Multimedia in education

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Multimedia in education

Abstract
Multimedia has a role in education, because of its ability to present information in a format that interests the users. It can serve to complement traditional instruction. According to Luehrmann (1994), multimedia instructional software cannot totally replace the human teacher, because the purpose of education is not entirely academic. He further pointed out that schools not only provide the environment for learning, it also lets pupils interact and communicate with adults and peers. Multimedia can potentially offer learners the ability to access information in an appealing format without the direct presence of an instructor. This could reduce the cost of education and/or increase the accessibility of information. By reducing the overhead of educating and employing trained teacher to teach standardized and basic information, the cost of education could be reduced. By providing asynchronous instruction on demand, multimedia can potentially enable each individual to learn at their own pace. Although, these benefits are not yet realized in any large scale, business and educational communities are gearing up for the information revolution that is taking place with multimedia being the catalyst (Bingham, 1992; Multimedia Source Guide, 1995-96). This revolution will transform the current education structure. Because in order to reap the benefits of multimedia, the traditional "teacher-student", "group instruction", "grade-diploma" educational system is not compatible with the ability of multimedia to provide asynchronous instruction individually.
MULTIMEDIA IN EDUCATION

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CHAPTER 1
INTRODUCTION

Multimedia has a role in education, because of its ability to present information in a format that interests the users. It can serve to complement traditional instruction. According to Luehrmann (1994), multimedia instructional software cannot totally replace the human teacher, because the purpose of education is not entirely academic. He further pointed out that schools not only provide the environment for learning, it also lets pupils interact and communicate with adults and peers.

Multimedia can potentially offer learners the ability to access information in a appealing format without the direct presence of an instructor. This could reduce the cost of education and/or increase the accessibility of information. By reducing the overhead of educating and employing trained teacher to teach standardized and basic information, the cost of education could be reduced. By providing asynchronous instruction on demand, multimedia can potentially enable each individual to learn at their own pace. Although, these benefits are not yet realized in any large scale, business and educational communities are gearing up for the information revolution that is
taking place with multimedia being the catalyst (Bingham, 1992; Multimedia Source Guide, 1995-96). This revolution will transform the current education structure. Because in order to reap the benefits of multimedia, the traditional "teacher-student", "group instruction", "grade-diploma" educational system is not compatible with the ability of multimedia to provide asynchronous instruction individually.

**Purpose**

This paper reports on software and hardware developments, delivery systems, applications, and studies of multimedia, and investigates possible effects of multimedia on our social and cultural belief.

**Definitions**

The word multimedia represents different things to different people. Generally, when people use the term "multimedia", they usually mean "interactive multimedia." Multimedia is often confused with the terms hypertext and hypermedia. Although they are similar in many respects, there are distinct differences.

**Multimedia**

Tolhurst (1995) defined multimedia as "... the use of two or more media to present information." The types
of media include text, image, animation, movie segments, sounds, and music. The different types of media is linked into a non-sequential format under computer control. One of the main characteristics is that users are also producers of multimedia.

Interactive Multimedia

Apple Computer, Inc. favors the term "interactive multimedia" (Paske, 1990). This term describes Apple's early attempts to develop interactive audio-visual systems without components which are made up of the "hyper" techniques like node linkage, interactive annotations, and navigational systems. Charp (1995) states that "Multimedia is the use of a computer to present and combine text, graphics, audio, and video, with links and tools that the user navigate, interact, create and communicate" (p. 4).

Hypertext

In the early 1960s, Ted Nelson coined the term "hypertext" (Paske, 1990). This describes the non-sequential accessing of data based on the interactive selection of a linked word or phrase. Although he had no formal training in computers, he still envisioned a system
through which a user can access all the information that was ever written.

According to Tolhurst (1995), hypertext is defined either in terms of its functional components and construction or in terms of the semantic use of links. The functional definition describes nodes of information connected by links. The semantic definition of hypertext describes a system of information linked by association within the content.

Consequently, hypertext can be viewed functionally as nodes of information that are linked, allowing readers to follow a variable reading path of associations based on semantic links. Contrary to the suggestion in its name, hypertext has been described as including more than "textual information," that is, video and audio forms of information. (Tolhurst, 1995, p. 21)

Hypermedia

Nelson later coined the term "hypermedia" (Paske, 1990). As with hypertext, hypermedia describes the non-sequential accessing of data based on user selection. The "media" part of the term denotes a medium of communication which includes video, audio, and text. The "hyper" part of the term denotes above or beyond. Together, the term hypermedia describes an interactive information system that could contain video, audio, and textual elements. An ideal hypermedia system would present organized
information in a multimedia format and provide logical connections of one piece of information to every other piece of information. However, hypermedia described an ideal that is even more difficult to achieve than the early hypertext project, Xanado. Paske attributed this difficulty to the inability of artificial intelligence packages to reliably perform natural language recognition let alone the understanding of gestures and other forms of body language.

Hypermedia is also defined in terms of its function and semantic perspectives (Tolhurst, 1995). Its definitions overlap that of hypertext in many respects. Their similarity reflects the evolution of multimedia technology and its applications. As computers become faster and graphics increase in quality, the use of the term hypertext gradually shifts to hypermedia.

Summary

Multimedia offers great potential educational benefit. This paper reports some of the current developments, delivery systems, applications, and studies of multimedia and explore some of the effects it may have on our society.
Multimedia, hypertext, and hypermedia are closely related terms. Multimedia is the most general term that describes presentations which include more than one type of media. Hypermedia develops from hypertext to include non-linear functional and semantic links of text, images, audio, video, etc. Although any presentation which includes two or more media is termed multimedia, people commonly refer to multimedia more as interactive multimedia, where a computer provides the delivery platform and includes many forms of media available.
CHAPTER 2

LITERATURE REVIEW

This chapter reviews literature concerning software and hardware developments, delivery systems, applications, and studies of multimedia and discusses the social effects of multimedia.

Software and Hardware Developments

With the continuous developments in computer and information technologies, multimedia delivery systems are now on the verge of being accessible by everyone. The user can access multimedia titles through removable mediums like CD-ROM and interactive videodiscs or through established fiber optic and traditional communication infrastructures. These broadband communication infrastructures can link individual systems through an intermediate medium like the INTERNET or direct PC-PC/PC-network link.

Powerful and inexpensive multimedia authoring hardware and software packages are now available in all the common computer platforms. Digitizer like the Intel's ISRVpro for PCs or the integrated Macintosh AV can provide inexpensive digitized video directly from TV or camcorder outputs. Animation, authoring, images editing,
presentation, and video editing software packages are available through multiple companies for Macintosh, Windows, DOS and UNIX platforms. With the availability of all these developmental tools, the software market is now flooded with a multitude of instructional titles to teach and entertain.

Astound 2.0

Gold Disk’s Astound 2.0 is an integrated multimedia presentation authoring software. It not only provides templates which let users develop traditional presentations quickly and easily, but also enables users “...to create colorful presentations with movement, sound, color gradients, animation, video, and interaction” (Gold disk astound version 2.0 for windows: Tutorials, user’s guide, media manager, 1995, p. 1). The users can create interactively in the presentation by using buttons which can be linked to other slides. Astound 2.0 also includes the following software: Astound Actor, Astound Animator, Astound Draw, Astound Sound, Astound Image, and Astound Video. They enable uses to edit or create actors, animations, and movies.
According to Stern & Lettieri (1996), educators can distribute video resources on CD-ROM. CD-ROM writers have dropped below $2000 and CD-ROM discs can be produced at under $10 each. Current CD-ROMs generally use codecs to compress and decompress digital movies, because of the cost associated with hardware based compression. Data compression is necessary, because CD-ROM is a slow media. The recommended data rate for a single speed CD-ROM is 130 kBps and the recommended data rate for a double speed CD-ROM is 280 kBps. Cinepak and Indeo are free video codecs software. While Indeo provides better quality, requires high-end processors. Cinepak is the most popular codecs. It is available for QuickTime as well as Video for Windows movies. The authors also reported Mac platforms provide the best post-processing tools for editing videos. The most frequently post-processing applications are MovieShop, Movie Cleaner, and Premiere 4.2.

World-Wide-Web (WWW)

WWW can serve as a multimedia delivery medium. "The WWW, by its very nature, distributes resources and information, making it the tool of choice for those interested in delivering instruction using the distributed
learning model" (Saltzberg & Polyson, 1995, p. 11). The two distributed learning models discussed were the Course Supplement Model and the Virtual Classroom Model. Under the Course Supplement Model, instructors use web pages as an information distribution tool. The class meets in traditional or telecourse classrooms, while the class information is delivered through the WWW. In this model, much of the instructions are delivered synchronously. Under the Virtual Classroom Model, instructors deliver the entire course through the WWW. The components in these classrooms consist of on-line lectures, interactive multimedia textbooks, one-to-one communications, asynchronous and synchronous group discussions, and etc. The following are a list of the benefits of using WWW as the distribution of the distant learning medium:

1. Student-centered, collaborative learning environment
2. Convenience
3. Ease of use
4. Development is relatively quick and easy
5. Resources are readily available
6. Updating and dissemination information is easy
7. Easy standardized access (Saltzberg & Polyson, 1995, p. 12)

Although current contents of the WWW are dominated by text and still images, the continual widening of the bandwidth of the INTERNET will enable the incorporation of dynamic multimedia WWW pages. These improvements in INTERNET technology will make WWW increasingly important to higher education.

**Multimedia Delivery Systems**

**Iowa Communications Network (ICN)**

The Iowa Communications Network (ICN) is a fiber optic based communication infrastructure which enables the delivery of 100% live video and other media to various parts of Iowa. Currently, its primary application is in the deliver of distant learning courses; however, it is fully capable of providing multimedia access to potential users.

The ICN runs over fiber optic cable laid throughout the state, with classroom connections (Points of Presence) in all 99 counties, primarily in high schools and community colleges. In addition to the county connections, the three state Regents institutions-Iowa State University, the University of Iowa and The University of Northern Iowa-had classrooms installed; private colleges and universities were also given the opportunity to join the system. (Rees & Safford, 1995, p.63)
Because the equipment in each of the ICN classrooms are already set up to include a computer, VCR, slide projector, etc., the delivery of multimedia instruction is efficient and automatic.

**Interactive Compress Video (ICV)**

Interactive Compress Video (ICV) utilizes lossy compression techniques to transmit and receive video and audio through T1 telephone lines (West, 1994). At the University of Kentucky's Lexington campus, there exists such a system. This system uses the software from the MediaMax Videoconferencing System which digitizes and compresses the images. The type of compression used is the "lossy" method. This method is so termed, because it only retain parts of the original image so that some data are lost. The compressed "lossy" images are then transmitted to receiving sites located at various community colleges. The receiving sites then decompress the images and display them in the monitor. The movements in the transmitted video appear jerky, because "lossy" compression reduces the resolution level of the transmitted images (parts of the image data are lost).
The Interactive Multimedia Distribution System (IMDS)

Purdue University at Indianapolis, IN. implemented a multimedia delivery system, IMDS, based on the following components: client workstation and the user interface, a Distributed Multimedia Controller (DMCS), a media storage and retrieval system, and multimedia networks (Jafari, 1996). This system can deliver video and audio on demand from a variety of sources including television stations, video tapes, and videodiscs campus-wide through the university's library information home page on the WWW. This system serves four applications: video on demand, multimedia authoring, advance multimedia development, and classroom viewing.

System Description. Due to the unique nature and capabilities of the IMDS, its implementation requires in-house development that involves seven multimedia media experts who coded over 100,000 lines of codes. The IMDS supports both the PC and MAC platforms with graphic user interfaces. The DMCS provides the users with multiple functions, reliability, ease-of-use, and flexibility. The designers also designed the system to be expandable to support emerging technologies, distant education, INTERNET and digital storage/retrieval/distribution. Two TiltRac
robotics videotape management systems, a videodisc jukebox, and satellite downlink provide a backbone of the media storage and retrieval system. The next phase of the IMDS will include digital video archiving. Developer has considered using the digital archiving for the initial system implementation but shelved the idea due to copyright considerations. The multimedia network uses the present campus-wide bus topology broadband cable network and the Ethernet network. Fiber optic cables connected the workstations to the media storage and retrieval and provided direct two-way interactive control. Coax cable splits off the main link to over 258 acres of campus and can support 16 users with 24 TVs and teleconferencing channels.

**System Applications.** The IMDS user can access the archived or live station through the library information system's home page. Currently, a user can select from about 400 full-length video titles, live TV stations (CNN, CSPAN, SCOLA, CBNC, & PBS), or via satellite downlink. The user can use these videos by simply copying and pasting the video clip on to a Microsoft Word or Word Perfect. This makes authoring multimedia papers a cinch. By using multimedia authoring software like ToolBook and
Director or HTML, the user can develop advance multimedia applications that include interactive full-motion video. Classrooms can also view the available video titles and developed multimedia presentations through television and the IMDS Modem.

**Multimedia Applications**

**Knowledge Acquisition Reference Multimedia Aid (KARMA)**

The Knowledge Acquisition Reference Multimedia Aid (KARMA) is the latest evolution result of one of the first successful and widely used multimedia title, "Developing Your First Expert System," by the College of Integrated Science and Technology (CISAT) (Liebowitz & Letsky, 1996). It provides lessons, models, knowledge acquisition sessions, and exercise on knowledge acquisition for an expert system.

Knowledge acquisition is still one of the biggest bottlenecks in developing an expert system. Not only is it a time consuming and labor intensive task, the expert system developer may not have the necessary interviewing skill to extract the rule base needed to develop a valid model. On top of this, a knowledge engineering paradox states that the difficulty of extracting knowledge from an individual increases with his level of expertise.
Due to the lack of knowledge acquisition courses offered at universities and industries, a multimedia self-tutorial was deemed appropriate to support the needs of the prospective knowledge engineer.

**Cardiothoracic Imaging**

According to Lynch (1994), "A specific application of these digital multimedia technologies is Introduction to Cardiothoracic Imaging, a program created to introduce the range of cardiothoracic imaging techniques to students of medicine, nursing, and other health professions" (pp. 51-52). This program can be accessed by concurrent multiple users from network locations in the Yale School of Medicine. "It contains over 800 diagnostic images, 100 medical illustrations of normal anatomy and anatomic landmarks, and several dozen digital videos of echocardiography, explanatory animations, and motion magnetic resonance imaging (MRI) clips" (p. 52). Although still images can be delivered through the school’s network effectively, full motion video delivery appears jerky. However, it can still be downloaded to the local hard disk for on-site presentation.
Multimedia Studies

Bingham (1992) reported the benefits and pitfalls of a study on student using a CD-ROM multimedia encyclopedia. A set of perceived benefits is presented in Figure 1.

Why Use a CD-ROM Encyclopedia

Student:
- Dictionary and glossary available
- Related terms
- Sound, motion, and color
- Ease of movement from topic to topic
- Ability to retrace research path
- Notebook (print or save to disk)
- 8 Search paths for various learning styles
- Icons

Teachers:
- Motivational to students
- Lends itself to problem solving activities
- Show related items
- Encourages note taking
- Dictionary readily available
- Multi-sensory
- Individual or collaborative activities

Figure 1. Perceived benefit list (Bingham, 1992, p.92)

The summary of benefits and pitfalls are presented in Figure 2. Although there were some benefits to the students, they tend to distrust multimedia and generally are only interested in extracting the entertainment value from the particular packages.
Monti, Goodkind, Cicchetti, and Ganci (1994) reported that computer presentational technologies compliment traditional lecture instructional methods by including interactive multimedia presentations. Preliminary results indicate the following: students were more interested; note-taking increased in occurrence and effectiveness; and participation increased dramatically.

Summary of Benefits
Variety of search methods or logic paths.
Recognition and use of related terms or keywords.
Multi-sensory presentation of information.
Ease of movement from topic or term to another.

Summary of Pitfalls
Lack of belief of a benefit over the paper version.
A tendency to read only the main article and not investigate the related articles.
Slow to moderate reading speed, which limits the number of users of the technology-based system.

Figure 2. Summaries of benefits and pitfalls (Bingham, 1992, p. 92).

Mayer and Anderson (1992) reported that Students receiving instructions with both animation and narration
performed better than students receiving instructions with animation alone, narration alone and no instruction in problem-solving tests. They recommended that "An instructional implication is that Pictures and words are most effective when they occur contiguously in time or space" (Mayer & Anderson, 1992, p. 226).

Gillingham (1992) reported that

"Results indicated that (a) most readers found the two-part questions difficult to answer, although more successful readers chose important hypertext nodes more often an read them relatively longer than unsuccessful readers, (b) questions pose to the hypertext readers differed in difficulty as a direct result of the complexity of their traversal paths, (c) readers who adopted a depth-first search strategy were more successful than readers who used a breadth-first search strategy, and (d) readers who reinspected their responses were more likely to be unsuccessful". (p. 227)

He recommended that "Hypertext may be beneficial as a writing medium wherein readers respond to writers by writing within the format of a hyper-text" (p. 228).

Higgins and Boone (1991) found that hypermedia is a promising instructional tool for students who score low on their readings achievement test.

Kari and Nojd (1991) found that students rated interactive video as a popular method of instruction amongst students. They observed a high level of activity during instruction with few cases of disturbing behavior.
They also reported that "... interactive video will change the role of teachers and teaching material" (p. 228).

Social Effects of Multimedia

Grabe and Grabe (1996) reported that traditional multimedia research generally indicated a slight advantage of multimedia over traditional instructional methods, but did not support the claim that multimedia will restructure education. According to Luehrmann (1994), although information technologies have been proven in society in areas like training, self learning, and entertaining. They seem to have no significant impact on the way instruction is provided in our educational institutions. Many attribute this to the lack of funds and/or training for our school and teachers, but they overlook the most important deficiency of multimedia and other instructional technologies -- the human factor.

Pros

A multitude of literature supports the use of multimedia in education. According to Howles & Pettengill (1994) the greatest advantage of multimedia is the visual aspect. It complements a teacher's verbal commentary in a classroom presentation. Various researchers (Rieber &
Kini, 1991; Grabe & Grabe, 1996) believe that instructional use of multimedia will increase and that animation increases students' ability to learn due to the Dual-Coding theory. This theory states that when learners are exposed to more than one form of media, especially graphical (picture) and verbal (text), they learn more and retain the learned knowledge longer. A human brain processes verbal and graphical information using different area of the brain. By simultaneously stimulating and utilizing these different parts, the learner is more likely to link information together, thus learning and retaining more. Crisci (1994) reported great success with multimedia when applied to music instruction. By integrating music with historical and cultural annotations, multimedia makes each part more compelling and easier to digest.

**Cons**

If multimedia is so great, why isn't it being implemented in all phases of education? Literature generally attributes this to (a) lack of trained teachers, (b) lack of resources [hardware and software], and (c) politics and policies (Beichner, 1994; O'Neil, 1995; Sturdivant, 1989). However, these authors all
believe that these difficulties are the primary impediment to the success of multimedia and if solved, multimedia will dramatically improve our educational system.

**Middle of the Road**

Another explanation may be that multimedia cannot fulfill the purpose of our educational institutions. Luehrmann (1994) observes that the purpose of our educational institutions does not entirely focus on learning. O'Neil (1995) indicates that schools serve three functions: teaching, socializing, and guardianship. Multimedia may be able to assist schools in performing these functions.

**Multimedia and Communication Theory**

Communication models can provide a framework through which the effects of multimedia can be systematically evaluated (Severin & Tankard, 1988). Because multimedia encompasses various modes of communication, Gerbner's communication model (Gerbner, 1956) can be applied in the evaluation of the effect of multimedia. Gerbner's model describes communication with ten components:

1. Some one
2. perceives an event
3. and reacts
4. in a situation
5. through some means
6. to make available materials
7. in some form
In multimedia presentations, the user perceives the various inputs from the computer (text, sound, images, and animation) and reacts to the situation through the available computer input devices (mouse, keyboard, voice, etc.) to select and organize the available materials in some form and context conveying content of some consequence.

Multimedia authors encode messages into the software and these messages are decoded by the users. According to Hall, Hobson, Lowe, and Willis (1980), simple visual signs may appear to be universal, but they are actually cultural specific. Thus, encoding by the authors based on one framework of knowledge may not be decoded by the users in the same way and can lead to differences in their final meaning. He also suggested that users may view a presentation either with the dominant-hegemonic position or the negotiated position. In the dominant mode, viewers decode the message in terms of the reference code and correctly decipher the message. While in the negotiated position, the viewers decode the message in terms of local conditions, thus causing a misunderstanding.
Multimedia and World Making

I am not claiming that rightness in the arts is less subjective, or even more subjective, than truth in the sciences, but only suggesting that the line between artistic and scientific judgment does not coincide with the line between subjective and objective, and that any approach to universal accord on anything significant is exceptional. (Goodman, 1978, p. 140)

Goodman (1978) suggested that for different people different versions of the world exist. These worlds are the right versions if they fit the real physical world. Different versions are altered and created constantly. By viewing the world form different perspectives, people generated different realities. The normal people are the ones that view the world with enough similarity with the majority of the population.

Summary

The advancing multimedia technologies has enabled multimedia to deliver unprecedented levels of animation, sounds, and images. Presently much of the research in multimedia has reported great success in the application of multimedia in instruction. However, multimedia are not as widely used in educational institutions, because it still lacks human like responses. Also communication theories suggested that multimedia may not deliver the
intended message to the learner. Lastly, the idea that each person view the world differently are introduced.
CHAPTER 3
DISCUSSION, SUMMARY, AND RECOMMENDATIONS

Multimedia technologies are on the verge of being embraced by our society. Advances in software, hardware, delivery systems led to increased application of multimedia. Furthermore, studies presenting results due to the application of multimedia generally reported successes. However, the real benefits of multimedia are not yet realized. In addition, the full adverse effect of multimedia has also not surfaced. Due to the multitude of praises in favor of multimedia, further acclamation will not be emphasized, and the remainder of this chapter will focus on the limitations and the potential adverse effects of multimedia on society from an educational perspective.

Various authors like Howles and Pettengill (1994), Rieber and Kini (1994), and Crisci (1994) reported the advantages and benefits of using multimedia in education. However, the wide spread application of multimedia in education has not occurred. Researchers generally attribute this to the lack of resources and support (Beichner, 1994; O'Neil, 1995; Sturdivant, 1989). However, others point out that the slow acceptance of multimedia in education is due to the inability of
multimedia to fulfill all the role of educational institutions (Luehrmann, 1994 and O'Neil, 1995).

If we applied the Gerbner’s Model of Communication on multimedia, we see that the user (student) reacts to the multimedia presentation and responds with the available inputs. Although multimedia can present a subject in a variety of formats, they are pre-programmed and cannot adjust as well to the user's inputs as a human being. Hall (1994) also pointed out that the encoded message (by the author) and the decoded message (by the student) may differ, which results in the failure of communication. Another shortcoming of present multimedia packages is the lack of human-like input devices. Using traditional input devices (mouse, keyboard, voice) just cannot convey the entirely range of human communication.

By Goodman's definition, the application of multimedia is a method of world making. The ability of multimedia to not only present information but also to obtain feedback from the user provides the ideal instructional media. Students can be drill over and over again until they learn the desired responses. However, this also raises the objection that diversity is lost. Multimedia authors create a version of the world to
instruct others. No matter how well thought of and how wondrous these versions may be, can they inherently be better than any other alternate version of the world?

The ability to multimedia to shape the minds of young people exists. If the world making process shifts away from individual development and towards centralized molding, can humankind still survive the challenges yet to come?

Lastly, because children are our future, do we want a selected few (multimedia authors) to impose their world views on them? Goodman suggested that people constantly engage in the act of world making. By imposing the world views contained in multimedia applications on our children, we give up the control of shaping their views. Also, since there is a chance for the failure of communication (Hall, 1994), can we entrust our children to take the dominant-hegemonic position when interacting with a multimedia application?

Summary

This paper discusses the status of multimedia in education. Because multimedia cannot replace teacher in the traditional educational sittings, the adaptation of multimedia in schools occurs slowly. Although potential
benefits are great, using multimedia to replace teachers presents many drawbacks. These drawbacks include the inability of multimedia to replace a human teacher, the chance for a misunderstanding to occur which results in a failure of communication, and the relinquishing of the responsibility to shape the world views of our children.

The purpose of education is more than just teaching and learning. If the present educational institution cannot satisfactorily meet the demands of this increasingly competitive and complicated world, then new educational structures will arise and take its place. Already concepts like mastery learning and objective based education are challenging the concepts of traditional lecture-test system. Multimedia can facilitate and ease the transition as indicated by communication theories and demonstrated by magnet schools. However, there are pitfalls in this wondrous technology as the concern for control of our children's destiny shifts from our hands to multimedia producers.

Recommendations

Although multimedia can be an effective instructional method, its applicability greatly depend on the material
and the learner. Based on the data presented in this paper, a list of recommendations are presented here:

1. Educators should use multimedia in addition to traditional media.

2. Multimedia will and should play a role in education, but it will not and should not replace teachers.

3. Multimedia should be used to teach specific content and for specific purposes under the supervision of competent teachers.

4. Multimedia authors should take the responsibility of shaping the world views of our children and attempt to exclude personal biases and beliefs into the content of their presentation.

5. Additional research should be conducted to uncover the effects of multimedia on the world view formation of the learners.
REFERENCES


