Producing Interactive Educational Radio Programs for Distance Education

T. Volkan Yüzer, Ph.D
Distance Education Department, College of Open Education
Eskisehir Anadolu University
TURKEY
vyuzer@anadolu.edu.tr

Gülsün Kurubacak, Ed.D.
Distance Education Department, College of Open Education
Eskisehir Anadolu University
TURKEY
gkurubac@anadolu.edu.tr

Abstract: It is not surprising that the interactivity affects radio and its applications. Besides, after radio began its first broadcasting, new inventions affected its development two ways: 1) the first one was the technological developments of sciences. For instance, the invention of transistors made it possible to create very small radio machines, and also the use of FM broadcastings were able to deliver the first stereo programs, and 2) the last one is the program dimensions of radio broadcastings. The various program styles and formats of radio have been broadcasted gradually for many years, such as countless music, drama, entertainment, culture, documentary, sporting events, news or education programs. Both the technical dimensions and program producing processes of radio can affect the use of interactive educational radio programs. Accordingly, the main purpose of this article is to explain the infrastructure of interactive educational radio programs, and to introduce a framework about how to develop interactive educational radio programs in e-learning systems.

Introduction

Radio is one of the communication media invented in the information age, the 20th century. Because it had only voice, it was mentioned as an easy technology, but its invention almost took sixty years. James Clerk Maxwell (1860-1865) introduced the process of the idea of electromagnetic waves to people. In 1886, Heinricht Hertz proved Maxwell's ideas with some laboratory tests. With the highlight of these developments, another scientist, Guglielmo Marconi succeeded in the audio transmission in the first time in the world in 1895. (DeFleur & Dennis, 1996) After this time many scientists started to work on audio transmission issue. After these developments, the first radio station, KDKA, started to broadcast the radio programs in 1920, in Pittsburg, USA. After this growth, radio spread out worldwide in fifteen years period. (Dominick, 1996) After worldwide growth, radio was used for educational purposes. This means, this mass medium has become one of the delivery technologies of the distance education systems for many years. Learners have a chance to take the courses only with audio, which contains voice, music, and effects.

Like radio, computers and the Internet were also the two most essential gadgets of the information age. They reached out worldwide in the last quarter of the 20th century. With computer and the Internet-based technologies, the people of society started to be faced with multi-way interactive environments. Especially, human-machine interactions and immediate interactive milieus with these media are becoming the daily communication styles of most of the people in the 21st century. (Abbey, 2000) It is not surprising that the interactivity effect radio and its applications. Besides, after radio began its first broadcasting, new inventions effected its development into two ways: 1) the first one was the technological developments of sciences. For instance, the invention of transistors made creating very small radio machines possible, and also the use of FM broadcastings made delivering the first stereo programs available (Crisell, 1994), and 2) the last one is the program dimensions of radio broadcastings. The various program styles and formats of radio had been broadcasted gradually for many years, such as countless music, drama, entertainment, culture, documentary, sporting events, news or education programs.

The technical dimensions and program producing process of radio can affect the use of interactive educational radio programs. Accordingly, the main purpose of this article is to explain the infrastructure of interactive educational radio programs, and to introduce a framework about how to develop interactive educational radio programs for distance education.

What is Interactive Educational Radio Programs?

Radio is a communication technology, and uses electromagnetic waves for transmitting the signals from places (studios, or anywhere where the programs are producing) to other places with radio machines, which are capable of playing radio programs. These waves travel through air and the vacuum of space equally well, not requiring a medium of transport. (Dictionary & Encyclopedia, 2004) Because of reaching many people in a short time, radio is defined as a mass medium. There are more than one definitions of radio, which are defined in its technological infrastructure, or in its medium characteristics. In social and communication sciences, however, the medium characteristics of radio are more important. With highlighting this point, it can be said that radio is a medium, which sends audible messages through its potential listeners. The producers constitute audible messages with voices, music, and effects. In distance educational radio broadcastings, there has to be a definitional part, which explains educational-based presentations or programs.

One-way-communication technique and concept is the basic type for the educational of radio programs, which have no interactivity. One-way-communication refers the program types in which the messages only come through the potential learners and audiences. The learners and audiences are not respectful to give (immediate) feedback for these kinds of programs. When multi-way interactivity is included in a program, two-way-communication takes place instead of one-way-communication. In these kinds of programs, learners or audiences have a chance to give (immediate) feedback to the program presenters, experts, or whoever presents the program. This cannot be only one person. There can be two or more people presenting the program, and persons send their feedbacks to these persons.

Finally, interactive radio can be defined based on a radio programming concept and technique, which has two-way communication among presenters and audiences. Two-way communication allow to have immediate messages from audiences. Interactive educational radio is defined as the radio concept bringing together instructors, learners, resources, experts etc. together even if they have not been at the same place and same time.

Creating Distance Education Milieus with Interactive Educational Radio Programs

Commonly, some devices are used to create interactivity with communication media. Telephones, telephone lines, Internet lines, emails, fax machines are some examples of these tools to create interactivity circuit. Interactivity looks like a circuit, because the messages from radio goes through learner/audiences, and feedback from learner/audiences goes through radio program (consequently feedback reaches the instructors or program presenters of radio program). In educational interactive radio programs, feedback covers questions, answers, and/or commands about the sessions.

To explain how to use emerging communication technologies to create interactive environment via educational radio, it is vital to discuss the program broadcasting styles of radio. There are two major approaches: 1) live broadcasting, and 2) taped broadcasting. Both of them can be used for creating interactive distance education setting and the devices.

Delivering Interactive Educational Radio Programs with Live Broadcasting

In educational live broadcastings, presenters, or instructors come together with learners in real time. Some cutting-edge communication technologies, mentioned above, can be used alone or together for creating interactivity. Learners can use either telephones, or other communication technologies, such as emails, and/or fax machines for their answers, questions, and/or commands.

Program presentations, choosing learners to connect them to the studios via telephones, choosing the written materials and sending them to instructors on air, create a big traffic during delivering educational programs. Directing this traffic is one of the major parts of interactive radio. Providing assistances to instructors is a solution to conduct this hectic traffic. Operators can open phones first, and then connect the learners to instructors, or some assistant people take emails and messages from fax machines, then arrange them, and send the arranged materials to

instructors. For instance, an instructor can ask a question about something, and then assistances take emails, arranged main answers, and send collected answers to instructors. As wished, instructor may have a phone connection with one or more learners about the question during the arranging time.

Telephone has a difference from new communication technologies used in educational interactive radio. The learners on radio with using telephone can hear their voices. Other communication technologies do not have this specialty. For this reason, these kind specialties of new communication media gain importance in interactive education with radio. Telephone can connect learners directly to live program in studio. There is always a handicap to use this arrangement for educational or other purposes. A person who is either a real learner or not can want to use this mass medium about showing herself/himself, give an opinion which is not about the sessions, or illegal propagations. Using of some voice delay machines prevent these kinds of attempts. An operator checks the speaking of person connecting to live program, and if this person attempts to speak about something out of discussion topic, operator can cut her/his voice before these messages reach other learner/audiences.

When inviting learners to phone in program, it is best to have a special number rather then take calls through normal station telephone number. Otherwise, program can bring general telephone traffic to a halt. (McLeish, 1999) Also, cost-free telephone numbers can encourage learners to call interactive radio program. Besides, the technical infrastructures of phone calls enable two or more learners to connect the live session at the same time. Sometimes, this situation can be very useful for instructors, and sessions. Instructor has a chance to share the different answers and/ or commands of learners about discussion topic with other audiences. Instructor can create different discussion dimensions among learners when the session continues. The developments of telephone technology provide a different usage model. For example, cellular telephone messages can be used for interactive education. Distance learners can send their messages with SMS (Short Message Service) systems. In these circumstances, while the telephone specialties, mentioned above, is vanishing in educational communication, SMS makes it possible for the telephone to come closer to other communication technologies such as email or fax machine.

Like telephone technology, other new communication technologies have their own characteristics. By using email, which is involved in computer technologies, the messages about questions, answers, and/or commands can be easily separated and arranged into some main headlines by assistance people, who take messages first. These headlines can be transferred to instructor via the use of computer systems among assistance and instructor on live program. The same direction can be followed in cellular telephone messages. The arrangement with fax machine, however, can take a long time, because everything should be done manually.

The narration in live educational radio programs may not continue as it is prepared or estimated, because questions, answers, and/or commands from learners mostly affect the flow of program. Sometimes, a question which deals with the previous parts or the next parts of continuing program may come from one or more learners. This is valid about commands, or long answers. In these situations, instructors or presenters of radio program can jump to different topics of the sessions from the estimated flow. Shown in Diagram I, this is the predictable narration of live interactive structures, and it is called object-oriented narrative. (Cotton & Oliver, 1995) This kind of narration takes part in real-time events.

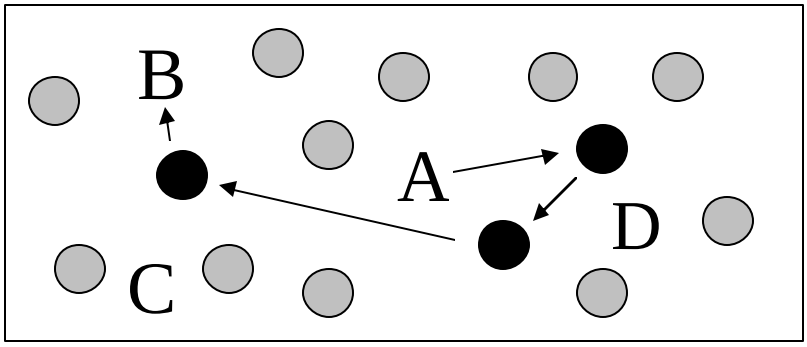

Diagram I. Object-Oriented Narrative

When using this narration model in educational programs, there are different ways to move from topic A to topic B in all sessions or programs. This is valid for the other topics such as C and D. The educational content structure of program has to be prepared with clear borders not to allow moving the discussions outside of session. If the borders

draw in a good way, the flowing without the estimation of program do not constitute a big problem. Also, training about these kinds of narrative structures for instructors or presenters prevent confusion during interactive radio programs.

Delivering Interactive Educational Radio Programs with Taped Broadcasting

The second type is taped-broadcasting in distance radio programs. Using this method in interactive education seems limited, because of some natures of the radio broadcasting. First, radio can be connected with some infrastructures providing interactivity like fiber-optic cables. With this method, it is easy to present some educational methods in taped broadcasting between human-machine interactions; such as audio on demand programs resemble video on demand programs. However, this does not have a meaning if the area being used for educational radio programs does not have an infrastructure such as fiber-optic cables for provide interactivity. This situation sets a limit for interactive radio programs, because interactive program areas are limited while radio programs are reaching everywhere. If there is not such an infrastructure at a place, this means this interactivity type cannot be used. Second, radio programs can be transmitted via Internet lines and computers. It is easy to create taped interactive methods in this situation like audio on demand, but this also sets a limit. If there is not Internet line and a computer, learner does not have this kind of taped broadcasting, while he/she gets the broadcasting on air via a radio machine. As a result, using more complex infrastructures for creating taped interactivity in educational radio broadcastings is useful, if they have been already on the place or area for reaching the learners.

It is possible to use some of the devices for live broadcastings in taped interactive radio broadcastings when it is necessary to transmit educational sessions through air to learners. Oliver and McLaughlin (1997) indicate that getting the telephone messages from learners is important after a live educational program is finished in interactive television. This seems valid in interactive radio, because some learners may not reach their instructors on live program. Assistances can continue to get and arrange telephone messages after the live program is finished. This situation is also valid for other devices in radio such as emails, fax machines, and/or cellular telephone messages. After arranging the questions, answers, or commands from learners, if there are some data mostly repeated, it is possible to make a taped program for this data in a short time period. For example, taped program can be broadcasted, two or three hours later after the live program. Learners must be announced for this kind of interactive programs before live programs.

Another way is the use of taped part, when explaining sessions, and then connecting to instructor in live program. This kind of program types can be used when a session is broadcasted for more than one time. Since a program is broadcasted more times during a week or mount period, it is clear that instructor or presenter performance will not be the same in every interactive program. Using taped broadcasting and having the questions, answers, and/or commands from learners after this part provide to avoid performance alteration in distance education.

There have been radical reforms in the strategies and organization using cutting-edge technologies as educational media in distance education systems for the last two decades. Interactive radio programs with these novel improvements and understandings of emerging technologies compel the educational and communicational designers to develop technology-based applications and integrate them into distance education systems. Interactive radio programs, fundamentally, does combine interactive TV, video programming, the Internet and computer-based applications to construct a knowledge network. Interactive radio, moreover, provides richer interaction to develop the critical thinking skills of learner with real life experiences inexpensively and more collaboratively sharing and exchanging knowledge from different viewpoints and resources among distance learners. Interactive and accessible knowledge resources with interactive radio programs with a careful design process help learners construct their own knowledge and the formation of critical consciousness in a short time without discriminations of digital divides. The radio programs, therefore, allows learners to question the nature of their economical, political and historical as well as social situations.

Radio has the potential to construct global, interactive and dynamic communications on distance education systems. Interactive radio programs provide opportunities to develop live and taped distance programs for learner-centered education and training. However, designing, delivering and evaluating radio programs with emerging technologies in distance education requires thoughtful analysis and investigation as well as an understanding of the attributes and resources of radio. Radio-based distance learning environments must be carefully designed based on the framework that allows us to create *open, flexible and distributed* learning environments.

Framework for Interactive Educational Radio Programs in Distance Education

To design, implement and evaluate any interactive radio programs in distance education for any developed, developing or underdeveloped country, first, we have to define and analyze the three important basics of educational radio. These three essentials can help us understand undoubtedly the *open, flexible,* and *distributed* nature of radio programs in distance learning milieus: 1) Developing the strategic technology plan, 2) implementing the program development process (Type, Purpose, Strategies, Components), and 3) evaluating the implementation process. In this paper, we, Yuzer and Kurubacak, call these three fundamental aspects as STEP-DE shortly (Table 1), as a theoretical framework, which serves multi-dimensional angles for distance education and communication designers, faculties, learners, and any distance education systems. The viewpoints of the social strategies, institutional management and educational policies of distance education as well as the learners and educational workers of the community in the 21st century all influence largely STEP-DE, which is practical, inexpensive and convenient to broadcast radio to construct radio-based learning societies, which can encourage to share and exchange knowledge among learners and resources.

Developing the strategic technology plan is the first step to produce interactive radio programs in distance education. The strategic technology plan provides the necessary answer and defining the components to accomplish successful interactive radio programs. This plan has seven major periods: 1) Defining the current needs and expectations of people in the high rhythm of life styles, 2) planning technology requirements to define the needed communicational media, 3) examining personal sources and supports to analyze current situations and needs, 4) communicating with the stakeholders to construct a knowledge network with prospective society, business, school, universities, etc. 5) creating standards based on the mission statement to cope with the future challenges, 6) developing the goals and objectives to define the proposed outcomes clearly based on the ethic codes, , and 7) creating the learning statement for interactive radio programs. The plan must provide a specific description of the use of interactive radio programs in distance education systems.

The second step of producing interactive radio programs is to implement the program development process, which has pursuing these actions: 1) Working on project timelines to define the project tasks to work fine and punctually, and 2) budgeting to select the models for the broadcasting to estimate all costs and identify the fund sources. The timeline and financial plan have extremely vital roles to accomplish the broadcasting interactive radio programs without any delay. The program development process has four sub-steps based on the project timeline and the budgeting strategies to deliver radio programs in distance education systems: 1) type (deciding the broadcasting styles, such as live or taped broadcasting, synchronously or asynchronously, or mixed), 2) purpose (clarifying the objectives of the unit of the radio program will be delivered), 3) strategies (highlighting which critical thinking skills will be learnt), and 4) components (defining what kind of the cutting-edge technological devices are needed).

Evaluating the implementation process is the last step of the STEP-DE framework, and has two essential activities: 1) receiving feedback from the learner and stakeholders to clarify whether the radio programs meet their needs and expectations successfully, and 2) managing the change process to provide a helpful guidance for the system producers to create more open and flexible educational milieus. In the evaluation process, which is a continuous procedure, the data are collected from different sources, and then the findings are analyzed. Finally, based on the analyzed findings are summarized to obtain the results. The evaluation process of producing interactive radio programs let the designers make right decisions on the usefulness and value of distance education systems. Therefore, the evaluation process serves the specifics answers about the ill-structured steps and learning circumstances, and the monitoring guidelines for the educational and communication designers during producing the programs.

The distance education systems of communities in the 21st century are in conversions due to economic pressures from decreasing costs and time boundaries from the life-long learning demands of culturally diverse learners, who prefer to attend their education continuously. (Bonk & King, 1998) The critical 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 STEP-DE in distance education systems that do show how to deal with alteration and divergence. The planned strategies for the necessary changes in distance educational systems to integrate interactive radio programs need to be developed within the STEP-DE framework, which include an awareness of the principal steps of developing the strategic technology plan (Wiburg,, 2001), implementing the program development process and evaluating the system. Most of distance learners, additionally, can reap knowledge from diverse learning resources in their paces, places and times.

PRODUCING INTERACTIVE EDUCATIONAL RADIO PROGRAMS IN DISTANCE EDUCATION				
DEVELOPING THE STRATEGIC TECHNOLOGY PLAN Defining the current needs and expectations Planning technology requirements Examining personal sources and supports Communicating with the stakeholders Creating standards based on the mission statement Developing the goals and objectives based on the ethics codes Creating the learning statement for interactive radio programs				
THE PROGRAM DEVELOPMENT PROCESS Working on Project Timelines Budgeting to Select the Models for the Broadcasting				
	TYPE	**PURPOSES**	**STRATEGIES**	**COMPONENTS**
Radio Programs with Live Broadcasting	Synchronously	▪ Learning Facts & Conversations ▪ Delving Knowledge into Resources ▪ Discovering interrelate concepts from diverse discussions	▪ Listening to experts & instructors ▪ Speaking literally to learners ▪ Bring course resources to life	▪ Radio Receiver ▪ Phone, Cellular Phone ▪ Fax ▪ Email ▪ Internet Lines
	Synchronously	▪ Learning Facts & Conversations ▪ Delving Knowledge into Resources ▪ Discovering interrelate concepts from multicultural discussions ▪ Tracking diverse point of views to accomplish the necessary steps	▪ Involving self-discipline and self-esteem through the structures and practices of real life ▪ Being intertwined with critical thinking to organize knowledge from diverse culture around the world	▪ Radio Receiver ▪ CD ROMs ▪ Phone, Cellular Phone ▪ Fax ▪ Handbook (Ebook or traditional book) ▪ Email, Bulletin Board ▪ Internet Lines
	Synchronously	▪ Learning Facts & Conversations ▪ Delving Knowledge into Resources ▪ Discovering interrelate concepts from multicultural discussions ▪ Tracking diverse point of views to accomplish the necessary steps ▪ Achieving to solve problems to make a decisions	▪ Examining the consequences and effects to exchange ideas ▪ Exploring all aspects of discussion topics and different viewpoints ▪ Learning to take risk and responsibilities to gain greater insight into how to respect others, even when there is disagreement ▪ Asking right questions	▪ Radio Receiver ▪ CD ROMs ▪ Phone, Cellular Phone ▪ Fax ▪ Activity Book Handbook (Ebook or traditional book) ▪ Email, Bulletin Board ▪ Eportfolio ▪ Internet Lines
Radio Programs with Taped Broadcasting	Asynchronously	▪ Learning Facts & Conversations ▪ Delving Knowledge into Resources ▪ Discovering interrelate concepts from diverse discussions	▪ Listening to experts & instructors ▪ Speaking literally to learners ▪ Bring course resources to life	▪ Radio Receiver ▪ Phone, Cellular Phone ▪ Fax ▪ Email, Bulletin Board ▪ Internet Lines
	Asynchronously	▪ Learning Facts & Conversations ▪ Delving Knowledge into Resources ▪ Discovering interrelate concepts from multicultural discussions ▪ Tracking diverse point of views to accomplish the necessary steps	▪ Offering new dimensions of learning to explore the concepts and facts from real life ▪ Acquiring knowledge to form new ideas and conclusions ▪ Motivating learners to share and exchange their experiences with others ▪ Focusing on raise ideas and problems to clarify ideas and evaluate assumptions	▪ Radio Receiver ▪ CD ROMs ▪ Phone, Cellular Phone ▪ Fax ▪ Handbook (Ebook or traditional book) ▪ Email, Bulletin Board ▪ Internet Lines
	Asynchronously	▪ Learning Facts & Conversations ▪ Delving Knowledge into Resources ▪ Discovering interrelate concepts from multicultural discussions ▪ Tracking diverse point of views to accomplish the necessary steps ▪ Achieving to solve problems to make a decisions	▪ Learning to take risk and responsibilities to gain greater insight into how to respect others, even when there is disagreement ▪ Becoming more aware of how they think and finding ways to facilitate reasoned and logical knowledge-based thinking ▪ Raising problems and asking the right questions to be a thinker into the high rhythm society	▪ Radio Receiver ▪ CD ROMs ▪ Phone, Cellular Phone ▪ Fax ▪ Activity Book Handbook (Ebook or traditional book) ▪ Email, Bulletin Board ▪ Eportfolio ▪ Internet Lines
THE EVALUATION OF THE POCESS Receiving feedback from the learner and stakeholders Managing the change process				

Table 1. Producing Interactive Educational Radio Programs in Distance Education

Table 2 is an additional framework to use interactive educational radio programs with mixed broadcasting methods in distance education. Distance radio programs can be delivered via the mixed approaches, by using live and taped broadcasting together. This understanding of broadcasting knowledge can support more collaborative and interactive shared power in learning, which is implemented in control over the curriculum. (Giroux, 1983) Besides, the multi-way interactions via the mixed broadcasting strategies of educational radio programs can empower learners to share and exchange the ideas, beliefs and facts of others from the real life experiences. Needles to say, the development of learners does only occur in mutuality with others from the world. The free exercises of the high rhythm of real life through the knowledge sharing process among learners and society improve the critical skills and proficiencies of people in distance learning.

INTERACTIVE EDUCATIONAL RADIO PROGRAMS WITH MIXED BROADCASTING METHODS				
	TYPE	**PURPOSES**	**STRATEGIES**	**COMPONENTS**
Mixed Broadcasting	Synchronously + Asynchronously Asynchronously + Synchronously	▪ Learning Facts & Conversations ▪ Delving Knowledge into Resources ▪ Discovering interrelate concepts from multicultural discussions ▪ Tracking diverse point of views to accomplish the necessary steps ▪ Achieving to solve problems to make a decisions	▪ Listening to experts & instructors ▪ Evaluating feelings, beliefs and ides based on reasonable criteria ▪ Appling their higher-order thinking skills to everyday circumstances ▪ Developing Socratic questioning to cope with the high tempo of life styles ▪ Dealing with real life problems to empowering independent thinking skills ▪ Becoming an open-mind and objective thinker to reach reasonable conclusions ▪ Learning to take risk and responsibilities to gain greater insight into how to respect others, even when there is disagreement ▪ Becoming more aware of how they think and finding ways to facilitate reasoned and logical knowledge-based thinking ▪ Raising problems and asking the right questions to be a thinker into the high rhythm society	▪ Radio Receiver ▪ CD ROMs ▪ Phone, Cellular Phone ▪ Fax ▪ Activity Book Handbook (Ebook or traditional book) ▪ Email, Bulletin Board ▪ Eportfolio ▪ Interactive TV ▪ F2F Classes ▪ Eclasses ▪ Internet Lines
THE EVALUATION OF THE POCESS Receiving feedback from the learner and stakeholders Managing the change process Revising the Strategies and Technology Infrastructure to Plan the Knowledge Networks Process				

Table 2. Interactive Educational Radio Programs with Mixed Broadcasting Methods in Distance Education

Discussions and Recommendations

Radio provides easier, cheaper and quicker access (Adams & Massey, 1995) to indispensable knowledge for learners than high-tech communication media does. With interactive radio programs in distance education, knowledge sharing process is changing from an emphasis on teacher-centered to learner-centered learning milieus and from lectured-based education to collaborative real life interactions. The framework developed by Yuzer and Kurubacak can provide a practical background to help distance education and communication designers, administrations, and policy-makers better apply interactive radio programs in distance education.

While cutting-edge communication technologies are increasing challenges (such as digital gaps, digital diversity etc. due to their high prices) to design interactive learning environments, interactive radio programs are providing more open and flexible environments, which are mutually supported learning for empowerment. Educational degree programs and courses, therefore, can be constructed over interactive radio programs with the emerging communication technologies to engage learners interacting with knowledge from diverse resources around the world fast and without time barriers in especially elearning-based distance education systems.

References

Abbey, B. (2000). *Instructional and Cognitive Impacts of Web-Based Education*. Hershey, PA: Idea Group Publishing.

Adams, M. H. & Massey, K. K. (1995). *Introduction to Radio: Production and Programming*. New York: The McGraw-Hill Companies, Inc.

Bonk, C. J & King, K. S. (Eds.) (1998). Electronic *Collaborators: Learner-centered Technologies for Literacy, Apprenticeship, and Discours*e. Mahwah, NJ: Erlbaum.

Bonk, C. J. & Cunningham, D. J. (1998). Searching for Learner-Centered, Constructivist, and Sociocultural Components of Collaborative Educational Learning Tools. In C. J. Bonk, & K. S. King (Eds.), *Electronic Collaborators: Learner-centered Technologies for Literacy, Apprenticeship, and Discours*e. Mahwah, NJ: Erlbaum.

Caffarella, R. S. (1994). *Planning Programs for Adult Learners. A Practical Guide for Educators, Trainers and Staff Developers*. San Francisco: Jossey-Bass.

Cotton, B. & Oliver, R. (1994) *The Cyberspace Lexicon: An Illustrated Dictionary of Terms from Multimedia to Virtual Reality***,** London: Phaidon Pres.

Crisell, A. (1994). *Understanding Radio*. Second Edition. New York: Routledge.

DeFleur, M. L. & Dennis, E. E. (1996). *Understanding Mass Communication: A Liberal Arts Perspective*. Princeton, NJ: Houghton Mifflin Company.

Dictionary & Encyclopedia (2004). http://www.wordiq.com.

Dominick, J.R. (1996). *The Dynamics of Mass Communication*. Fifth Edition. NY: The McGraw-Hill Companies.

Giroux, H. A. (1983). *Theory and Resistance in Education. A Pedagogy for the Opposition*. London: Heinemann

McLeish, R. (1999). *Radio Production: A Manual for Broadcasters*. Fourth Edition. Oxford: Planta Tree.

Oliver, R. & McLaughlin, C. (1997). Interactive Patterns in Teaching & Learning with Live Interactive Television. *Journal of Educational Media.* March, Volume: 23.

Wiburg, K. M. (2001). Effective Technology Planning. In G. Ivory (Ed.) *What works in Computing for School Administrators*. Maryland: Scarecrow Education.