NSDI Cooperative Agreements Program
Standards Development and Implementation Assistance and Outreach Project
Final Project Report

31 March 2010

08HQAG0034

A Proposed Course and Modular Curriculum for FGDC Standards Adoption and Implementation

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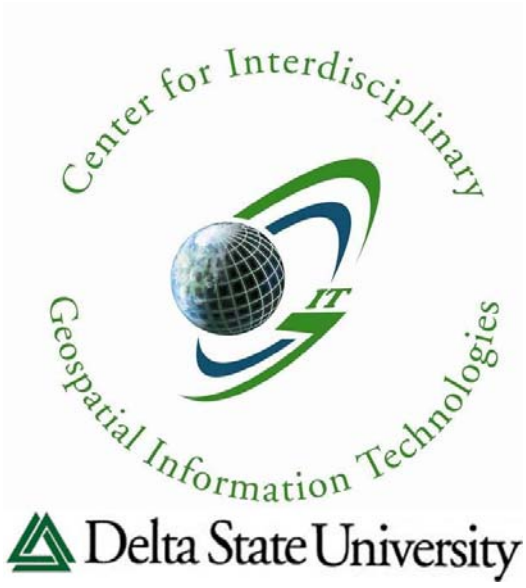

Executive Summary

The objective of this program of work was to develop training and educational modules for the US National Grid, Orthoimagery, Cadstral, and Address Data Content standards as adopted by the FGDC. Each module was to contain 2-9 hours of instructional time, based largely in narrative videos, which may be strung together for use as a 3-semester hour academic course. This program of work proved exceptionally challenging because of unforeseen technical difficulties and an overambitious scope of work. It also proved to be tremendously rewarding as many of the final products are of a high quality, chiefly the orthoimagery and USNG components, and will likely find wide-spread use.

Project Narrative

This project resulted in the following tangible products:

1. A series of Powerpoint-based slide decks for use in providing instruction about the FGDC cadastral standard, address data content standard, USNG standard, and orthoimagery standard.
2. Materials for use in assessing comprehension about the FGDC cadastral, address data content, USNG, and orthoimagery standards.
3. Recorded lectures and demonstrations for the orthoimagery and USNG standards.
4. The development of a working technique for creating future materials.

Unforeseen obstacles presented significant challenges that altered the fundamental premise of this project from attainable in the amount of time and effort planned to extremely over-ambitious. Challenges faced in the pursuit of completing this project generally fell into one of two categories: technical and "everything else". Both sets of challenges were surprising as we did not realize that which we did not know. For example, as an academic program, developing course content is a forte. In fact we have developed dozens of courses, academic programs, and training events, winning awards and accolades in the process. We are also a group of computing and technology experts with extensive experience in web design, GIS, remote sensing, networking, server and database administration, and more. .

Challenges Encountered

Technology

While it is fairly straight forward to record a digital video 15 minutes in length or less, we encountered significant challenges doing so for longer videos. The technical requirements change significantly when moving from a YouTube type video to longer content. Understanding technical specifications and requirements thoroughly are critical for success. These challenges included:

1. Finding and evaluating software that would permit screen capture and voice narrative – we eventually chose Camtasia Studio and SnagIt, both by Techsmith (http://www.techsmith.com) and were quite please with our choice. Nonetheless, before arriving at that conclusion we learned that requirements included:

a. Maintaining a reasonable capture resolution such that the quality of image shown maintains the level of visual detail needed to provide adequate instruction about topic at hand. For example, line thicknesses of 0.2 mm required at least 1280 x 1024 capture resolutions. Lesser resolutions literally loose the finer points.
b. Determining the required frame rate for capture. The frame rate of capture required for recording a Powerpoint lecture is typically much slower than that required to capture an on-screen demonstration involving ArcMap (12-15 vs 20-24 frames per second). If a lower frame capture rate is used during an on-screen demonstration, the cursor jumps around the screen and menus pop on and off too fast.
c. Keeping decent control of file sizes. This concept we understood going in – file size is a function of resolution and image size. What we did not know was how well any given software package could/would compress files and uncompress them during playback.
d. Permitting playback on both a local computer and over an Internet connection without the use of a streaming media server. Flash video format provided the solution to this issue.

2. Delivering content to a variety of browsers and through a variety of security environments proved to be more difficult than anticipated.
    a. Our principle challenges were in overcoming our own campus' internal network security. To this day we still have not been able to get our office of information technology to open the needed outbound ports in the campus firewall. This was one of those issues we would have thought easy to overcome but in which we quickly lost weeks of time navigating the bureaucracy.
    b. In attempt to overcome the above, we purchased space at http://www.screencast.com/users/Talbot_Brooks. We posted our initial experiments to this site. All USNG videos are still running live on this site and we will continue to maintain them at that web location indefinitely. However, the Federal government has blocked access to that site for most government computers. Again significant time was lost and no final resolution was reached in opening this site for access by FGDC staff.
    c. We experimented with Internet Explorer, Opera, Google Chrome, and Firefox and discovered that production settings in the video needed to be altered for correct playback online. This process involved a tremendous amount of trial and error and "code cracking" where we manually manipulated xml scripts associated with online playback. A lesson learned here – after significant frustration and experimentation – is that Camtasia will spit out a group of files associated with the resulting video. For most browsers videos will play as long as these files are maintained in the same root directory. Firefox proved to be the exception – there is an internal pointer in the xml file described above that must be manually reset. We reported this issue to TechSmith and it has since been resolved in subsequent releases.

    d. Additional testing was conducted within the BlackBoard 6.0 and WebCT environments. Once we nailed how to deliver smooth video for most any browser we encountered no problems within these application frameworks.
3. Investment in a high quality sound card is required. At least 2-3 hours should be planned for learning how to correctly adjust input volume levels and other audio recording controls. We used a Sound Blaster Extreme X-Fi card and found the results satisfactory.

"Everything Else"

Items in the "Everything Else" category included:

1. The amount of time required to record lecture and on screen demonstrations was much more than anticipated. When we lecture in the classroom or provide a lab demonstration, a garbled phrase, sniffle and cough, or interruption is not a major challenge. However when recording the following should be considered:
    a. Near absolute background silence is required.
    b. There is no such thing as "nailing it" in one take. Plan on at least 10 hours of preparation, recording, and editing time for every hour of product created.
    c. Keep water or some other beverage handy.
    d. Test input volume levels against playback volume levels.
    e. When a mistake is made in the narrative, DO NOT stop recording. Simply pause for 3-5 seconds and then correct your error and continue. We initially re-recorded several hours of lecture after finding too many coughs, wheezes, slamming doors and other assorted noises. By leaving an extended pause one creates an adequate gap that may be used during the editing process.
2. We tried to employ several different narrators so that those using these materials would not have to listen to the same voice over and over again. We learned that some people with talented voices are not good at extemporaneous lecture, no matter how well they understand the material. Thus some narrators will require well edited scripts, others will not – it is a matter of style that must be known before tackling a project like this.
3. Plan for different learning styles. While this is a known commodity in education, it is tricky to accommodate all learning styles adequately in "canned" lectures and on-screen demonstrations.
4. Standards are all about details. Be prepared to explain minute details in an interesting way because they matter significantly with respect to this topic. We put some of the most dedicated standards experts to sleep with early attempts.
5. Be prepared to receive a tremendous amount of criticism as every detail will be examined when content is reviewed. This is reasonable and prudent, but when we provided feedback to some of our voice talent they were absolutely overwhelmed with criticisms. Spoon feed critiques and work on one or two elements at a time during the production process.

Reviewers:

Julie Binder Maitra was kind enough to tackle our spelling, slide design, and similar details and provided much needed guidance.

Nancy Von Meyer provided tremendous insight about the cadastral standard to our student interns working on this project. Her patience and skill as a teacher proved invaluable. The Bureau of Land Management will provide additional comment and review.

Tom Terry provided comment and many significant graphics used in providing instruction about the US National Grid

Dr. Henk VonReissen provided critique of the orthoimagery lectures. USGS will provide additional comment and review.

It is expected that the address data content standard will be reviewed by URISA. This standard has changed a fair bit since the preparation of the slide deck for this standard and we are committed to reflecting those changes once the standard gains final approval.

Access

Once the review process is complete and final corrections made, the materials created for this project will be posted to the FGDC web site (http://www.fgdc.gov), the web site for the Center for Interdisciplinary Geospatial Information Technologies (http://gis.deltastate.edu), GITA's web site (http://www.gita.org), and that of the Mississippi Automated Resource and Information System (MARIS, http://www.maris.state.ms.us).

FGDC and the CAP Grant Process

As stated, this project was overly ambitious. While an exact accounting is not readily available, we estimate that in-kind time and resources contributed thus far exceeds 3:1 in favor of the FGDC. That said, the availability of funding and expertise provided pumped enough "seed money" into this project to get it off the ground. This effort will continue long after the grant opportunity is formally closed as it has developed to the point of being viable on its own merits. This is a critical first step because, as identified in our original proposal, little attention to standards is given in the academic environment. The Center for Interdisciplinary Geospatial Information Technologies is committed to providing additional content development and distribution to raise this level of awareness. We would repeat this project, but would limit our efforts to ONE standard and solicit continuing guidance from an expert in creating online video.