

A Framework for Integrating Enhanced TV (ETV) into Distance Education

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Abstract: The main purpose of this paper is to create digital media design, production, and programming standards for Enhanced TV (ETV) in distance education milieus. ETV, commonly known as Interactive Television, provides increased learner control over viewing and interacting in virtual educational settings. This essential aspect of ETV emphasizes two-way collaborations among distance learners in virtual milieus. Also, a framework for ETV applications in distance education will be developed and discussed to ensure learning purposes for not only educators who integrate distance online activities into their traditional courses, but also educators who deliver courses via distance online. This framework provides necessary and useful information to distance education producers developing ETV programming and methods and improves their understanding of ETV technology applications in virtual milieus.

Introduction

There have been drastic changes in the strategies and organization using television as an instructional tool in distance online education environments over the last decade. The new advancements and approaches of television use for virtual education purposes force online designers to develop Enhanced TV (ETV) applications and integrate them into distance online education. ETV, essentially, combines traditional TV viewing, video programming and the Internet as well as computer-based applications through a network. Moreover, ETV provides richer interaction and more collaboration among online learners. Interactive and accessible information resources on ETV are other essential advantages.

ETV embeds a variety of interactive functions within the standard television program. The mixed signal is sent to learners via standard television transmission methods and/or telephone lines. Without a doubt, the radical improvements of high speed networks, digital devices, new set-top boxes, software and compression technologies and data broadcasting services allow distance online providers to give educational services to virtual learners in their homes and offices around the world. Needless to say, many traditional and contemporary distance education professionals are turning their attention in growing numbers to the Internet and computer-based technologies to apply ETV to their programs. ETV encourages existing passive television learners to become actively involved.

The most essential elements to consider when designing, implementing and evaluating an ETV framework are the social, political, economical, institutional, technological and educational backgrounds of the countries using ETV for educational purposes in distance education programs. Although positive changes are happening around the world to enable this innovative medium, building up an applicable ETV framework for any developed, developing or underdeveloped country will be discussed based on existing circumstances and possibilities of the educational systems. Regardless of the developments and improvements over the decade, there are still many challenges and risks in establishing and implementing ETV applications in distance education programs. Launching ETV requires not only money, but also well-educated human resources. Therefore, it remains unclear to what extent each country can use and integrate the same ETV frameworks into their virtual educational applications.

The Definition of Enhanced Television (ETV)

Enhanced Television (ETV) is defined generally as the blending together of television picture with HTML and Web-based elements such as timed links, textual information, forms and animations (Hartman, 2002). This definition explains the basis of ETV that the innovative television (TV) concept in distance education is two-way interactive TV presentations in a great spectrum.

Enhanced TV is a combination of the word *enhanced* and the word *television* (TV). The word *enhanced* highlights not only two-way communication dealing with virtual milieus, but also open and flexible learning environments. The word *television* in this case emphasizes distance and distributed as well as interactive learner-focused educational settings. Together, *enhanced television (ETV)*, in this study, is used to describe two-way distance collaboration including all computer and television-based technologies which are now rapidly merging. Computers and their related applications are digital devices essentially where numbers represent the stored information in memory. While most developing and under-developing countries in the world have been using analog broadcast television, new digital phone technology has been become important worldwide. Not only is Integrated Services Digital Network, commonly known as ISDN, a basic digital service of 128 kbps, available in most metropolitan areas in the US, Europe and Japan, but it is also rapidly becoming accessible in suburban and rural areas (Portway and Lane, 1994). Although attracting more than millions and millions of people in the US, Europe and Japan, as well as other developed countries, telephone companies and satellite services have been investing in approximately 45 channels. Some telephone companies in these developed countries also currently offer digital fiber transmission systems, which can provide approximately 200 channels.

With some applications in ETV, there is no *back channel*, or return channel, for receiving immediate feedback and providing interactive dimensions to Interactive Television (ITV). Consequently, ITV audiences do not have a chance to interact with either other people or content providers by sending any information to the broadcast center. ETV audiences, however, are capable of accessing the additional features which provide interactivity. Instead of only receiving data from content providers or the broadcast center, each audience has a working *back channel* (return channel) through which data can regularly be sent back. Accordingly, two-way interactivity is established among the audiences, content providers and the broadcast center. The interactive dimension in this application needs complex technology that allows it to be used for a variety of ITV programs, such as sports, documentaries, video-games, shopping directly from the television screen, sending emails, talk-shows, news, weather programs, dramas and sitcoms.

Designing and implementing educational programs in distance education is not only feasible but also practical with ETV. Before introducing an ETV framework in distance education milieus, the essential elements of designing, implementing and evaluating enhanced ETV will be discussed.

The Essential Elements to Design, Implement and Evaluate an Enhanced TV (ETV)

With the rapid growth of the Internet and digital technologies all over the world, ETV has become not only a powerful, global, interactive medium of virtual education in distance learning milieus, but also an economic and democratic one. ETV provides an opportunity to develop live and on-demand distance programs and learner-centered virtual instruction and training. However, designing, delivering and evaluating education on the Internet combined with TV technologies requires thoughtful analysis and investigation as well as an understanding of both the Internet's resources (Khan, 1997). Consequently, ETV applications must be carefully designed based on an ETV framework that allow us to create *open, flexible and distributed* virtual learning environments.

To design, implement and evaluate any ETV-based applications for any developed, developing or underdeveloped country, first, we have to define and analyze the four necessary elements of ETV to understand the *open, flexible, and distributed* nature of virtual learning environments: 1) Society, 2) Institution, 3) Technology, and 4) Education. In this paper, Yuzer and Kurubacak refer to these elements as SITE. The perspectives of social strategies, institutional management and educational policies as well as the distance education learners and workers of society all broadly influence SITE.

Society and Enhanced Television

One of the imperative elements of ETV is society. People living in communities are the key element to implementing ETV programs, because they decide to enhance the programs in distance education. A generation growing up in the technological and digital world easily adapts to TV interactivity; for instance, this generation which used video-games easily embraces the first ITV programs easily. (Murrie, 1994) Not only the video-game generation, but also the people who used computer programs and the Internet easily adapted to enhanced interactive milieus. The Internet generation watches and interacts with ETV programs in distance education settings. However, these applications are appropriate for not only youth but also adult education, because more elderly people have been using the Internet year after year. The average age of the World Wide Web users in the United States is thirty-four. (Harper, 1998). Learners in a society faced with the digital world of the Internet and/or computers are comfortable to learn through ETV programs. Otherwise, it would be too early to integrate and implement these high-level interactive programs into distance education milieus.

The economic condition of the society affects the production and implementation of ETV applications. ETV learners must have certain devices, such as a set-top box or a computer, to interact with educational programs and other audiences. If they do not have such devices, the institution can provide them to the users. This situation can create some financial problems for the institution. However, the institution can help the ETV learners rent the devices long or short-term.

Culture is another important element. The larger the learner groups, the more diverse the culture in distance education applications. Accordingly, educational ETV programs must be appropriate for all distance learners. Appropriateness refers to the moral and cultural values of a society.

While interactive ETV programs are being produced in distance education milieus, the target learner characteristics of distance education must be considered. The age and gender differences of the audience must be considered to design, implement and evaluate ETV programs.

The Institutions and Enhanced Television

The institution is the second crucial part of the four essential elements of ETV-based educational programs. The institution is concerned with the issues of administrative affairs, academic affairs and student services. These issues associated with ETV-based distance education are related to needs assessment, organization and change, budgeting and return on investment and partnerships with other institutions. Any institution which delivers courses via ETV-based educational applications must focus on marketing and recruitment information, technology services, accreditation and services for students with disabilities.

Depending on the ETV-based educational program, different facilities and appropriate support staff are compulsory to distribute the courses in distance education. Moreover, ETV-based educational applications are essentially complex and require well-trained technicians and instructors (Stress on these resources affects on learning and teaching methods into virtual environments). The problem is to introduce new ways of learning and teaching in conservative institutions in spite of inadequate capital investment in learning materials and staff development (Tait and Mills, 1999). Adoption of ETV-based distance education methods and strategies by traditional institutions can be incomplete and of low quality as well as weak in institutional policy.

Because of the lack of the resources, institutional ETV-based educational applications in distance education have evolved through governmental arrangements. Therefore, to develop new facilities, institutions newly involved in ETV-based education must establish an administrative organization to integrate and collaborate with other departments and offices. While considering the administrative support, either policy makers or administrative people must discuss vigilantly and in great depth the cost effectiveness of developing ETV-based distance education programs. The cost of ETV-based distance programs creates a good deal of debate, because delivering courses via technology-based applications can be seen as expensive activities by institutions. However, on-demand ETV-based education programs in developing or under-developed countries can be less expensive per course than delivering distance courses live with live instructors. ETV-based distance education providers must be able to reduce costs in certain circumstances. Learner-contact hours, the number of distance education learners, faculty workload, and the

use of part-time or full time faculty and staff are the factors generally considered for ETV-based distance education cost evaluation.

Distance education programs delivering courses via ETV can reduce labor costs and increase enrollments. The imperative point, however, is that the cost of ETV-based education programs must be cautiously considered in relation to the quality of a distance program. For that reason, the operating budget for any ETV-based distance education program must provide extensive technology support and regular upgrading to virtual learners and instructors. The distribution of funding for the expenditures, such as personnel, equipment, software, supplies, high-speed telephone lines, satellite, etc., vary significantly depending on the type of the program and faculty development as well as the instructional delivery technologies (Picciano, 2001).

Technology and Enhanced Television

There are three distinct categories to using ETV programs in distance education environment: Set-top boxes (STB), TV tuner cards and two-screen synched methods (Hartman, 2002).

A set-top (STB) box is a device for providing interactive experiences on a television screen. A learner experiences an enhanced educational program on his/her analog TV using a STB. This device is connected to a cable or digital satellite broadcast which receives and transfers analog or digital data from the broadcast and decodes it to the television screen. ETV programs are capable of sending feedback data or messages. This is possible only when two-way interactive enhanced programs are broadcast. Cables or telephone lines are used to send data as well. Because of the higher costs of STBs, it is recommended that only the essential elements be included the best solution when they are used in interactive distance education programs. The major concern is that ETV learners must be able to obtain them without great financial outlay.

A learner can have interactive programs on his/her computer via TV tuner cards. For most a TV tuner cards with a capacity to merge video from external sources, television signal is the normal display system in a computer. There can be a disadvantage in that the learners experience problems watching the educational ETV programs. The audience usually watches the educational programs on a small screen. When the screen is divided into texts, graphics, and motion pictures, the main part of the educational program is shown on a small part of the screen. If the learner does not pay attention to this part, he/she might miss some of the instruction.

Gathering a television and a computer screen together is another way to experience ETV programming. Watching a television program, an audience can simultaneously use a computer and interact with content that is synched to the program. Both devices perform their best with this method (Hartman, 2002). To receive educational interactive programs, an audience must have a TV, a computer, and an Internet connection in the same place.

The three ways mentioned above can be used with educational ETV in distance education milieu. The specialties of the target audiences force the producers to find the best technological distance learning option. If all the learners have Internet connections and computers, (technically appropriate for ETV programs) the TV tuner card can be chosen. For instance, educational programs can be produced for the workers of a company with a closed circuit broadcasting technique. If it is known that all the workers have a computer and an Internet connection in their offices, this method may be the best way of interactive education. If the target audience learners do not have a computer or an Internet connection, STBs can provide the most appropriate solution.

A program can be broadcast in two ways on television: live programs and taped programs. ETV has the capacity to use both ways. Over a long period of a distance education program, both live and taped programs can be used. Choosing the program type depends on needs and circumstances.

The most significant aspect of live programs is that they are presented at one time. There are no repeats once they have been broadcast. There may be several programs about the same topic or instruction, but these programs are never exactly the same. Instructor performance, questions and comments from the different learners, etc. affect the interactive program. *Live on tape* technique can be used to show the previous program later. In this technique, the live program is presented later from the tape. However, if the program is taped, interactivity can be lost. If an instructor makes a mistake during a live broadcast, this reaches the learner audience immediately. Aside from the live program disadvantages, there are some advantages to it. If a two way interactive enhanced program is presented,

the learner audience can directly reach the instructor who is presenting the program and ask questions or comments with the help of the Internet or the STBs. Human interaction is possible with this kind of communication, and machines only assist.

Using the taped broadcast technique is the second way. In this technique, once the program is produced, it can be presented several times, and the maximum performance of the instructor can be achieved by editing. On the other hand, there is no human-to-human interaction in this technique. Interaction only occurs between human and machine.

Education and Enhanced Television

Education, which refers to virtual and global teaching and learning, is the last essential element of ETV-based educational applications. This element strongly addresses issues concerning two-way dissemination, collaboration and facilitation. These issues are related to information distribution and internal collaboration as well as external interaction via ETV applications.

The explosive popularity of the Internet and digital technologies has continued since the beginning of the last decade. Therefore, ETV has the potential to reinforce and enhance distance teaching and learning environments by providing new rich learning experiences for global learners. ETV is also having an enormous impact on faculty and learners on many college campuses. ETV provides a global learning environment that reaches learners around the world. In other words, ETV has opened new ways of learning for learners and instructors and instructional designers. The traditional methods and activities of education are changing rapidly. As college classrooms start to employ ETV for distance education programs, ETV has begun to change the face of education. However, there has been a blurring border between distance education and on-campus teaching (Tait and Mills, 1999). Universities are more commonly using ETV-based distance education terms such as flexible learning, flexible delivery, open and flexible learning, distributed learning, etc. There are several characteristics in ETV-based distance education: 1) Equity and access issue, 2) the needs and expectations of learners, 3) lifelong learning, 4) reducing staff numbers but increasing learner enrollments, and 5) maximizing the use of all resources.

ETV-based educational programs in distance education cannot automatically help learners improve their learning skills. ETV itself is just an electronic data sources for learners and instructors. Like the design of any instruction, designing ETV as an instructional tool must include instructional theories, design models and strategies. Designing and implementing ETV-based educational programs requires instructional designers to carefully redesign and revolutionize not only their learning but also teaching environments. This electronic learning milieu gives learners the ability to interact and collaborate with other learners, professors and experts beyond the walls of their classrooms. Time and space limitations will no longer be an obstacle for educational settings. The learning environment is being redesigned for learner-centered rather than teacher-dominated learning. Today, this trend can be observed in many university environments. However, it is not easy to create well-designed ETV-based education programs.

ETV has begun to provide totally new learning experiences to global learners. An ETV-based education program is an important medium for delivering instruction and addressing a variety of learning styles. There are, however, some challenges that learners face in ETV milieus that affect not only their attitudes but also their success in studying with ETV: 1) degree of learner-instructor collaboration, 2) degree of interactivity among learners, and between learners and instructor, 3) the amount of difficulty in using ETV, 4) the ease of access to ETV, 5) the content level delivered on ETV, and 6) the communication abilities of virtual learners.

Developing a Framework for Enhanced TV (ETV) in Distance Education

The framework for ETV in distance education developed by Yuzer and Kurubacak is a theoretical framework of ETV, which includes learning theory and its instructional model to describe the design features of any course. This framework provides a theoretical model to analyze and examine the four essential elements (SITE) of designing, implementing and evaluating ETV for any developed, developing or underdeveloped country. It also uses instructional methods, strategies and activities associated with ETV in a variety of distance education applications.

There is a new paradigm shift for learners, instructors, trainers, administrators, and technical and other support services staff, as well as for the institution in ETV-based educational applications. Students, instructors, and staff are familiar with traditional educational systems based on teacher-based instruction in face-to-face classrooms. ETV-based educational applications in distance education provide multicultural educational opportunities in innovative ways to diverse learners in virtual milieus. The structure of any ETV-based educational setting which extends the boundaries of four-wall learning to an open and flexible system, is different from the form of any traditional classroom that takes place in a closed system. To create effective and efficient ETV-based educational milieus for diverse learners and to jump out of the closed system learning environments, our framework helps us to understand the paradigm shift in distance education. The purpose of this framework also helps instructional designers thoroughly think through each aspect and step of the design, implementation and evaluation processes of ETV-based educational programs. This ETV framework we have provided to create meaningful learning milieus provides the best support system in distance education.

This is a theoretical ETV framework, which serves a multi-dimensional perspective for instructional designers, faculties, teachers, and distance education institutions (Table 1). The purpose of this framework is to help distance-learning workers thoroughly think through each aspect of what they have to do during all the steps of ETV design, implementation and evaluation. This theoretical framework has five fundamental dimensions associated with ETV: 1) the general method of overall design, such as the theoretical or pedagogical basis, instructional approach, etc., 2) the purpose of the general method, 3) specific activities in ETV applications, 4) the purpose of specific activities of instructional methods and their strategies, such as the transmission of course content, the facilitation and fostering of learner collaboration and participation, etc., and 5) the actual activities of distance education, such as electronic mail, Listservs, Internet links, multi-user domains, etc. The many overall instructional approaches can be used for delivering instructional information over ETV.

Yuzer and Kurubacak strongly suggest that a particular theory of learning must be identified and applied to the design, implementation and evaluation of ETV-based educational applications, and that the basics of television program production must be considered when developing educational ETV programs. This situation indicates a need for collaboration among producers and the people related to educational dimensions of the program. Therefore, there is an urgent need for teamwork between the two disciplines of Communication Sciences and Instructional Technology. Consequently, a particular theoretical arrangement that is deliberately selected provides the indispensable basis for corresponding instructional methods in ETV-based instruction. Each dimension of the ETV framework also has a number of sub-dimensions that consist of issues focusing on an explicit feature of ETV-based educational distance applications. These items or issues of the ETV framework are systemically interrelated and interdependent. These characteristics of the ETV framework can also help instructional designers design, implement and evaluate meaningful virtual learning milieus. Designing, implementing and evaluating ETV based on the framework of any distance education program of a developed, developing and under-developed country must be focused on how the SITE provides open and flexible virtual learning environments for global learners worldwide. For this reason, distance education workers must collaborate with learners, instructors, trainers, administrators, and technical support staff as well as other services from all over the world.

Although designing, implementing and evaluating open, flexible, and distributed ETV systems for globally diverse learners is challenging (Khan, 1997), a gradually growing number of distance education institutions offer ETV-based educational programs to global learners worldwide. Therefore, for instructional designers to accommodate diverse learner needs and expectations, they must ask themselves several critical questions along with the five dimensions and sub-dimensions of the ETV framework. To create more meaningful and supporting ETV-based learning settings for global learners, instructional designers from different cultures must focus on critical distance education issues within the five dimensions of the ETV framework.

Table 1. A Theoretical Framework Based on the Four Essential Elements (SITE) of ETV Associated Methods, Strategies and Activities

<p>ASSOCIATED METHODS, STRATEGIES AND ACTIVITIES</p> <p>THE FOUR NECESSARY ELEMENTS of ETV</p>	<p>General Method</p>	<p>Purpose</p>	<p>Specific Activity</p>	<p>Purpose of Specific Activity</p>	<p>The Actual Activities in Distance Education</p>
<p>Society</p>	<p>Social Background</p> <p>Political Background</p> <p>Economical Background</p> <p>Ethical Background</p>	<p>Generation gaps, Age, and Gender</p> <p>Democracy, Multicultural Society</p> <p>Diverse society, Human and nonhuman resources</p> <p>Values, Customs, Traditions, Ethnicity</p>	<p>Apply Pre-Surveys and Focus Group Approaches</p> <p>Regular Collaboration with Society</p> <p>Use Assessments and Evaluation Tools</p>	<p>Analyze and define the backgrounds of society</p> <p>Analyze and define society based needs of the community</p> <p>Create learning societies</p>	<p>Life-long Learning</p> <p>Multicultural Education</p> <p>Diverse Learning Milieus</p> <p>Learner Focused Learning</p>
<p>Institution</p>	<p>Administrative Affairs</p> <p>Academic Affairs</p> <p>Student Services Related to ETV</p>	<p>Needs Assessment</p> <p>Organization and Change</p> <p>Budgeting and Return on Investment</p> <p>Partnerships with Other Institutions</p>	<p>Marketing and Recruitment</p> <p>Information Technology Services</p> <p>Accreditation</p> <p>Services for Students with Disabilities</p>	<p>Instructional Quality</p> <p>Faculty, Staff and Learner Support</p> <p>Intellectual Property Rights</p> <p>Orientation and Advising</p>	<p>Learning and Teaching Skills Development</p> <p>Social Support Network</p> <p>Electronic and Regular Tutorial Services</p>
<p>Technology</p>	<p>Set-top Boxes</p> <p>TV Turner Cards</p> <p>Two-screen Synched Method Between TV and Computer</p>	<p>Live Programs</p> <p>Taped Programs</p>	<p>Two-way Enhanced Programs</p>	<p>Human Interaction</p> <p>Collaboration</p> <p>Shared Information and Knowledge</p> <p>Learner-Instructure/ Machine Interaction</p> <p>Maximum Instructor Performance</p>	<p>Using a Television Channel</p> <p>Using Computers and an Internet Connection</p> <p>Producing CDs</p>
<p>Education</p>	<p>Dissemination</p> <p>Collaboration</p> <p>Facilitation</p>	<p>Information Distribution</p> <p>Internal Collaboration-Learner Communication</p> <p>Outside Collaboration-External Interaction</p> <p>Learner Assistance</p>	<p>Posting Information</p> <p>Link Resources</p> <p>Posted Projects</p> <p>Electronic Mail and Bulletin Board</p> <p>Computer Conferencing and Bulletin Board</p> <p>Electronic Mail, Bulletin Board and Computer Conferencing</p>	<p>Information Delivery</p> <p>Links to Web Sites</p> <p>Shared Project</p> <p>Course Interaction</p> <p>Group Discussion and External Participation</p> <p>Providing guidance, directing discussion, suggesting possible resources</p>	<p>Posting course syllabus and posting information about the instructor</p> <p>Email, chat, computer conferencing announcements, document-sharing announcements, link-sharing announcements, and other course work related announcements must be found on the course Web site.</p>

Conclusion

The use of ETV in distance education systems has been increasing rapidly around the world. Many schools, colleges, universities, companies and organizations are already integrating ETV-based educational applications into their teaching and training. Furthermore, many learners would like to explore distance-learning applications in their paces and places. Whatever the current interest in ETV-based distance education applications, it must be carefully designed, implemented and evaluated according to the four essential elements of ETV, which are society, institution, technology and education (SITE).

Today's academic institutions are in transition due to economic pressures from increasing costs and demands by business (Palloff and Pratt, 1999). Culturally diverse learners choosing to attend a school are another major factor as well. The crucial question to ask is how educational organizations in developed, developing and under-developing countries respond to these changes and demands. There is no universally applicable guide for ETV-based distance education applications that shows how to cope with change and conflict. However, strategies of planned, necessary changes in educational systems need to be developed within the SITE framework that include an awareness of the major forces of social, institutional and technological as well as educational changes confronting educational systems.

The development of ETV-based applications in distance education milieus involves developing not only new approaches to education, but also new skills in its delivery. The creation of a virtual learning community must support and encourage the sharing and exchange of knowledge. Therefore, distance education workers must employ the skills of virtual community building in ETV-based educational programs instead of relying on the technology to create distance education milieus. ETV, however, is not only a new but also developing area of distance education with rapid technological change in which many issues in ETV educational applications remain unsolved and unanswered.

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