation by community members with the important role accorded the individual in choosing what to access.

Some learning forms of ICT (information communication technology), in particular those relative to edutainment, will greatly influence the programs

that will be produced for interactive television. And if forms of e-learning are planned for the new medium, they should be redesigned for the new technology. A new technological medium requires new visions and utilizations, new ways of learning. The interface used by television is very different from that used by the Internet. Table 1 highlights some major differences.

Due to these differences, it is not desirable to transfer the same formats offered in e-learning to digital television. In general, however, the attitude towards interactive television as demonstrated in the USA are only moderately encouraging for educators, as it seems those exclusively using television do not necessarily find many services (other than games) attractive. Those who find the other services attractive are computer users, and it would then beg the question of why we should invest in another technology (for work or training) when users probably already have access to the Internet (Berry, Kelso, & Lamshed, 2000).

At the start, there was some skepticism about interactive educational television. There was a feeling that work completed to date had consisted of reusing old computer-based learning techniques unimaginatively in a new interactive medium (Luckin, Coultas, Underwood, du Boulay, Mateer, Mudge, et al., 2003). So far, different methods of program enhancement through interactive television have been experimented. Program enhancement can take a number of forms: picture only, picture with prompts for additional information, picture with overlaid information, information with inserted picture, and information only (Berry et al., 2000).

Table 1.

<i>Features</i>	<i>T-Learning</i>	<i>E-Learning</i>
<i>Data processing ability</i>	Lower data processing capability	Huge data processing and storage capability
<i>Screen resolution</i>	Lower resolution of presentation devices	High resolution of presentation devices
<i>Interactivity</i>	Reduced interaction opportunities, due to the sole use of a remote for interaction	Great interaction opportunities, using keyboard, mouse, and other devices
<i>Distance from the screen</i>	Elements displayed on the screen must be readable from a distance	The display is generally viewed at a short distance, allowing the use of even very small fonts and visual elements
<i>Utilization</i>	Traditional passive utilization of equipment	Traditional active utilization of equipment

- a. **Video with prompts for additional information:** A "button" is provided on the screen that when selected by remote control will link to further program information. This additional material is broadcast simultaneously in real time with the video. The additional information may be text, images, or even another video.
This information is not retrievable when the broadcast is over.
- b. **Video with overlaid information:** In this case, additional information is screened at the same time as the video broadcast and laid over the picture. However, the text needs to be fairly large, colorful, and limited in quantity because the screen is viewed at a distance of 2 meters or more. Consequently, concise information is effective. This function may be useful when a specific point or issue needs to be highlighted at the same time as the video transmission.
- c. **Information with inserted video:** In this case, text needs to be sufficiently large for clear reading at a distance of 2-3 meters. This function is effective when there is a large amount of content to be presented.
- d. **Information only:** This function is currently broadcast as teletext on analog television.

Among the programs that have established a standard as far as interactive television is concerned are two natural science BBC productions: "Walking with Beasts" and "Blue Planet." Users can choose whether to watch the additional text or extra video documents, and they can also choose among commentaries focusing on various scientific aspects. The additional material is made available for a span of time longer than that of the broadcast itself. Another historical program by the BBC was "Pyramids." For every episode, online quizzes and competitions based on solving mysteries were proposed. For younger audiences, the BBC has produced elementary interactive games, like those associated with the programs "Bob the Builder" and "Teletubbies." None of these programs was planned as a deliberate form of learning, but rather as a reaction to the broadcast program (*reactive learning*).

One of the television networks with a consolidated tradition in digital programs is Chaos Media Networks (<http://www.chaosmedianetworks.com/>), which offers daily a series of interactive programs according to the preferences of different target users. The programs of-

ferred Chaos Media Networks are examples of different forms that digital television might take, namely:

- Linear broadcasts, from those scheduled daily to programs on demand.
- During each program, users can ask questions using the remote and receive answers in the form of 30-90 second video clips providing a quick presentation of the topic on which the questions were based.
- Nonlinear interactivity, by means of a menu. The menu offers different segments of programs according to user or target audience interests. For example, in the case of a language program, only the in-depth parts at the user's level will be shown on the screen.
- Episodic programs, mini-series tailored to spectator interests.
- In interrupted modality, programs that offer the spectator, with no previous notice, a long or short program (for example a quiz).
- Collaborative programs, which may have different spectators participating at the same time (e.g., a debate on local problems).

MAIN FOCUS OF THE ARTICLE

TV has perhaps most often been seen as an entertainment medium with a complex identity. Its use moves along an axis ranging from passivity to escape and entertainment, and finally, in the best of cases, to a type of engagement (Ling & Thrane, 2002). Possible forms of learning fall into two main areas:

- Formal learning
- Informal learning

The main difference between the two is that informal learning typically lacks the administrative attributes of formal learning, such as external evaluation, the awarding of credits, a prescribed learning framework, and so on (Smith, 1999).

According to Masthoff and Pemberton (2003), the potential of T-Learning may best be realized by concentrating on informal rather than formal provisions. Eraut (2000) also suggests that we need to explore the full range of learning processes or modes falling within the domain of "nonformal learning." Eraut creates a

continuum with, at one end, *implicit learning*—“the acquisition of knowledge independently of conscious attempts to learn and the absence of explicit knowledge about what was learned.” At the other end is *deliberative learning*, where time is specifically set aside for learning. Between the two lies *reactive learning*, when learning is explicit but takes place nearly spontaneously and in response to recent, current, or imminent situations but without any time being set aside for it.

In the case of t-learning, we can think of forms of reactive learning connected with the viewing of normal television programs. Before, during, and after the program, through the apparition of in-depth icons, users are allowed to move to short learning paths that are absorbing and exciting. Because they are chosen on the spot, these programs must necessarily be complete in themselves, condensed, and modular at varying levels. The user must always have the possibility of choosing, according to her momentary needs, the level and in-depth section and whether or not to utilize them, along with the modality of choice.

In designing t-learning programs, particular attention should be paid to the TV audience. A definition of the interactive television audience is a rather complex problem. Educational programs on digital television need to adapt to viewer interests and viewing habits. The difficulty in defining viewer learning conditions is due to the fact that watching TV is basically a social phenomenon involving groups of viewers at the same time. More formal ways of learning do not fall naturally into how we normally use television, like watching TV while we are engaged in other activities, zapping from one channel to another or watching TV with other people. After all, television is considered a medium oriented towards entertainment rather than one promoting activities.

From all this, it follows that the aim of t-learning should be above all to offer informal learning programs rather than formal ones. More formalized learning programs will be offered to users that are more motivated and more used to e-learning interaction, targeted users within institutions such as schools or universities. However, the majority of learning programs should be based on so-called “lazy interactivity.” Viewers will be asked to cast their vote on a current topic, to take part in a survey, a quiz, on their own or together with other viewers. The habit of watching quiz shows could be the starting point for promoting other forms

of learning. The back-channel will allow users to have immediate feedback to their answers.

In informal learning, learning objectives are defined by the user: it is the user who decides what to watch, for how long, and up to what point. It is accordingly necessary for t-learning educational programs aimed at informal learning to help users in their choices, first presenting all the objectives that users might expect to achieve with the content offered, along with their forms of presentation. It has already been stated that traditional forms of assessment, present in more formal formats where it is required to certify the level of knowledge and ability achieved, cannot be proposed in informal learning. This is due to the fact that the user is free to skip around and watch the parts that momentarily interest him the most. Nonetheless, quick forms of assessment of the competencies acquired might be conceived to be administered after short learning sequences, as well as evaluation methods regarding progress satisfaction levels, either through the number of users or user satisfaction levels, to be determined by means of short questionnaires.

One of the most meaningful limits of informal learning is the short attention span. This is due to the fact that although there might be the desire to achieve the objectives established, at the same time program viewing is bound to be interrupted, as there are other things to do at the same time (children, need to socialize with other people in the same room, etc.). Another aspect connected with the limited time available is that instead of looking for specialized services on the topic among those offered, an informal user is likely to choose the first available source. One way to increase attention span is to involve the user in a story or ask her to take part in a simulation (Driscoll & Carliner, 2005).

Electronic games are generally seen as pastimes, but they might have useful educational applications. As far as possible, games should be connected to both formal and informal in-depth paths. A racing car simulation game could have links to:

- a. A quick test consisting of 10 true/false or multiple choice questions
- b. A short animation or educational simulation

Both of these examples focus on how a car engine works.

FUTURE TRENDS

Market research on the first digital television programs have highlighted how supplementary channels are generally appreciated much more than interactive functions within the programs themselves. Games were the most frequently requested service. The main reason why consumers do not use interactive services has been identified in a lack of familiarity with the medium and with educational training. It is expected that viewers will access interactive services much more frequently as they become more familiar with the technological tools available.

An important feature of interactive television will be to favor forms of lifelong learning. This new television should not only encourage the participation of those already involved in forms of self-study, but also encourage broader participation in bettering their education after the end of formal academic training. Considering that, for a variety of reasons, the utilization of computers does not involve the whole population, television, with its almost universal presence in every home, might be an alternative solution to face the emerging digital divide and offer opportunities for educating population groups not involved in lifelong learning. The success of this solution will depend on finding solutions and tools that the targeted population is familiar with and can use in their own homes.

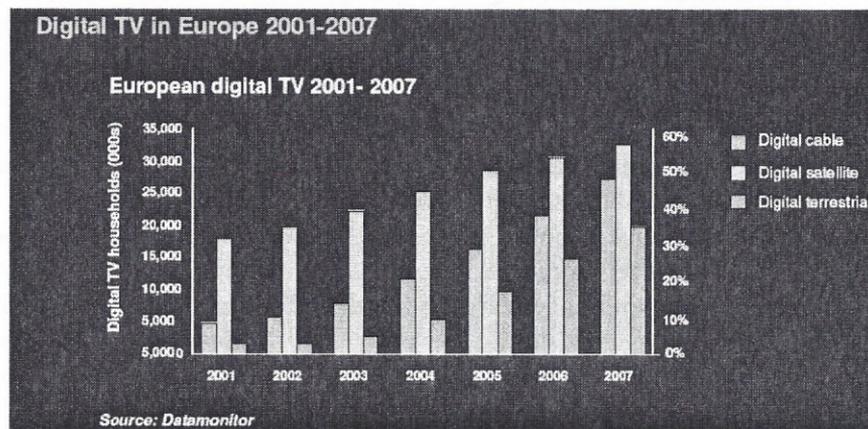
CONCLUSION

In the emerging era of lifelong learning, learning will take place in a wide variety of contexts and locations in which informal and nonformal learning will be as important as formal learning (Bates, 2003). There is some evidence to suggest that nearly one-third of adults say they have not participated in any formal learning since leaving compulsory schooling. Lifelong learning initiatives should therefore not only encourage increased participation of those already engaged in learning, but encourage wider participation of those not actively involved in it.

Approximately 99% of households have a TV as compared to around 50% of households with an Internet-enabled computer. Research suggests that Internet-enabled computers are unlikely to reach more than 60% of households and that digital TV will increasingly become the dominant means for accessing structured information and interactive services. Most children spend at least two and a half hours per day watching TV. In many homes, the television is on when they come home from school and is still on when they go to bed.

Working class children are far more likely to have their own television (and spend more time watching it), while they are far less likely to have access to a PC. The potential for education via television is clear. Interactive television could bring some form of instruction into people's living rooms and children's bedrooms. For instruction to be effective, the system (television in this case) needs to adapt its broadcasts to the interests,

Figure 1.



capabilities, and knowledge of the individual student. In the case of television, this is even more important than in a classroom, as television competes with other entertainment forms (Masthoff, 2002). This means looking towards solutions and devices that people are familiar with and feel comfortable using, either in their own homes or on the move. Opportunities for informal learning will also increasingly be a means to encourage and draw people into active, engaged learning that might lead to learning of a more formal type.

Television is a familiar and reliable consumer device with around 95-99% penetration in European households. It is also perceived as a learning tool. However, in its more traditional role, it has tended to be used in a passive viewing mode. The problem is how television's educational potentialities can be exploited to the fullest. Based on the nature and habits of television audiences, t-learning should be most of all designed so as to engage viewers in forms of reactive learning, that is, forms of explicit learning that take place spontaneously in answer to recent or current situations without any time being specifically set aside for it.

Along with reactive learning, a major share of users' preferences will be for games. What is essential is to shift from a PC-centric vision of learning to one based on the limits and potentialities of the new medium. Television is present in the majority of homes in most countries and, as e-learning is backed by years of research and improvements, the main factor in the success of t-learning is to continue e-learning research activities, to determine how the Internet and this new media form may converge. Further research is also needed to explore this medium through large-scale trials in order to better understand the sociological, socioeconomic, cultural, and motivational factors enabling individuals to move from participating in informal learning to more active and engaged formalized learning in their own homes (Bates, 2003).

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KEY TERMS

Back-Channel: A means of communication between users and content providers. A simple type of back-channel is an Internet connection using a modem. Viewers and listeners can use a back-channel to provide feedback, request additional information, and purchase goods and services.

Edutainment: Edutainment is a form of entertainment designed to educate as well as to amuse. Edutainment typically seeks to instruct its audience by embedding lessons in some familiar form of entertainment: television programs, computer and video games, multimedia software, and so forth. Most often, edutainment seeks either to tutor in one or more specific subjects or to change behavior by engendering specific sociocultural attitudes.

Formal Learning: Learning taking place within an organized, structured context like formal education or company training, which is intentional from the learner's perspective and may lead to formal recognition (diploma, certificate).

Implicit Learning: The acquisition of knowledge independently of conscious attempts to learn and the absence of explicit knowledge about what was learned.

Informal Learning: Learning resulting from daily activities, often related to experiential learning and often considered accidental learning; it may be intentional but is generally mostly non-intentional from the learner's point of view.

Interactive Television: Interactive television describes technology allowing viewers to interact with television content while viewing. To be truly interactive, the viewer must be able to alter the viewing experience or return information to the broadcaster. This "back channel" can be by telephone, mobile SMS (text messages), or cable.

Lazy Interactivity: The ability of users to flick directly from a TV program to datacasting services as opposed to going from one system into another or using a relatively complex medium such as the Internet.

Lifelong Learning: In a European Commission memorandum, the definition is "all purposeful learning activity undertaken on an ongoing basis with the aim of improving knowledge, skills, and competences." A broader definition would also include lifelong learning as a means of reintegrating the alienated back into society and promoting active citizenship. It should also embrace the possibilities of using lifelong learning to promote people's personal development and value as human beings. A broader definition would then stress lifelong learning as learning over the entire lifespan, including all learning activity, whether formal or informal with the aim of improving knowledge, skills, and promoting personal fulfillment.

Nonformal Learning: Learning embedded in planned activities not explicitly designed as learning but containing an important learning element, intentional from the learner's point of view.

Reactive Learning: A form of learning that is explicit but takes place almost spontaneously and in response to recent, current, or imminent situations but without any time being specifically set aside for it.

T-Learning: T-Learning refers to the offering of e-learning services using digital TV technologies. T-learning, a shorthand meaning for TV-based interactive learning, is about having interactive access to video-

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rich learning materials primarily within the home by means of a television or a device more like a TV than a personal computer. T-learning can be seen as the convergence of two technologies: television and the computer.



E