Sharon Porter ILS 655 S70
Unit 5/6 Assignment

Harvard-Smithsonian Digital Video Library

Project Information

The Harvard-Smithsonian Digital Video Library grant project began on September 1, 2002 and ran until approximately November 30, 2004. Robert Stephen Cunningham supervised the project that was funded for $4,777, 1253. The principal investigator for the project was Matthew Schneps and the project can be found online at http://www.hsdvl.org/

Project Goal or Mission

Teaching time is precious in K-12 education. With states having benchmarks by grade level, often based on national standards, prescriptive curriculum in the schools assures a developmentally appropriate progression of concepts in context learning. Benchmarks assure coverage of a subject area and that students will not repeat units already in their repertoire. With the pressure to be time efficient in the classroom to address all the given benchmarks of the grade level, teachers employ various strategies to address concepts. One of these strategies is using video streaming collections. It is often not necessary to view more than a minute or so of a scientific concept for students to grasp the parameters of the concept. An entire film watched is often a waste of time when an isolated clip will do. There are a few commercial projects offering video clips to educators and they usually require a school district adoption to be able to afford the service. These services have holdings across curriculum areas and support curriculum K-12. Often these services include organization strategies to save lists of videos for lessons and often offer lesson plans. Film is a powerful medium and can often impart meaning that words cannot express.

The Harvard-Smithsonian Digital Library is funded by the National Science Foundation. The NSF is responsible for about 20% of national funding given to education for research. A large part of the funding of this project is also being provided by the Office of Multidisciplinary Activities in the NSF Directorate for Mathematical and Physical Sciences for development of materials for K-12 education and for undergraduate faculty. The Harvard-Smithsonian Center for Astrophysics is a collaborative effort between the Harvard College Observatory and the Smithsonian Astrophysical Observatory, working under the direction of one administration. The purpose of the project is to provide 350 hours of video, some edited and some complete, for science and math curriculum topics K-12. A massive undertaking, the digital library was culled from 3,500 hours of video footage to be able to choose the best quality video for streaming.

Project Significances

The Digital Video Library serves educators and students in three significant ways. Teachers often do not get a change to watch each other teach and gain valuable insight into the art of teaching. The Digital Video Library contains case studies of instruction and research of two dozen different teachers at various stages in their careers over a two year period. Inquiry learning is demonstrated over a period of a unit. Secondly, there are selections of clinical interviews with students and adults about how they process concepts in science. These are combined into a video called *Minds of Our Own*. Interviews with experts are another significant project aspect. There are interviews with well-known researchers such as Joseph Novak (learning process) and Joan Solomon (physics) and also footage of parents and student talking about their STEM (science, technology, engineering, and math) learning. Most remarkable are the demonstrations of phenomena using time lapse movies of processes in motion. Examples are a rotting apple and the movement of stars. There are also many animated illustrations to aid in illustrating science concepts. Some of the footage was gleaned from the television program, *A Private Universe*.

The American Association for the Advancement of Science (AAAS) has a science education reform initiative called Project 2061, working in partnership for this project. Using local, state, and national standards, the website was organized around the framework of standards and by STEM concepts allowing educators the ability to locate lessons by identifying the science or math content area to reinforce and then searching by grade level. An education review panel of the Multimedia Educational Resource for Learning and Teaching Online (MERLOT) gave this library a 4.9 overall rating on a 5-point scale for providing users with acess to “more than 1,000 videos that can be identified by the AAAS Benchmarks for Science Literacy, the Atlas of Science Literacy, National Science Education Standards, and/or all state standards.” The digital library has also won praise from the International Communications Film and Video Competition in presenting the highest award, the silver plaque, for an educational Web site—at INTERCOM 2005 (American Association for the Advancment of Science, 2007).

The footage used in the collection is drawn from previously-filmed programs produced from the Science Education Department and the Annenberg/CPB television program materials. They are produced by the Science Education Department except as noted:

- A Private Universe
- Principals for Principals (Annenberg)
- Aries
- Energy
- Case Studies in Science Education
- Cosmic Horizons
- Essential Science
- Factors Influencing College Science Success
- Looking at Learning Again (Annenberg)
- Science in Focus: Force and Motion (Annenberg)
- The Next Move (Annenberg)
- Parallax 5
- Private Universe Project — Math
- Private Universe Project — Science
- Shedding Light on Science (Annenberg)
- SportSmarts
- Technical Difficulties

Methods Used

The HSDVL planned to produce a database of metadata and links learning goals in the Project 2061 Benchmarks Atlas. The database had to be web-searchable and contain 350 video clips. There had to be a search tool to navigate and locate video by subject content, state and national standards, and grade level. The last product was to create and maintain archival footage of full resolution and quality of the original for use by scholars. This footage was to be stored for future generations at the Wolbach Library, part of the Harvard Library system (Harvard-Smithsonian Center for Astrophysics & Department, 2007).

The project was broken into four steps:

1. Create a useful framework to organize 3,500 hours of video
2. Reduce 3,500 hours to 350 hours accessible via the Web
3. Provide access to the resulting library
4. Document the impact of the project, then take steps to sustain the library

To determine the footage to be used in the video clips a team of reviewers consisting of teachers, education researchers, and experts in math and science were chosen because of their prominence in the content areas under review, their knowledge of the national and state standards, and educational practice. This team, chosen and trained by the collaborator Project 2061, was also charged with coding the material with the appropriate metadata. The Protocol for Metadata Harvesting of the Open Archives Initiative (OAI-PMH) is a technical standard by which the metadata is shared from this video collection. The digital video library has contributed metadata to OpenDOAR, a repository of open access libraries listed by category (Open DOAR, 2007). Mechanisms for tracking use are in place and that data is kept in the database and part of the metadata reported for the project.

Much research and coordination is evident in the use of benchmarks to organize the video material. The AAAS benchmarks represent a three-year development in Project 2061 involving over 1,300 teachers, consultants and field experts in science, mathematics, and technology. These benchmarks are indicators of content to be mastered by the end of grades 2, 5, 8, and 12. Some states used the benchmarks as they were written nationally, but other states used them as a framework and molded their own. To organize the video clips to meet national and then state benchmarks is an important option for educators who are responsible for noting benchmarks in their lesson plans.

An advisory board was created to monitor progress, assure interoperability, and to champion the needs of the users. The advisory board consists of teachers, core integration, libraries, online video use, researchers, curriculum developers, learning standards, and educational television.

Organization and Types of Resources

The HSDVL database is populated with video clips and transcripts in pdf format. The database can be searched using four parameters: By AAAS Benchmarks, Using Strand Maps (in pdf form with link to download *Adobe Reader*), By Other Standards (organized by state), Relating to Instruction, Using Any Criterion, and View All. The strand maps are linked and the user is prompted to download the Adobe SVG Viewer to access the strand-map interface which is still under development. If available, there are also transcripts visible in pdf format when a video clip is loaded for viewing. While not particularly well-formatted in a easily-read document, the transcript will aid the hearing-impaired and can be used as a finding aid for a particular portion of a longer video clip. The transcript can also be used for the correct spelling of technical terminology.

Service Features

The user services available of the digital video library interface are introduced with video tour, explaining the scope of the library, use of the navigation features, and the content of the videoclips (Harvard-Smithsonian Center for Astrophysics, 2007). The HSDVL works optimally with *Internet Explorer*. Some features, such as the strand map interface, are not designed to operate in *Mozilla*. At any point a viewer or player is detected as being needed, the user is prompted to download and install that player. The download website is opened automatically and the user decides to install or not. Along with the four tabs for searching by parameters, there is the ability to search by keyword in all fields, by description for the film clip, and the title of the clip to aid those who have identified in a previous search a video clip that can be located again quickly. The user can choose how many search results are loaded per page from 10 to 30. Video transfer rates may be determined by the user from low, medium, to high. On the search results page, a thumbnail is visible on the left, followed by the title and a brief description of the video clip. That information is followed by the search category assigned to that clip. This feature is helpful for return visits to the site in locating a clip previously viewed.

On each item page, there is a title, brief description, AAAS Benchmark in narrative and by number, program description, publication/usage rights and the publisher of the video clip. These labels change when the area is in the Instructional Category/Criterion to more closely reflect the subtopics in that area, not categorized by a benchmark.

There is a Back to Search Results arrow on each item page, bottom and top to reduce the length of the mousing navigation path. If the results page is long, there are “jump” drop-down menus to quickly move through the alphabet to choose titles.

Technologies

No manner of sleuthing led to the discovery of the technologies behind this digital library. Examining the source code of each page did not reveal the database technology used but only that the pages are delivered through XML code. There is an indication in the source code that platform issues were addressed for particular protocol regarding Macintosh computers using Internet Explorer.

Video streaming is integrated into the page interface and hosted by the Harvard-Smithsonian Center for Astrophysics. The video streaming is on-demand with no provisions for saving to the user’s computer. Video streaming, using Windows Media Player or Adobe SVG Viewer, is supported by provided links to the free players for downloading to the user's computer. These links are found on the home page of the project from the link "Read about system requirements." The video player itself has all the customary controls: volume, fast forward and reverse, pause, play, and beginning and end of the clip. There is a buffer and a counter of the time elapsed and the total length of the video.

Evaluation and Maintenance Plans

The Digital Video Library is sustained and maintained at modest costs. These costs were to be recouped from income the project generates from sales of licenses, royalties, fees for use and philanthropy. The Harvard-Smithsonian Center for Astrophysics provides access to the internet, maintains and backs up the data on the servers as a service to the scientific community. The costs are covered by the Harvard-Smithsonian overhead and are maintained along with other related projects. Plans and strategies to evaluate the effectiveness of the library are not evident (Harvard-Smithsonian Center for Astrophysics & Department, 2007).

Analysis and Comments

One of the products for this project was to develop publications documenting the creation of the digital library. One of the goals was to publish the methods and impact of the project. Upon conducting thorough searches of the relevant databases at Buley Library, Eastern Oregon University, and the internet, no white paper or any evidence of scholarly reporting of this project was found. A Project Diary was to be part of the dissemination plans for this project. It also is not available online. A search on the Internet

Archive yielded no results, not did searching World Cat for a published work. For such an extensive and costly program, to not meet this goal is unfortunate. Chowdhury and Chowdhury list “publication and reporting skills” as a broad management skill for professional digital library environments (Chowdhury & Chowdhury, 2003). On this measurement of the digital library, a disservice to the digital community has been delivered. Researchers and scholars will not reap the benefits of successes and obstacles of the project. However, it is conceivable that documents were removed for public use given that time has elapsed since the building of this project in 2004.

The video streaming in this digital library is delivered “on-demand” (in real time) which works well for classroom use when all network infrastructure is operating in the user’s school. However, experienced educators know that when you most need internet access for a lesson or inservice training, a number of obstacles can impede the availability of the media for use that day. Video streaming services are not free for a reason. They provide the ability to download video clips to a hard drive for re-purposing or for use off-line. These advantages are not small. Re-purposing allows the teacher or presenter to use the clips in *Powerpoint* presentations or other authoring software to design the lesson in an aesthetic and organized manner. The video clips can be burned to a CD for use in future lessons. These advantages come by way of paying for a service that gives the educator a license for multiuse of the video. Having the video clip in a presentation or stored on a local hard drive relieves pressure on small bandwidth situations in some schools, eliminates the stress of being dependent on internet access for the lesson, and integrates the video clip as a natural flow of the instructional design of the lesson/presentation itself.

Licensing rights are preserved to the publisher in the HSDVL database so re-purposing is not an option.

The video clips begin automatically in a few seconds of the load. The user often has to stop the video and begin over if not ready to take notes from the video, or ready the viewing for the lesson/presentation. Giving the user control of when the video clip begins gives the user more control of the medium. In a presentation, it may seem as if the presenter/teacher has made a mistake and has to "rewind" to begin again.

The interface is consistent from item to item, page to page. This consistency reduces the time it takes to orient the user to the features of the library. The HSDVL has a clean interface and clear tabs for navigation using the search parameters. Search results return very quickly and the video clips are delivered efficiently. After choosing the parameter to use for searching and then making choices for grade level and sub topics, there is a SUBMIT button. A more straightforward term might be SEARCH. The RESET button is the second choice, a bit close to the SUBMIT button. However, it is not an obvious first choice. It is very easy for the user to orient in the site using the Home link, always available at the top-left of each page. The branding of each page is appropriate and aesthetically pleasing.

The prominent display of rights and publisher on each item page is a clear assertion of intellectual property ownership and a place to start for communicating with the publisher for rights of use in other projects created by an end user.

A helpful feature to add would be to link to the forms found often in the experiments or classroom activity. While the video clips often zoom in to show the worksheet or direction sheet, a link to a downloadable sheet would be very helpful to teachers at the item level. An equipment list would also be a helpful feature to add at the item level to give the teacher an idea of the ease of the experiment or a notice of specialized items that may have to be gathered or ordered.

The quality of the video clips and the range of support of the AAAS benchmarks make this resource a valuable digital library. The sheer work of editing down the footage to self-contained smaller units is a feat. The 350 items represent a body of information regarding science and math concepts and teaching strategies. A remarkable aspect of the project is the inclusion of many of the video clips that concern metacognition. By viewing the clips, an educator gets an idea of how students at various developmental levels conceptualize science and math learning, how they develop strategies for learning, and where their science and math ideas come from. Many video streaming services concentrate just on the concepts of a discipline but this library presents a deep understanding of how learning occurs and all the elements that contribute to the success of math and science learning.

References

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