

WebDVD and its Applications in the Learning Environment

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Abstract

In recent years, the emergence of the DVD technology spun wide range of applications both for commercial and academic purposes. One such technology is the WebDVD. This study reflects on the history of the learning technologies and discusses the use of WebDVD in modern educational settings. The researcher used the non-experimental quantitative research model and a Likert Scale questionnaire to gather data. Also the purposive sampling technique was used due to the availability of the study participants. The findings indicate that the research study subjects use technology (the Internet, presentational tools, video footage and interactive assessment techniques) on daily basis to conduct trainings. The study subjects are technologically literate and are willing to learn new technologies (WebDVD). The research indicates that WebDVD would be a good tool to incorporate all of the above components into one disc.

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Chapter I: Introduction

Introduction

Modern learning technology debuted with the introduction of film in the early twentieth century. In 1933, “Thomas Edison predicted that the motion picture would replace textbooks (and perhaps even teachers) in the classroom” (Rosenberg, 2001, p. 22).

Looking at modern education in the United States and the world, it is clear that Thomas Edison was wrong. However, over the course of the twentieth century, many fruitless attempts have been made to make this prophecy true. The first to successfully incorporate film with training was the United States military during the Second World War. As Rosenberg stated, the “United States Army trainers at that time were worried that there was no way they could reach the millions of service people around the world” (Rosenberg, 2001, p. 22). The solution for this problem came from Hollywood studios in the form of educational/training films which were used to educate United States servicemen on basic issues ranging from field hygiene to weapons maintenance.

During subsequent decades, film was replaced by other educational technologies such as Video Home Systems (VHS) and Computer Based Trainings (CBT). VHS dominated the market with its portability and linear delivery of video and audio content. VHS tapes never offered much flexibility when viewed and its users were and still are forced to rewind the tape in order to watch particular video segments. Also, VHS tape media cannot store any other type of content but video and audio. VHS, being an analog technology, provided very little leeway and placed limits on any attempts to make the video content more interactive. VHS was simply designed to play video material (movies,

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documentaries and training videos). It is common practice to refer to this as linear viewing as the VHS content was viewed in a continuous fashion. Users could jump to various segments of the tape but this would include a lengthy rewinding process and a search for the desired scene. This was distracting and inconvenient when demonstrating materials in the classroom.

In 1961 and 1969, David Paul Gregg patented Laserdisc technology and in 1972 Laserdiscs were demonstrated in public for the first time. This format could store data in both analog and digital form. Today, Laserdisc is viewed by many as the predecessor to the DVD. Laserdisc had a number of advantages over VHS. Aside from the superior image quality, Laserdisc could handle analog and digital audio whereas VHS was analog only. Laserdisc also provided random access giving users control over accessing any point on the disc within a few seconds at the most. Laserdiscs did not have to be rewound and had only one physical component while VHS tapes had 14 physical components including the actual tape. But not everything was serene with this new format: “All information is stored on videodiscs in analog form. This means that it is not digitized (converted to numbers or digits), creating separate sets of numbers that represent the level of intensity and status of each dot of light on the screen. It is, instead, recorded photographically as one image after another, in much the same way that films are sets of sequenced frames.” (Cates, 1993, p. 324). At this time, the digital era has already begun and analog technologies started to slowly disappear. All these factors, along with poor marketing strategies, led to the demise of this video format in the late nineties.

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Synchronously with the VHS and Laserdisc, CBT systems were being developed in the seventies and eighties. The need for their development was fueled by the desire to create an interactive tool which would offer two way interactions between the human user and the machine. Rosenberg states that this was hard work and many technologies failed because of the lack of authoring and developmental standards and systems incompatibilities (Rosenberg, 2001, p. 23). Most of these systems were boring and dull. Limited by small hard drives, slow computer speeds, poor graphics and a surprising disregard for what makes for good learning (Rosenberg, 2001, p. 23), these systems failed as quickly as they were introduced. These problems persisted as recently as the late eighties and early nineties, when a promising hardware technology known as “InfoWindows” was introduced. Developed by IBM, it employed touch screens and interactive videodiscs. Sadly, this technology could not survive as the technological world evolved, leaving it in the dust (Rosenberg, E-Learning – strategies for delivering knowledge in the digital age, p 23).

The real breakthrough happened with the introduction of CD ROM discs in the early nineties. CD ROM readers use optical technology (laser) for reading and writing data files onto the CD ROM discs. Rapid development in the field of personal computing and the availability of CD ROM drives made this format the “format of choice” for numerous industry branches. CD ROM technology enabled educators to place several larger files (audio, video, text and graphics) onto one medium and use it as tool for delivering multimedia presentations.

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After the CD ROM technology debuted in the market, 650 megabytes provided enough storage for the first several years. However, this format quickly became too small to store materials other than electronic documents. Another problem with CD ROM media is the inability to change content. As a result, any training that was incorporated on a CD ROM had to have specific, fixed content. Even today, decisions about whether to build an instructional CD-ROM must take content stability into consideration (Rosenberg, 2001, p. 23).

With the introduction of the DVD in 1997, the world witnessed the birth of a multimedia enabled format which offered high quality video, large storage (4.7 GB) and the ability to intertwine HTML pages with DVD content. DVD format also supports user interaction features thus making it a suitable tool for teaching. These features enable a wide spectrum of professionals to tailor and customize DVD content to their own needs. One method of such tailoring is the topic of this master's project – the WebDVD and its applications in the learning environment.

The purpose of this project is to describe the creation of an interactive DVD as a learning tool and its applications in learning settings. With this interactive tool, educators will be given a versatile instrument that can be customized according to their needs. Educators will be able to incorporate classroom materials such as images, electronic documents, videos, interactive and assessment components and other materials onto one disc. Such a disc can be distributed among students and used as a reference and learning tool.

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Unfortunately, the DVD ROM format by itself is not a content stable instrument. In other words, DVD ROM video and file structure cannot be changed easily due to the DVD disc's physical properties. In most cases, the DVD needs to be re-authored with updated video and file contents. If this does not happen, the DVD ROM quickly becomes an outdated learning tool as the learning material rapidly changes and adjusts to student and teacher needs. What greatly helps in this case is adding an HTML component to the DVD ROM (WebDVD), thus making it versatile and less content dependent. An HTML component enables educators to embed DVD video onto their course HTML Web pages which are located on the DVD. These pages can then be linked from the WebDVD to updated course materials which are located on an external server.

Statement of problem and purpose of study

In recent years, the need for a medium that would offer a larger storage capacity and multi-platform compatibility has risen dramatically. Many materials, such as video footage, need hundreds if not thousands of megabytes of storage space. While thumb drives, memory sticks, floppy drives and CD ROMs satisfy the need for storing smaller documents and multimedia presentations, larger storage media such as DVDs or portable hard drives are required to store and organize video materials.

Storage is not the only consideration when deciding on a medium. Delivery of digital content and the need for new tools that are cross platform compatible are important concerns. The DVD ROM meets these requirements. Further, the DVD ROM is portable enough and relatively cheap to manufacture, making it suitable as a presentational tool or

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as a student handout. The DVD ROM is especially suitable for storing courses which integrate large amounts of multimedia presentations (audio, video) because of its large storage capacity (4.3 GB).

The digital material delivery component comes in the form of now ubiquitous HTML and similar Web technologies. Combined with the DVD ROM it produces the WebDVD (also called the hybrid disk). The WebDVD offers a solution for several dilemmas educators face today:

- incorporate/store large amounts of information onto one disc (4.7GB)
- create content stable presentations
- intertwine the Web and the DVD video into the course content
- compact, portable, inexpensive so they can be readily available for students

Exploring the WebDVD as a learning tool will benefit a wide range of professionals both in educational and commercial environments. The need for storage media and ways to incorporate them into the learning process is constant and it is one of the factors that drive the rapid changes in the technology community. Current trends in education strive to incorporate multimedia in almost every aspect of the classroom, making the WebDVD a desirable tool.

A survey of trainers for the Center for the Development of Human Services (CDHS) was conducted to identify the scope of present technology use in the classroom and the

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willingness to use the WebDVD technology in the future. A thorough treatment of this study is given in Chapters III and IV below.

Significance of study

The ultimate goal of this project is to introduce a new tool (WebDVD) for educators/trainers to use in the learning environment. With the aid of the WebDVD, educators will be able to better organize and implement classroom sessions. The final product will be a detailed write up on how this tool is created and possible applications in the learning environment. The survey is intended to isolate the best way to present this new tool to educators/trainers so that it will have a maximum impact on their classroom.

Chapter II: Review of the Related Literature

Introduction

While researching resources that focus on the WebDVD and its applications in the learning environment, little literature that clearly describes the instructional WebDVD was found by the author. Topics that deal with the use of the WebDVD in the classroom are briefly covered in online databases such as ERIC. Most of the literature which supports the author's findings was found on various Web sites. Themes covered by these Web sites include DVD creation, WebDVD and learning, Microsoft MSVidWebDVD object and supporting technologies.

Review and critique of literature

MSVidWebDVD object is one of the core technologies of WebDVD described in this project. Its technical specifications were located on the Microsoft Developer Network (MSDN). MSDN libraries host the specifications of all Microsoft technologies. Users can browse numerous articles or even get the sample code of a particular product. MSDN library articles cover in depth the applications and features of MSVidWebDVD object. MSDN libraries are often intricate mazes of technical papers. Novice users can find this Web site difficult to navigate due to the gargantuan amount of information it contains.

Aside from the MSDN library, the Internet has much to offer when it comes to DVDs and DVD related resources. One such Web site is dvddemystified.com. This Web site is a collection of all information pertinent to DVDs. The author is Jim Taylor, chief of DVD Technology and general manager of the Advanced Technology Group at Sonic Solution. "He is also the author of DVD Demystified, the best-selling book about DVD

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technology, published by McGraw-Hill” (Taylor, 2004, para. 1). Jim Taylor has been involved with DVDs since 1995, two years before its debut on the market. His experience and in-depth guide to everything DVD greatly aided this project and helped researching the WebDVD.

Discussion boards, forums, BBS lists and other types of online communities often fill the void created by the lack of information. One such source of “non traditional” information is Doom9.net. Doom9.net is a Web site maintained by video enthusiasts and offers insights into video compression, ripping, multiplexing and other DVD related topics. This Web site also hosts reverse engineering articles but all within the limitations of the law and the freedom of speech.

Dvdcreation.com is a DVD resource, tutorials, editorials and reviews geared Web site. Some of its brilliant articles are written by leading DVD industry gurus. Daily news informs the reader of current industry changes and upcoming events in the digital video industry. The reviews section contains reviews on advanced DVD scripting and the use of DVD Studio Pro software for the Macintosh platform. Several tutorials offer insights on DVD scripting and how to achieve user interactivity in the DVD video.

Similar to dvdcreation.com, EMediaLive.com is a digital studio resource for digital studio professionals. It offers relevant product reviews, news, case studies and gives insight into emerging technology trends. The researcher found two articles pertinent to this study: “Case Study: Web + DVD=The Elements of Education?” (Misek, 2002, para.

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1) and “Untangling Web-DVD Playback” (De Lancie, 2001, para. 1). The former is geared toward the use of WebDVD in education while the latter is technical in nature and depicts the pitfalls of the WebDVD and supporting technologies.

DVD format and specifications are governed by the DVD forum, which is “an international association of hardware manufacturers, software firms, content providers and other users of Digital Versatile Discs” (<http://www.dvdforum.org/about-mission.htm>). Dvdforum.org is the official Web site for the DVD Forum and serves as a guide for the DVD specifications, licensing and broad acceptance on the DVD format and its applications. References taken from dvdforum.org frequently asked questions section (<http://www.dvdforum.org/tech-faq.htm>) serve as informational support to the author’s findings during this study.

By using the academic online databases, the author has found several peer and non-peer reviewed articles for use in this project. One such article is the “HD Format Wars” written by Jeff Sauer and was retrieved from the Applied Science & Technology Abstracts database. The article follows the current events in the video industry and describes the ongoing format wars between HD DVD and Blu-ray. Both of these formats are seen as DVD successors and they will reach the consumer market by the end of 2006. Sauer points out several key characteristics of each technology and indicates which format is the industry’s favorite. Sauer states that the “DVDs are just discs — bit buckets that can hold any kind of data, whether video, text documents, or photographs” (Sauer, 2005, para. 5) and adds that the “30GB of HD DVD sounds like plenty of storage. But

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history suggests that if the space exists, content creators will find a way to use it.” (Sauer, 2005, para. 7).

An article similar to Sauer’s article was found in the Academic Search Premier database. The article “Beating the blue-laser blues” by Brian Dipert. Dipert states that “industry standardization is a fickle mistress” (Dipert, 2005, para. 1) which has been historically true (Betamax versus VHS). The author foresees another format war looming over the next dominant technology which will replace the current DVD. Both articles predict the demise of the DVD in the next several years. This is a self fulfilling circle that all technological innovations undergo sooner or later. With the emergence of these new, post-DVD formats, new features and controls will be developed and hopefully most of the principles covered in this Masters Project will be adapted, expanded and improved to accommodate these new technologies.

Several articles address DVD editing software. A second useful article by Jeff Sauer is “DV Authoring Revolution” and it dissects the modern DVD software industry and presents clear views on where it stands today. The article describes what DVD editing tools are suitable for professional and non-professional use and compares companies and price/quality ratios among their products. One of the articles found in the Academic Search Premier database focuses on one such product – DVD Studio Pro v.3. Apple DVD Studio Pro 3 is addressed in an article written by Frank McMahon of Video Systems. The article is a review of the DVD Studio Pro software and the author glorifies its features.

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This software is briefly mentioned in this project and it is categorically one of the best DVD production tools available on the market today.

Another great resource used for this Masters project was Mark J. Rosenberg's book entitled E-Learning – strategies for delivering knowledge in the digital age. This book covers the evolution of E-Learning and related technologies, modern approaches to E-Learning and organizational requirements for E-Learning. The content section most pertinent to the scope of this project was the E-Learning evolution. This section describes the history of learning technologies, starting with early educational films developed by the United States military to the state of the art computer based systems. The author introduces foundational concepts of E-Learning in a clear, understandable fashion by describing how and when E-Learning was introduced, the success of various systems applied in the learning environment and ultimately the failure of these systems.

A.W. (Tony) Bates's Technology, E-Learning and Distance Education concentrates on integrating technology into education. Bates elaborates on the technologies which make E-Learning possible. Some of technologies include television, radio, Web, streaming technologies, CD and DVD. He also reflects on the technology costs and on the ease of implementation. Emphasis is given to the interactivity of each described technology. Each medium is dissected and classified into asynchronous and synchronous, one-way and two-way technologies and its pros and cons are described in detailed. The author also reflects on the use of DVD as instructional tool and states that "although the number of discs suitable for educational purposes is growing slowly, there is still a shortage of

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appropriate learning materials on DVD” (Bates, 2005, p. 94). Bates also considers DVD’s as asynchronous, one way technology which the author of this project considers to be a daring statement considering that DVD natively supports basic interaction and with the aid of PC and Web technologies such as HTML, it can become a powerful tool capable of delivering interactive, feedback capable content.

Literature used for the Masters Project study and data collection is *Educational Research, Fundamentals for the Consumer*, written by James H. McMillan. This textbook discusses the principles for conducting research and criteria for evaluating its credibility. The subject matter is discussed in a clear and understandable fashion and it covers almost any type of educational research and the processes which are involved. The type of educational measurement used in this project was a Likert scale questionnaire, described in detail in the “Types of Educational Measures” chapter.

Summary

According to the resources stated and critiqued above, the amount of information of the WebDVD and its use in the educational environment is surprisingly small. None of the peer reviewed databases yielded any results when WebDVD is queried. However, some of the peer reviewed articles did mention the WebDVD briefly in the contexts of a Hybrid DVD. Peer reviewed databases had to offer myriad information regarding the education and technology integration which was greatly explored and used by the author of this project. Most of the printed materials used for this project were of instructional and technological nature. Also, most of the historical facts and the technology usage in the classroom are derived from them. The author also had to use alternative resources

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such as message boards and newsgroups in order to extract the information on the technical details of the WebDVD (Chapter V). These sources offered bits and pieces of useful guides which aided the researcher in compiling the fully functional WebDVD.

Chapter III: Methodology

Design of Study

The study developed for this project focuses on the use of the WebDVD in the learning environment. The study is designed to answer questions on the feasibility and the usability of a WebDVD. An adequate source of data for this type of study is a scholastic facility where trainings are conducted.

The Center for the Development of Human Services (CDHS) and its trainers were chosen as the sample participants. CDHS, as part of the SUNY Research Foundation, puts a lot of emphasis on promoting the use of technology among its trainers and workers. Many CDHS trainers conduct trainings in the areas of social services and healthcare. While the majority of trainers work at the CDHS building in Buffalo, NY, some trainers travel to outpost offices or remote locations to carry out trainings. To minimize the load they have to carry to remote training sites, they often heavily integrate technology into their trainings (video and audio materials, PowerPoint and electronic documents). Training facilities at CDHS include Smart Boards, projectors, high end workstations and Student Response Systems. Having highly skilled and technologically erudite trainers, CDHS was chosen as a suitable sample selection location and its trainers as appropriate study participants.

Sample Selection and description of participants

The study uses the non-experimental quantitative research model. The researcher used a Likert Scale questionnaire to gather data and the purposive sampling technique due to the

availability of the study participants (CDHS trainers). The reason why this technique was chosen is that the researcher already has some familiarity and experience with the sampled group. The sampled group is composed of a diverse demographic population (Caucasian 80%, African American 15% and Hispanic 5%). All participants are over the age of eighteen, and the male to female ratio is 3 to 2. Education levels of the sampled group are Bachelors or Masters Degrees with various levels of familiarity with technology.

Data Collection Methods

The questionnaire was designed to be direct and short in order to minimize the time required to complete it and to maximize response rate among the sample population (CDHS trainers). The questionnaire was distributed to thirty eight subjects. The Likert Scale questionnaire has twelve items and one open ended comments section. Each question contains six response levels: not at all, very little, some, quite a bit, extensively and completely. The response levels were weighted according to their positive perception towards technology use in the classroom, ranging from N – Not at all (most negative) to C – completely (most positive). Interpreted to the numerical scale, these response levels correspond to 1 (most negative) to 6 (most positive).

The questionnaire was distributed to subjects in paper and electronic form. The paper version was distributed to the sample population at the CDHS headquarters in Buffalo, NY. In addition to this, the author of the study developed an online version of the questionnaire. An email was sent out by the researcher to the CDHS trainers informing them of the existence of the online survey version. Once the online version is accessed,

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trainers could familiarize themselves with the case study description and the possible uses of the WebDVD. Located on the same page are the questionnaire items (radio buttons) and upon form submission, the results are stored into a Microsoft Access database. The majority of the responses were collected through the online version of this questionnaire.

Data Analysis

The gathered data was analyzed with SPSS statistical analysis software. The researcher used the report analysis for generating tables and charts and descriptive statistics.

Chapter IV: Results, Summary, Conclusions

Data gathered during this study revealed some interesting key points related to technology use among the CDHS trainers. A total of 23 questionnaires were returned to the researcher. Out of 23, one was incomplete and eight questionnaires contained some input in the open ended comments section.

The descriptive results are presented in Table 1 and Figure 1 through Figure 10.

Table 1.

The Use of WebDVD as Instructional Tool in Learning Environment

	N	M	SD
Technology Usage	23	3.6957	1.01957
Assessment Components Usage	23	3.7391	1.42118
Internet Usage	23	2.1304	1.32474
Video Footage Usage	23	3.9130	1.31125
Printed Resources Usage	23	2.8261	1.80031
WebDVD Familiarity	23	2.2174	1.20441
WebDVD Training Improvement	22	3.4091	1.05375
Reluctance	22	2.4091	1.14056
Ease Of Use	22	2.3182	1.04135
Simplification	22	3.5000	.74001
Valid N	22		

Figures 1 to 10 are graphical representations of data collected through the survey.

Figure 1. Technology Usage

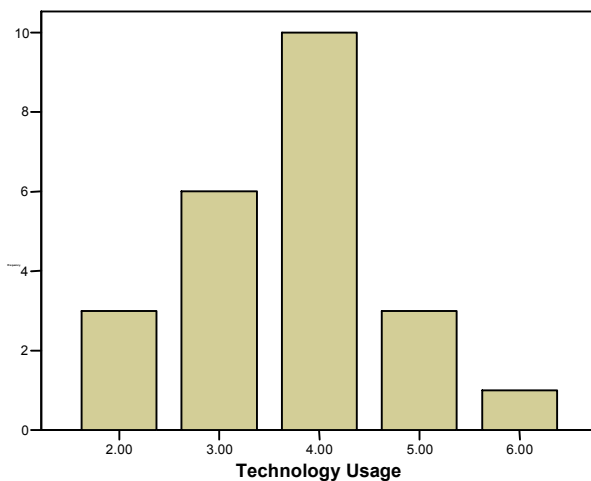


Figure 1 depicts the level of comfort with the use of technology in the classroom. According to the graph, the majority of trainers feel comfortable with using technology in the classroom. This is seen in that the mode is 4 and the

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mean is 3.70, so the distribution is nearly centered on the mode value. A standard deviation of approximately 1 indicates that nearly 70% of respondents were between approximately 3 and 5, which also indicates a high level of comfort with technology.

Figure 2. Assessment Components Usage

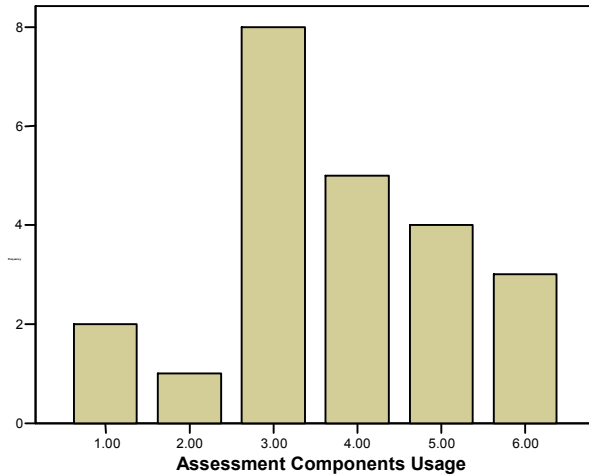
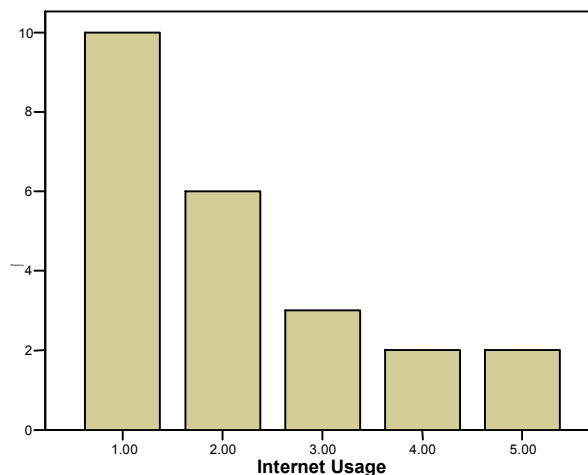


Figure 2 depicts the usage level for assessments during training sessions. A mode of 3 and mean of 3.74 indicates that the majority of responses reside above 3, which shows that most trainers frequently use assessments (such as quizzes, tests, or learner feedback surveys). The goal of obtaining this

information is to assess the possibility of using electronic assessment through WebDVD.

Figure 3 is the graphical representation of the number of trainers that use the Internet during training sessions. A mode of 1 indicates that the majority of respondents never use the Internet during trainings. Overall, 83% of respondents reported limited

Figure 3. Internet Usage



(scores from 1 to 3) Internet use during trainings. This fact brings the usability of the

WebDVD in the classroom into question since one of the major components is the

Internet connectivity. However,

WebDVD is also intended to be used as a handout which the students can take home and use on their own time.

Figure 4. Video Footage Usage

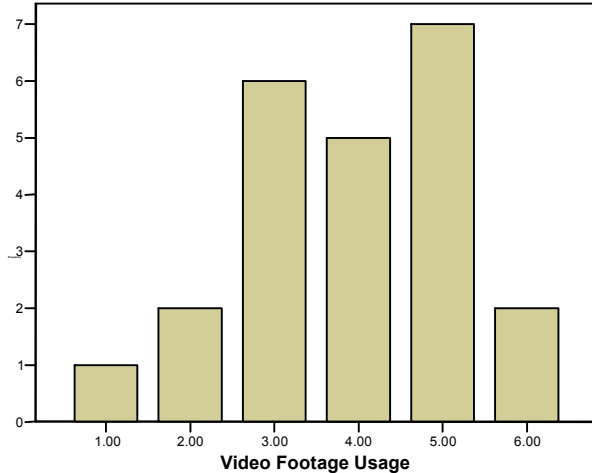


Figure 4 is the histogram of the video materials usage in the classroom. In that the mode is 5 and the average is 3.9, it is clear that the majority of

trainers frequently use video footage during training. This is a heartening result for the WebDVD because one of its strengths is the ease with which video can be incorporated into teaching materials.

Figure 5. Printed Resources Usage

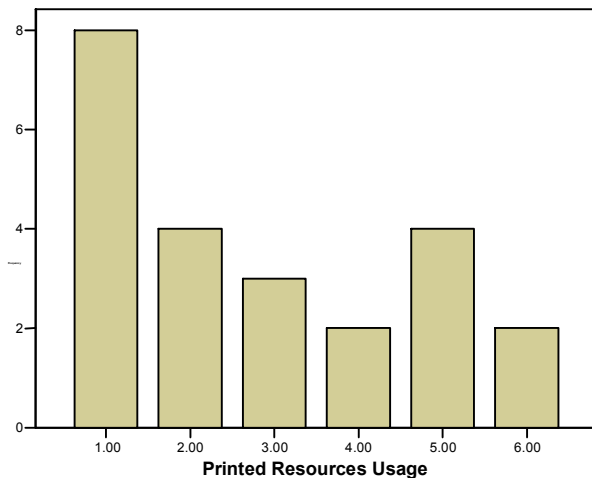


Figure 5 represents the number of trainers who only use printed materials (class handouts and textbooks) in the classroom. With a mode of 1 and average of 2.8, a large majority of the study participants reported that they never or infrequently use printed materials. This bodes well for the

WebDVD because all materials that could be printed can be placed onto the WebDVD for use by trainees.

Figure 6. WebDVD Familiarity

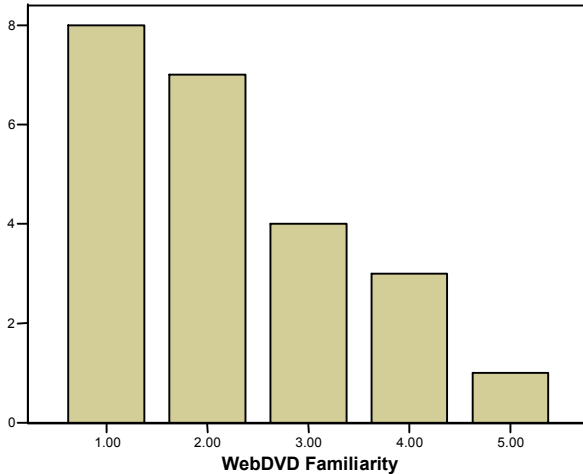
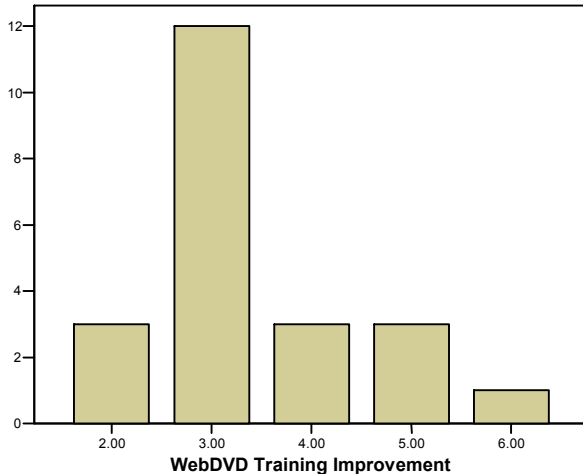


Figure 6 represents the trainers' familiarity with the WebDVD instructional tool. With a mode of 1 and a mean of 2.2, most respondents have little or no familiarity with the WebDVD. This creates a challenge for implementing the WebDVD but it could be overcome by putting the trainers through WebDVD training.

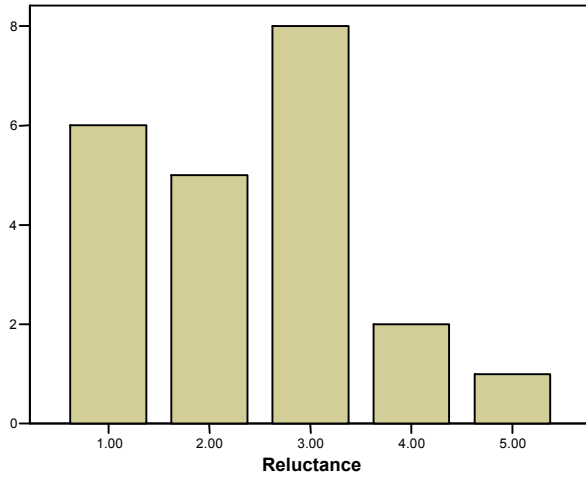
Figure 7. WebDVD Training Improvement



According to Figure 7, which depicts the trainers' belief that the WebDVD will improve their training, many trainers feel that the WebDVD will somewhat improve their training. This is supported by a mode of 3. A mean of 3.4 indicates that as a whole, trainers feel that the WebDVD will improve their training.

Figure 8 represents the study subjects' reluctance to use the WebDVD. The majority of respondents feel that they would not be reluctant to use the WebDVD. This is seen

Figure 8. Reluctance



through a mode of 3 and a mean of 2.4.

Only one subject reported complete reluctance to use the WebDVD. This is an encouraging result because it indicates that trainers would be willing to learn how to use the WebDVD.

Figure 9 relates to the perceived complication of using a WebDVD. Most of the study subjects feel that WebDVD would not be too complicated for them to use. This is supported by a mode of 3 and mean of 2.3.

Figure 9. Ease of Use

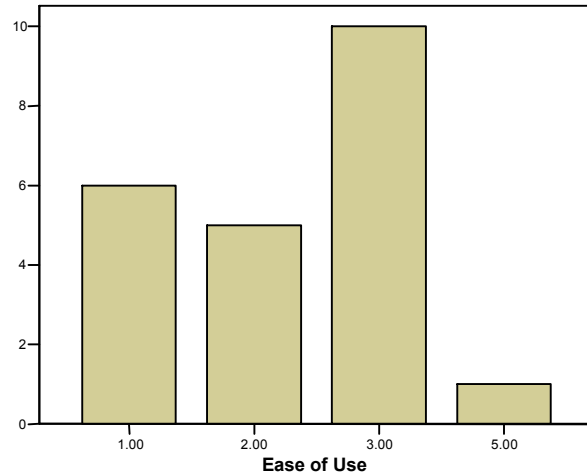


Figure 10. Simplification

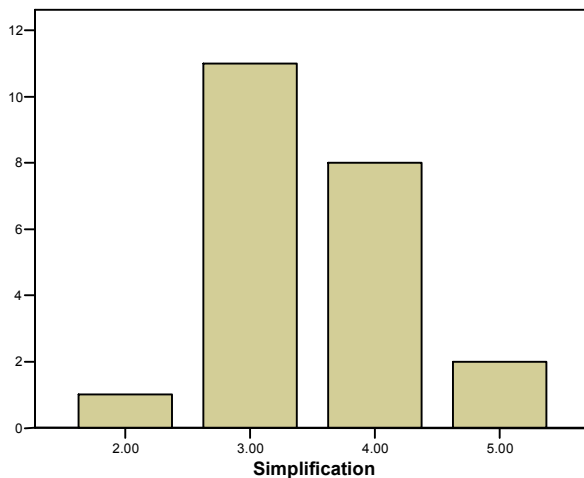


Figure 10 reflects the subjects' willingness to use the WebDVD if its creation process is simplified. Subject responses have a mode of 3 and mean of 3.5, indicating that simplifying the WebDVD creation process would encourage most trainers to use the WebDVD.

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This study provided a glimpse into the technology usage, knowledge and willingness to learn new technologies among CDHS trainers. The first five items in the questionnaire focus on the usage of teaching technologies by the study subjects (use of technology, assessment components, Internet, video and printed materials usage). The level of comfort with technology is surprisingly low (mean of 3.6) considering that the subjects use the Internet, electronic documents and video footage during training sessions. Some other facts are also discouraging such as the use of the Internet in the classroom, where over 70% participants answered that they never use or rarely use the Internet as an instructional tool. Overall, however, the trainers indicated a willingness to learn new technology and to attempt to incorporate the WebDVD into their classroom. The main hurdles to overcome for designers and implementers of the WebDVD are the level of technical proficiency necessary for using the WebDVD to its potential and the complication of the process necessary for creating the WebDVD.

Chapter V: Discussion

Implications of possible outcomes

By collecting and analyzing data, the researcher came to the conclusion that the WebDVD could be successfully applied in educational settings. Some of the data that was gathered may be discouraging (comfort with the use of technology and internet usage) but considering the young age of current educational technology and the technological background of the research study subjects, the researcher believes that there is a future market in the educational environment for the WebDVD. Perhaps, several years from now, when video editing and DVD production become ubiquitous and easy to master, educators will see the full potential that the WebDVD has to offer. The next section will discuss what did the author of this study discovered while researching the WebDVD and its underlying technologies.

WebDVD Specifications

The DVD is the new generation of optical disc storage technology: “DVD is essentially a bigger, faster CD that can hold cinema-like video, better-than-CD audio, still photos, and computer data” (<http://www.dvddemystified.com/dvdfaq.html>). The DVD is based on MPEG-2 video compression standard. “The MPEG-2 standard defines both the method of multiplexing and the program specific information (PSI) tables that enable the individual packetized elementary streams (PES) to be transmitted within the overall transport stream and subsequently decoded correctly” (Higgins J, 2001, p. 15). The DVD has replaced laser discs, VHS tapes, game cartridges and it is on track to replace audio CD’s and CD-ROM’s.

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This versatile medium has impressive technological specifications. Technical capabilities of a DVD media are impressive as “at an average bit rate of 4.5Mbs, a single sided DVD disc has the playback capability of 133 minutes of the highest quality audio and video images” (<http://www.dvdforum.org/tech-faq.htm>). For dual layer DVD discs this time is doubled as “dual layer discs can provide up to 4 hours of the highest quality audio and video on a single side of the disc” (<http://www.dvdforum.org/tech-faq.htm>).

The DVD is not designed to be used with the Internet. Its basic specifications are designed for basic video/audio playback with DVD compatible devices. However, in combination with the DVD ROM specifications and third party software environments, the DVD can become a versatile learning tool which can host the majority of modern multimedia files and electronic documents. This type of disc is called a WebDVD or hybrid disc. ”WebDVD refers to enhancing a DVD with HTML pages, links and scripting, or enhancing a Web site with content from a local DVD drive” (<http://www.dvddemystified.com/dvdfaq.html#2.15>).

The features listed above clearly indicate that the DVD is superior to the earlier VHS and Laserdisc technologies. Even more superior is the concept of the WebDVD, which many experts find suitable as a delivery medium for training purposes. The WebDVD model enables a wide range of professionals in different spheres to create an enhanced product which will integrate non-static content with high quality video and audio.

Referring to the use of the DVD in the educational environment, Misek states that “over the years, educators have tried many a gimmick to compel their students to pay attention in class, to do their homework, and to participate actively in the

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process of learning. Increasingly, those same instructors are discovering that DVD has both the capacity to house a tremendous volume of information and the allure to deliver that information in a way that will attract and retain student interest” (<http://www.emedialive.com/Articles/ReadArticle.aspx?ArticleID=5244>).

WebDVD Requirements

- Windows XP
- Windows Media Player v. 6.1 or newer
- Internet Explorer
- Third party DVD player software

The WebDVD, as its name suggests, integrates Web technologies such as HTML and server side scripting with a traditional DVD. Thanks to the DVD-

ROM specifications, the WebDVD also supports files that are commonly used by both Microsoft Windows and MAC platforms. Examples of such files are Microsoft Word, Excel, PowerPoint documents, and Macromedia Flash presentations.

The MSVidWebDVD Object

In 1998, during the first appearance of the DVD, “Microsoft recognized the need to integrate Web-based content with the DVD a long time ago, and created the DirectShow multimedia programming interface to allow content developers to talk to the software decoders on the end-user's machine”

(<http://www.emedialive.com/Articles/ReadArticle.aspx?ArticleID=5323>). This technology allowed multimedia developers to tap into important learning resources and develop the first WebDVD's.

“Microsoft® DirectShow® is an architecture for streaming media on the Microsoft Windows® platform. DirectShow provides for high-quality capture and

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playback of multimedia streams. It supports a wide variety of formats, including Advanced Systems Format (ASF), Motion Picture Experts Group (MPEG), Audio-Video Interleaved (AVI), MPEG Audio Layer-3 (MP3), and WAV sound files. It supports capture from digital and analog devices based on the Windows Driver Model (WDM) or Video for Windows. DirectShow is integrated with other DirectX technologies. It automatically detects and uses video and audio acceleration hardware when available, but also supports systems without acceleration hardware.”

(<http://msdn.microsoft.com/library/default.asp?url=/library/en-us/directshow/htm/introductiontodirectshow.asp>)

DirectShow simplifies media (video and audio files) playback, format conversion, and capture tasks. It also allows access to the underlying stream control for applications which require it. Direct-Show has several built in objects which allow this sort of interaction. One such object is the MSVidWebDVD object. This is a component of DirectShow and it is available only with Windows XP operating systems.

As stated in the MSDN Microsoft technical library, “The methods, properties, and events of the MSVidWebDVD object enable an application to control all aspects of DVD-Video navigation and playback, and to retrieve information from the disc”

(<http://windowssdk.msdn.microsoft.com/library/default.asp?url=/library/en-us/directshow/htm/dvdapplications.asp>).

MSVidWebDVD Object

```
<OBJECT classid="clsid:22D6F312-B0F6-11D0-94AB-0080C74C7E95" ID="MediaPlayer1">  
  <PARAM NAME="Filename" value="Filename">  
  <PARAM NAME="ShowControls" value="1">  
</OBJECT>
```

Depicted above is the MSVidWebDVD object required by the Web DVD to run. It is important to acknowledge that the MSVidWebDVD does not have built in decoder capabilities. In order to play DVD content in a browser (such as Internet Explorer), a DirectShow-compatible MPEG-2 decoder must be installed. Such decoders can be purchased from third party software companies that make DVD player software.

The MSVidWebDVD object provides an interface between HTML Web pages and the underlying DVD stream. It provides a set of commands which control the DVD itself. The MSVidWebDVD Object is the heart of the WebDVD disc. This object enables users to embed DVD video into the HTML page. The object takes parameters such as video size, auto play, show controls and other types of Windows media controls

How it Works

WebDVD is essentially MSVidWebDVD embedded into the HTML page (Appendix 4). The object displays the DVD content on the Web page and it is controlled by the user created buttons (HTML form buttons which call predefined Visual Basic Functions). In order for this to work, one has to use Internet Explorer 5.5 or later (MSVidWebDVD object works only with the Internet Explorer). WebDVD structure includes three or more directories located in the root of the produced DVD. TS_VIDEO and TS_AUDIO are required in order for the WebDVD to be readable by the set-top DVD players as well as

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DVD ROM drives on the PC. Other folders can be created but they don't meet the DVD specifications thus they will be ignored by the set-top DVD players. However, if used on the PC platform, these folders are recognized by the operating system and its contents are accessible by the user. This is where the supplemental WebDVD contents resides (HTML pages, PowerPoint presentations and electronic documents).

Limitations of Study

This study was limited due to the size of the sample population (38 participants) and due to the fact that the sample population was selected based on the purposive sampling technique. If the researcher had more time, the sample population would most likely include the Buffalo State College professors teaching in various disciplines. The researcher believes that more diverse data would be collected which would lead to more detailed analysis of the use of WebDVD in the classroom.

Some of the items in the Likert Scale were not clearly defined. Examples of this would be item 5 (I only use printed materials in my classroom). Sample population found it hard to answer given the scale from 1 to 6 and the only logical answer to this question would be "yes" or "no". Overall, the researcher believes that the study was a success and that WebDVD can be applied as instructional tool in the learning environment.

Future research

Applying the WebDVD to the core curriculum can aid the educators in delivering captivating and interactive course content. However, no research has been done to support this statement. Perhaps in the future, research on the impact of the WebDVD on

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the student population could be conducted to further explore its applications in the educational environment.

According to the study for this Master's Project, many subject participants stated that they would like to learn more about this tool and perhaps incorporate it in their curriculum.

Following this hint, the researcher could develop a prototype of a WebDVD and incorporate it in the new study which would assess the feasibility and usability of the WebDVD in the classroom.

The concept of the WebDVD is rather new and promising. As with any other technology, it has its pros and cons. For a technologically literate educator, the WebDVD may be useful to spice up the classroom sessions or to use as a classroom handout. An educator is not limited to these two concepts but rather to one's imagination and creative spirit.

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Appendix A

DVD Features:

- over two hours of high quality video which supports standard and widescreen aspect ratios (4:3 and 16:9)
- Eight digital audio tracks (multiple languages, narration , etc). Each track supports up to eight channels.
- 32 subtitle tracks (useful for training DVD's for inserting additional information)
- Nine camera angles for selecting different viewpoints during playback.
- On-screen menus for visual content control.
- Supports simple interaction designed for simple games, quizzes or other forms of user interaction.
- Instant search to title, chapter, music track, and timecode.
- Physical durability (resistant to magnetic fields, heat and continuous viewing)
- No need to rewind

Appendix B

DVD Forum Ten Founding Companies

- Hitachi, Ltd
- Matsushita Electric Industrial Co. Ltd.
- Mitsubishi Electric Corporation
- Pioneer Electronic Corporation
- Royal Philips Electronics N.V.
- Sony Corporation
- Thomson
- Time Warner Inc.
- Toshiba Corporation
- Victor Company of Japan, Ltd.

Appendix C

WebDVD Page with Embedded MSVidWebDVD Object

```
<html>
<head>
<title> WebDVD </title>
</head>
<body>

<OBJECT classid="clsid:22D6F312-B0F6-11D0-94AB-0080C74C7E95"
ID="MediaPlayer1">
    <PARAM NAME="Filename" value="Filename">
    <PARAM NAME="ShowControls" value="1">
</OBJECT>

</body>
</html>
```

Appendix D

Research Study Likert Scale Questionnaire

Student: Nedim Slijepcevic

Case Study: Use of WebDVD as instructional
Tool in Learning Environment

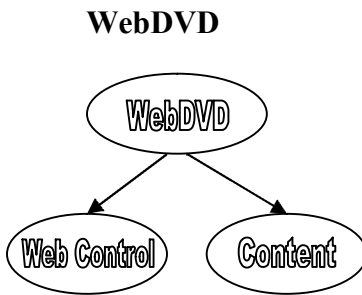
Study Participants: CDHS trainers

Date: 03/15/06

Use of WebDVD as instructional Tool in Learning Environment

Project Description

While working at the Center for Development of Human Services for the past twelve months as Graduate Research Assistant, I was involved in development of an instructional tool – WebDVD. WebDVD incorporates high quality DVD video, Web technologies such as HTML, ASP and JavaScript, and advanced user interaction. With this tool, teachers/trainers will be able to store and organize teaching materials (Word and PDF documents, PowerPoint presentations, video and audio files etc) onto one disc.



Storage is not the only benefit of this tool. Its Web component allows users to create Web pages that link to the WebDVD content. These pages can be tailored to trainers needs and can result in a product which is capable of displaying the learning materials in presentable fashion.

Assessment components can be build-in and can range from questionnaires, tests and quizzes supported by multimedia components such as animation, audio and video.

Example:

Angela is teaching Internet for Educators course at Buffalo State College. On the beginning of each semester, she hands out WebDVD to her students. Her WebDVD contains one hour of video, course syllabus, PowerPoint presentations, Microsoft Word and PDF documents, and Macromedia Flash lectures she prepared herself to enhance students learning experience.

During the first class session, Angela instructs the students on how to use this tool. It is internet connection speed independent (plays the same on dial-up or broadband connections) she says. All you need is Windows XP, Internet Explorer, DVD ROM drive and DVD player software installed on your computer. Once the disc is inserted into your DVD ROM drive, it will launch Internet Explorer and open default class page located on the WebDVD disc.

Loaded page is our main class page which links to course materials (Microsoft Word, PDF, PowerPoint, Flash and Video files) also located on the WebDVD disc. From the main page you will access thirteen lecture Web pages. Each lecture contains relevant media and document files. Video files (smaller segments of main video) are embedded into each page. Entire video can be viewed from the main page or on your set-top DVD player. On the end of the each lecture, you will find assessment component (assignment and quiz). Once you complete the quiz, click on the submit button to send me the results. You will need Internet connection for this.

Purpose and Focus of Study

The purpose of this study is to gather relevant data for my Master's project. The study focuses on the use of WebDVD is learning environment.

WebDVD and its Applications in the Learning Environment

1) **I am comfortable with using technology in my classroom.**

Not at all Very little Some Quite a bit Extensively Completely

2) **I use the following technologies in my classroom.**

Audio Video PowerPoint Internet Printed materials Electronic documents

3) **I use assessment components in my classroom.**

Not at all Very little Some Quite a bit Extensively Completely

4) **I use internet in my classroom.**

Not at all Very little Some Quite a bit Extensively Completely

5) **I use video material in my classroom.**

Not at all Very little Some Quite a bit Extensively Completely

6) **I only use printed materials in my classroom.**

Not at all Very little Some Quite a bit Extensively Completely

7) **I am familiar with WebDVD as learning tool.**

Not at all Very little Some Quite a bit Extensively Completely

8) **I feel that WebDVD would improve my training.**

Not at all Very little Some Quite a bit Extensively Completely

9) **Which WebDVD feature you use the most for your training?**

Video Word and PDF Assessment PowerPoint Flash All features

10) **I would be reluctant to use WebDVD.**

Not at all Very little Some Quite a bit Extensively Completely

11) **I feel that WebDVD is too complicated to use.**

Not at all Very little Some Quite a bit Extensively Completely

12) **I would use WebDVD if its creation process is simplified.**

Not at all Very little Some Quite a bit Extensively Completely

Comments: _____
