Distance Delivery Squared (DD^2)

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Abstract

"Old Dominion University (ODU) has assumed a responsibility to serve the members of the armed services and their families with high quality programming that meets the unique needs of military men and women." (NCPACE Web Site, 2002)[1] ODU is one of sixteen college and university partners that provide academic instruction to United States Navy personnel through the Navy College Program for Afloat College Education (NCPACE), part of the Navy College Program. While assigned to Arizona State University East, the authors, in conjunction with the Engineering Management department at Old Dominion University teamed up to create a modularized graduate course on Logistics and Supply Chain Management for distance delivery through the NCPACE program. The entire course, ENMA 613, was created in Arizona and was transferred electronically to Old Dominion in Norfolk, Virginia as the instructional modules were completed. The final course packet consists of a traditional published textbook, *PowerPoint*™ style graphics, audio files, a student handbook, published case studies, and problem solution sets.

This paper describes selected components of the development process used for ENMA 613, including a summary of technical development issues, electronic communications requirements, and systems limitations in a case study format. Elements of the course structure and content are briefly described in order to provide information for similar development efforts.

Background

In September 2001, a dialogue was initiated between Dr. Ralph Rogers, the Chairman of the Engineering Management Program at Old Dominion University and Dr. A. E. Jackson to develop a distance delivery course in Engineering Logistics and Supply Chain Management to support the Navy College Program for Afloat College Education (NCPACE). The course, ENMA 613, was to be developed for delivery to United States Navy personnel who are deployed aboard ship (primarily) and who enroll in college courses while deployed to continue their educational programs in non-traditional settings. The challenge was to develop a complete graduate-level course in Engineering Logistics without dedicated, on-site support for course material development, pre-production, post-production, mastering, proofing, and editing resources. All technical support personnel and courseware mastering services were housed at Old Dominion University (ODU) in Norfolk, Virginia, while the instructor for the course was located in Gilbert, Arizona. Several logistics and technical issues had to be resolved before a suitable plan could be defined and implemented. The processes used to create, edit and produce the final ENMA 613 product will be discussed in this paper.

Getting Started – Software Compatibility

The first step in creating the course was to define the course objectives, to identify the appropriate textbook, and to begin creating the necessary course materials. Fortunately, Dr. Paul Kauffman at Old Dominion University had recently taught the same course for resident students at ODU and was able to provide a vast amount of information to be used in creating the digitized version of the course. Basic assumptions had to be made regarding the availability of computer equipment to students before course materials could be developed. The initial assumption was that presentation software, like Microsoft *PowerPoint*™, would be adequate for developing all course-specific information for the students. This assumption was only partially correct. Course information encoded in *PowerPoint*™ was developed and delivered to the Military Distance Learning Programs office at Old Dominion University where the basic information was converted into a "web-friendly format" using *Macromedia*™ and related software tools. This allowed the visual information to be captured but the audio portion had to also be addressed. Digitizing the audio information proved to be the limiting factor in creating the course material for several reasons. More will be covered on the audio issues later in the paper. Software compatibility issues continued to plague the authors during the development process. Specifically, the textbook selected for the course – *Business Logistics Management - Planning, Organizing, and Controlling the Supply Chain, 4th Edition*. by Ronald H. Ballou [2] – included a CD-ROM with Logistics specific software – *Logware*™ – however, the software could not be easily integrated into the course since deployed officers and enlisted men may not be able to add supplemental "non-approved" software to educational computers, therefore, the software was not included as a required element of the course. This had an effect on converting materials already created by Dr. Kauffman as well as structuring examinations without the use of course-specific software tools. This artificial limitation reduced the quality of instruction and forced the instructor and students to use work-around solutions using "approved" software tools, such as Microsoft *Excel*™. This limitation in computer resources needs to be evaluated for future generations of distance delivery coursework for NCPACE and other students in the educational system.

Working Through Audio Difficulties

In order to effectively capture and present materials for the course, a semi-traditional lecture/presentation format was utilized. The graphical elements were created using *PowerPoint*™ as stated before, but the audio portion of the material had to be addressed. The solutions for capturing the requisite audio files were time-consuming and cumbersome. The first step was to select, purchase, and install the necessary audio encoding software. *GoldWave*™ [3] Digital Audio Editor, from GoldWave, Inc. (a Canadian Company), was selected based on recommendations from the Military Distance Learning Programs office at ODU. This software was relatively easy to purchase on-line, to install, and to operate, but the full functionality of the software was never really mastered during this process since mastery would take several hours of dedicated practice and experimentation. One of the first surprises during the audio encoding process was the size of each audio file. For example, a two-minute recorded clip could range from 2 Mb to 5 Mb in size. The information on each corresponding audio slide would quickly become stale for the student, so several more slides had to be created for each module in the program. On average, 50 to 60 slides were used to cover a single chapter in the textbook, with

each slide remaining visible for one to two minutes. A simple mathematical calculation will show that 60 slides times 5 Mb per slide for accompanying audio would create very large storage and transmission requirements for the raw data. This was a concern, because the method of transmission was over the phone line via an FTP connection. Once the audio files were recorded, the authors individually evaluated them before placing the files into a dedicated directory structure and transmitting them to ODU for post-processing. This batch processing methodology created significant delays in the module review process and continuity was difficult to maintain due to the sequence of editing events. For example, audio files submitted during "week one" may not be returned to the author for review until three to five weeks later. This delay caused problems in maintaining course continuity and quality control, because it was difficult for the author(s) to remember the flow and thought processes used to create some of the information. The editing and review process, therefore, required significant review and evaluation, similar to preparing for an examination, weeks after the material was originally covered in class.

Hardware Issues

In order to capture all of the audio files, graphics files, and supplemental information, a significant amount of storage space is needed on the computer that is being used to capture, process, and store the information. Having enough "spare" capacity is a rather subjective issue, however, the effect of running short on spare storage capacity or processing capacity results in a slowdown or pause in the data throughput rate necessary to capture streaming audio files. If the computer has to write a portion of the audio file to the hard drive, while the recording is still in progress, the audio stream will be momentarily interrupted and the resulting audio output file becomes broken and corrupted. If the author does not recognize this interruption, the broken audio will likely be transmitted to the post-production facility as a "good" file. When the defective audio is discovered, days or weeks later, the file must then be redone. This may include re-recording the entire audio clip (with the corresponding changes in voice pitch, volume, tone, and tenor), or it may be possible to correct the file by editing individual sound bites using the editing function of the software. In either case, the time to re-create the audio file(s) can be significant. The best advice the authors can give to other faculty who plan to complete an on-line endeavor, such as the one documented herein, is to be very careful with each step in the process and to insure it is correct *before* it ever leaves the author's control. It is much easier to edit audio and graphic files during the original development process than it is to wait until someone else in the system identifies the errors days or weeks later. To better define the spare storage capacity needed to insure relatively problem-free operations, it was determined that a minimum of 200 Mb of spare storage capacity was required at all times. Even though 200 Mb of spare storage capacity seems to be adequate to handle day-to-day computer operations, the cache and buffering requirements needed to process real-time audio, under the conditions cited above, suggests otherwise.

Summary

The experience of creating an entire course for distance delivery is a valuable experience, and the authors highly recommend that all instructors endeavor to create one or more courses using these emerging technologies. It must be noted however, that it is neither a simple nor a

quick way to complete an academic course, when compared to a traditional in-class delivery method. Unless the instructor(s) are well-versed in a wide variety of software applications, including audio capture/editing software, graphics programs, web-development tools, and traditional software products, such as *Microsoft Office*™, they should ensure they have a team of experts available to perform the necessary tasks to turn out a quality product. The time required to complete the entire course was nine calendar months, but some of this time was consumed by the re-mastering process cited above and more time was used to develop a core competency in new software tools, such as *GoldWave*™ and FTP (File Transfer Protocol) software.

Bibliographic Information

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3. GoldWave Digital Audio Editor. Retreived January 4, 2003 from http://www.GoldWave.com.

Biographic Information

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