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Video Planning Document

This document will serve as the guide for collecting, editing and distributing the web-based digital video that will be used on a future NASA education web site. This document is divided into the following sections: (a) Purpose, (b) Audience, (c) Objectives, and (d) Strategy/ Treatment, (e) Timeline.

Purpose

The purpose of this digital video project will be to create a motivational web site for elementary school students about to participate in a NASA Langley education program. The web site hopes to motivate students before they embark on the mathematics, science, technology and problem-solving activities contained in the larger NASA ***"Why?"*** Files education program. A description of the NASA program has been provided below.

The following excerpt comes from the NASA ***"Why?"*** Files web site (http://edu.larc.nasa.gov/dl.html):

> The NASA "Why?" Files Series is a standards-based, technology focused, distance learning initiative designed to integrate and enhance the teaching of math, science, and technology in grades 3-5. The 2000-2001 series of four, 60-minute programs uses problem-based learning and scientific inquiry, including the scientific method and science process skills, to introduce students to the excitement and exploration of real-world mathematics, science, and technology. The NASA "Why?" Files is video and web-based and includes a resource rich teacher's guide. The series combines the leading-edge technology of the Web with the content-driven instructional quality of video programming.
>
> **"Why?"** File Web site description of Problem-based Learning:
> http://whyfiles.larc.nasa.gov/teachers/pbl_over.html
> The NASA "Why?" Files video series and web site implement problem-based learning. Students simultaneously learn subject matter and develop process skills while engaging in solving real-world problems. The problem-based learning practices enable the students to become proactive and critical thinkers capable of self-guidance and assessment when involved in a problem-solving situation.
>
> The NASA "Why?" Files technology components provide a learner-centered environment in which the educator monitor, questions, and challenges, while students construct meaning and direction that will lead them to a solution.
>
> In order to get to a solution, students go through the following stages: understanding the problem, learning about the problem, solving the problem, and reflecting on the process used to solve the problem. Because of implementing the problem solving stages, the students walk away with ownership in not only the solution, but also the process. This

process helps students develop crucial problem solving skills to become life-long learners.

The first NASA Langley ***"Why?"*** Files program airs October 11, 2000 on many PBS stations and has a companion web site with follow web and classroom activities.

Audience

Students in grades 3-5 are the primary audience. Teachers will incorporate students use of the web in their classrooms as a supplement to The NASA ***"Why?"*** Files education programming. I envision students viewing the web site under the direction and guidance of the classroom teacher or media-library specialist while using individual computers or a LCD projector to project the video/web onto a screen. While students could use the web site at home, the primary context planned for this web site will be the school environment. This site will not be structured as a self-paced, individualized student tutorial, but as a supplemental aid to the original NASA ***"Why?"*** Files content. Students will use the engineering student vignettes as an introductory piece to the larger NASA "Why?" video programming and web site (URL provided earlier in this planning document).

Learner Analysis

Entry Behaviors:

In order for the students to effectively utilize the web site they need to know how basic Internet and computer skills. For example, students will need to know how to use a mouse, keyboard and powering-up the computer. They will also need to know how to launch an Internet browser and navigate through the site structure provided. The media specialist or teacher may of course facilitate students in these endeavors.

Prior Knowledge:

Students should have some basic/minimal understanding about the process of scientific inquiry or problem solving and how science, mathematics and technology are related to effectively solve problems and learn about the world around us. While students will almost certainly have a notion about what science, mathematics and computers are, they may not have significant exposure to how these topic inter-relate. Absence of this connectivity is not detrimental to viewing the web site, but foreknowledge of this synergy will facilitate the concepts being presented in the web.

Student attitudes will probably be favorable toward using the web and viewing web-based video. Computers and Internet usage to children in this age group in traditionally uninhibited and novel. Science, technology and problem solving are usually interesting concepts to youngsters in this age group as well.

Students preconceptions about how these topics inter-relate should be discussed prior to viewing the web site for students construct new knowledge by building on their previous understanding.

Attitudes Toward Content and
Potential Delivery System:

Prior skills and attitudes toward the mode of delivery (web) will by positive. Students will most likely contain the ability to use a browser and perform rudimentary inquiry and problem solving abilities like observing, recording and generating questions about their environment. Their mathematical ability will cover a wider range of skills, from addition and subtraction to multiplication and division but in all cases, viewing the motivational vignettes will not require students to perform science or mathematical skills.

Academic Motivation:

Keller's 1987 ARCS model of attention, relevance, confidence and satisfaction will not comprehensively be addressed in this web. The concept of attention will be incorporated as this web is supposed to stimulate students as they work through the larger NASA "Why?" File web, which does incorporate more concrete activities. The following components of Keller's ARCS model dealing with attention will be utilized:

- Concreteness:
- Show visual representations of any important object or set of ideas or relationships.
- Give examples of every instructionally important concept or principle.
- Use content-related anecdotes, case studies, biographies, etc.
- Variability:
- Vary the medium of instruction.
- Break up materials or (displays) by use of white space, visuals, tables, different typefaces, etc.
- Change the style of presentation.

Demographics, Physiological Status and Learner Preferences:

The demographic of the students will be both male and female of varying ethnic dissent. The physiological motor skills will be sufficient to manipulate a mouse and interact with choices on the screen. Special attention should be made to the density of the text/graphics on the page as well as the reading level of the text itself. Although detailed catering to different learning styles is a complex notion and difficult to incorporate into fixed multimedia web sites, attempts will be made to keep the graphics and text clearly legible and not confuse field-dependent learners. Given the nature of hyperlinks, students will be given control of how they navigate the site. This control feature will also available to teachers should they display the site using a LCD projector.

Contextual Location:

Supervisory support should be provided to the learners as they progress through the motivational and content rich web. The learners are still very young and will need assistance as they peruse the web. The physical aspects of the site may vary widely. The site may be viewed in a closed computer lab with a bank of computers side by side or in an open library setting with several computers side-by-side. Teachers may have an Internet computer their classroom and rotate students through the computer station or project the web onto a large screen via a LCD for the whole class to view. Given this varied use it will be difficult to optimize the web for all locations. Special attention will be given to using large sans-serif fonts (Arial, Helvetica) and provide varying video streams and resolution sizes (a 160X120 video resolution may be adequate for a monitor but not for projection via a LCD).

With respect to the social aspects of the site, this too will be varied depending on how the teacher assists the students through the site. Given this, the site will not force the teacher to place students in small groups to use the site, but may provide hints as to how using the site from different social learning perspectives may be accommodated.

Objectives:

It is hoped that the web site will be a motivational and realism piece for elementary school students by demonstrating real world applications of science, mathematics, technology and problem solving. By showcasing relevant and exciting university student engineering projects (involving the use of science, mathematics, technology and problem solving) it is hoped that elementary school students will be have a brighter outlook when engaging the NASA ***"Why?"*** Files Education program.

Strategy/Treatment:

A) DISTRIBUTION MODE (why):

The Internet will be used as the distribution medium for the digital video. There will be both high quality/high bandwidth and medium quality/sufficient bandwidth versions available to the end users. The use of the web for distribution is fourfold.

First, this is the medium the client, NASA Langley, wants for the distribution of this "promotional" product. Second, by using the Internet, many more perspective teachers will have the ability to view the online video versus distribution via VHS tape or videotape. NASA Langley has a strong education web presence throughout their multi-state region and on a national level. By using a medium that already has a large subscriber base NASA hopes more teachers will view this finished product. Third, distribution via the web will also provide the functionality of immediate access and information on demand to perspective teachers. Remember this is a promotional video with the goals of gaining attention and motivation. If a teacher is interested in using The

"Why?" Files programming, we don't want to force teachers to wait weeks to preview the educational material, which would be the case should CD-ROM or videotape be the medium. Finally, from an economical standpoint, once developed the distribution costs will be significantly cheaper using the web versus burning CD's or Videotapes and mailing them to individual teachers. It should be noted that the ***"Why?"*** Files programming will consists of live and prerecorded video (broadcast via PBS) and have a supplementary web component for teachers, parents and students.

B) MOTIVATION:
The web will use the context of information presentation to discuss The NASA ***"Why?"*** Files. To facilitate changing attitudes I looked toward Gagne and Driscoll's Strategies and Conditions for Learning (taken from Dr. Greg Sherman's Instructional Design course). If the designer is attempting to change an attitude or motivate a user toward a desired action, the following conditions are suggested for presenting the instructional event:

- Clearly identify examples of choices made by people who possess the desired attitude (credible and attractive-similarity, familiarity, appearance).
- Clearly identify instances in the students' lives in which making choices are based on the attitude being presented.
- Make students aware of the personal benefits gained by making choices based on attitudes (preferably by someone the students admire).
- Allow students the opportunity to practice making choices associated with the desired attitude (role-playing, group discussion, etc.) and give them feedback.

Given the bullets above it seems plausible to capture students talking about special "exciting" projects that utilize science, mathematics, technology and problem solving. I may ask students questions like:

- Why did you choose engineering?
- What is exciting about this field?
- How do you use science, mathematics and technology in your engineering project?
- Describe a problem you recently encountered with the engineering project.
- How did you analyze and generate potential solutions to the problem?

Hopefully the answers provided to these questions will provide excellent footage for engineering projects like the human-powered submarine, the formula one racer, or the Baja dune carts.

With respect to the types of video shots captured, I foresee close-up head/shoulder shots for the interviewees as they answer the predetermined listed in the interview guide. I'll use titles underneath the interview student to list their name and position on the engineering team. Finally, as an interviewee describes a particular section of the vehicle, I'll go back and capture close-ups of these sections of the vehicle to use cut-away shots during the interview. Since this video will be used for the web I'll try to stay away from a

lot of motion in the camera (pans, tilts) and motion of the objects in the video. I'll also try to stay away from many wide shots since this will not be easily recognizable when compressed for the web.

I also have been provided a format layout to follow and sample questions from NASA Langley. You may go to the following URL to get an idea of how the high-end footage might look:
http://ltp.larc.nasa.gov/temp/yfiles/experts/Craig.html

C) PRESENT INFORMATION and EXAMPLES: (tell them something then provide an example) Intro text with still images, video.

The web will open with a cool slide-show series of images and corresponding questions next to each image. Questions like "How is science used in dune buggies?" or "Is technology really that important?" will be displayed next to the engineering project still image. By using a series of still images on individual pages the site hopes to grab the attention of the student viewer.

The next section of the web will provide a brief overview of the engineering project. This will continue to provide a motivational stimulant and provide a deeper context of the engineering project. The overview page will succinctly describe in text and images how the students at Virginia Tech incorporate mathematics, science, technology and problem solving into their project. The list of 14 questions will be on this page and serve as links to the embedded video answers. Children viewing this page will just need to click on a question that interest them. A help link describing the necessary plug-in requirements will also be provided on this page providing links Real Networks and Apple QuickTime.

By clicking on one of the 14 question links the user will proceed to a new displaying the embedded video answer. This format is at the request of Langley to avoid the confusion of separate and new pop-up browser windows appearing.

The embedded video pages consist mostly of close-ups (good for web video) and medium shots-close-up cut away shots. I will try to keep the motion of the camera to a minimum (no panning, zooming) and do straight cuts to the apparatus being talked about. I'll keep the background plain and not busy but try to incorporate the theme of the engineering project if possible. This will aid in a more efficient compression and sharper image quality.

The other embedded video pages will be similar to the description above with different interviewees and questions being answered, depending on the person being interviewed. NASA Langley will use the video clips I generate, but encase the digital movies in a layout and style consistent with the existing NASA ***"Why?"*** web site.

I posed the questions below to Jeff Seaton at NASA Langley with respect to the technical parameters of the project. His replies are below each question.

1. Is using Real Media format to stream ok (do you need QuickTime as well, or AVI for possible inclusion on CD-ROM)?

   Answer: We use two formats for the NASA "Why?" Filed - Real Media and QuickTime. QT for high bandwidth, nice quality and RM for low-to-high bandwidth using their Sure Stream encoding (one stream handles many connection speeds, dependant upon how you do the original encoding). Both of these would be needed.

2. Approximate length you want the total video for each teacher to be?

   Answer: As for clip length, we probably don't want to exceed two 60-90 seconds for any one clip (possibly 2 minutes would be OK). The way we have been handling the interviews is that they are broken into individual clips so that students/teachers click on a topic/question to view that 30-90 second portion, and then can select other clips to view.

3. Are titles/labels of the teacher's name appropriate for inclusion on the video as it is being played back?

   Answer: Problem with titles/labels overlaid on the video is that they get hard to read at that small resolution. They are fine if you want to include them, but what we usually do is do a full-frame title and then fade into video, or display the title below the video, in another web-based format (HTML, Flash, etc) not is streamed video.

4. What desired background, if any? Would you like a classroom setting or one that is more controlled for lighting and removes "business" of classroom backdrop (but more sterile)?

   Answer: The background is up to you - just make sure there is very little movement in the background, or your compression will really suffer and the output will be poor - so a classroom background is fine, a classroom background with 30 kids moving about would be terrible (a marine biologist with a large body of water filled with sharks as a background looks pretty cool on video, but water with sharks in it moves around an awful lot and doesn't compress very well.

5. What screen resolution size (320X240) do you desire?

   Jeff Seaton did not provide a direct answer to this question, but did provide a link to a test page that has sample video on a web page: http://ltp.larc.nasa.gov/temp/yfiles/experts/Craig.html . It would appear from looking at this video that encased in a separate web page and loading at 240X196 with control playback bar

or 240 X 180 without the control bar. One may scale the movie larger (with pixelation) if desired if using IE 5.0 on a Mac browser. I opened the movies in a PC browser and the movie opens not in a small window, but an entire full screen web page (which is not resizable).

6. How many interviewees would you like?

   Answer: I think that Tech has participated in a number of interesting design competitions that a professor or student may be able to discuss. Refer to the sample video URL to get a sense for the number of questions/ interviewees.

Potential Interview Candidates/Projects (only one project will be used for the web site-human powered submarine contact info not listed here):

1.Formula Car-SAE Contact: Chandler Reubush grad student email: dreubush@vt.edu shop: 231-5459 Best time (Thursdays at 11:00 am) http://filebox.vt.edu/org/sae/
2. VT Baja Vehicle Contact: Chris Schen Email: shoe@vt.edu Ph: 540-818-1076 http://filebox.vt.edu/eng/mech/baja/bajapage.html Advisor: Dr. Hayden Griffin http://filebox.vt.edu/eng/ef/griffin/ohghp/ohghp.html email: griffin@vt.edu Ph: 231-6555

Timeline:
Raw footage capture: November 9-23
Editing video clips: November 24- December 8
Creating web site to hold clips: Develop concurrently as edit video
Tweaks: December 8-11
Project Deadline/Completion: December 12

Conceptual
Site Map for project