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

An Interim Report From:

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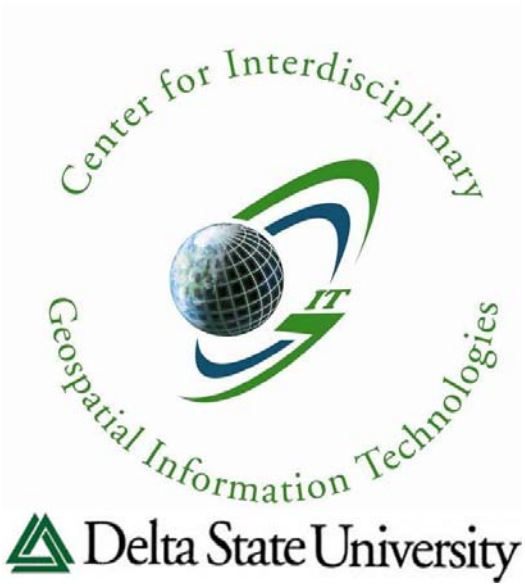

Executive Summary

The Center for Interdisciplinary Geospatial Technologies at Delta State University (The Center) was awarded a Federal Geographic Data Committee (FGDC) CAP Category XI award in the amount of $25,000 to construct educational modules in support of the FGDC's US National Grid, Orthoimagery, Address Content, and Cadastral Data Standards. The Center's efforts were initially focused on two principle arenas. The first was the development and application of technologies suitable for the presentation of educational modules in an online format. Work in this first arena was extremely challenging as appropriate software for the construction of educational modules had to be evaluated for not only for successful use in constructing the actual lessons, but use as a stand alone package that could be easily integrated into classroom and online environments without creating an additional technology burden on potential users and delivery systems. The second arena required establishing detailed knowledge about each standard among all project staff. Faculty members at the Center were able to use the second arena as a test bed for teaching standards curriculum to an undergraduate student body. Technical limitations, described in detail below, helped guide the construction of the resulting curriculum. These curricula are now being assembled for evaluation using introductory and advanced GIS students at Delta State University.

Project Narrative

The purpose of this project is to develop easily accessible and well organized training opportunities for FGDC standards in support of the belief that such materials must exist before widespread adoption, implementation, and regular use may occur. Specifically, this project addresses the following:

1. Working to identify existing education and training modules on the FGDC website and integrate them within the "Training" section on the FGDC web site in an easy to use fashion.
2. Update/create new training modules the FGDC website for the US National Grid, Cadastral, and Orthoimagery standards.
    a. Addressing (we acknowledge that this standard is still under review)
3. Integration of existing and newly created standards training into a 3-credit hour online course, the curriculum for which may be freely shared among educational institutions.
4. Providing outreach to non-traditional users through publication about spatial standards in non-spatial publications and newsletters representing the above identified marketplaces.

We originally commenced the work plan as outlined below, but soon realized that some technical challenges existed with online delivery of course materials. These challenges were as follows:

1. Online educational modules MUST NOT place an additional technology burden on those seeking to serve or consume them.
    a. For the consumer side, lessons cannot require the type of major Internet bandwidth availability associated with the delivery of extremely high quality audio and video. This drove use to find means and methods of compacting the size and means of delivering audio and video such that it plays well when used with a DSL Internet connection.
    b. For the server side, we recognized that bandwidth, hardware, and software challenges were present. By way of example, FGDC does not use a streaming media server nor the software required to support such a device for the presentation of online content. We needed to find a way to deliver our lessons without imposing that burden.
2. To reach the widest possible audience, we realized that the lessons constructed must work within a broad range of hosts. We want training modules to be self-contained and usable directly from an FGDC server, from within a BlackBoard type software package (used for online instruction at many colleges and universities), and from within free online tools such as Google Video and YouTube.

These technology constraints frustrated us considerably at the project outset. To help resolve these issues, we consulted with Dr. Susan Hines, a technology educational specialist here at Delta State University, and participated in a faculty technology institute during August of 2008. Using these experiences, we were able to successfully overcome most all of these hurdles.

We are using two software packages, Camtasia and SnagIt, both produced by Techsmith to create and deliver content. These software packages enable use to record audio and video from a

Microsoft PowerPoint presentation, capture screen movements and audio using software such as ESRI's ArcGIS, and edit the resulting products for sound and video quality and length. Moreover, we can export the resulting product into a broad spectrum of formats for server side delivery, most importantly as a self-coded html-based server side video product that plays using a Flash media player. To install an use, a server-side administrator needs only copy a set of files and establish a hyperlink on the desired web page. An example of the resulting product may be found at:

http://mississippi.deltastate.edu/data/GIS%20I%20Notes/Data%20models%20Lecture%202/Data%20models%20Lecture%202.htm

The underlying file structure needed to implement this lecture at:

http://mississippi.deltastate.edu/data/GIS%20I%20Notes/Data%20models%20Lecture%202/

The result is that a 3 KB htm control file is created and is easily embedded in any web server (a streaming media server is NOT required). This file acts in concert with a file containing production and player information to self-stream a 17 MB media file containing a 35 minute lecture. While we have discovered some minor issues with timing the transition of slides and/or software demonstrations with the underlying audio track, the product has proven tremendously effective – especially when we were forced to use it when yet another unexpected challenge arose.

The principle investigator, Talbot Brooks, is also an extremely active emergency responder and serves as the Deputy Chief for Mississippi's 3rd largest fire department (Bolivar County). He sustained a life threatening injury in late August that required extensive recovery time at home. During this time period, he communicated with student and staff and was able to tweak the method and product delivered above to provide lectures to his classes from home. Analysis of course outcomes and student evaluations found that this method was rather effective – students fared just as well in accomplishing learning outcome objective and found the course as satisfactory when supplemented with teaching assistant support as those taught in prior semesters in person (author's note – I'm not sure if my feeling should be hurt here or not).

Similarly, sample videos were created, external to the PowerPoint environment and tested as shown under the training resources section of our website at:

http://www.deltastate.edu/pages/3504.asp

With these initial technical challenges met, we began organizing our educational modules around the following outline:

1. Work with each maintenance authority to develop learning outcome objectives
2. Refine the module outline proposed below or devise a new one if needed
    a. USNG
        i. Why Use USNG?
        ii. An Overview of Projections and Coordinate Systems

iii. National Map Accuracy Standards
iv. The USNG and Fundamental Map Reading Skills
v. Making USNG Maps, Part 1
vi. Making USNG Maps, Part 2

b. Cadastral (from http://www.fairview-industries.com/standardmodule/intro.htm)
i. Purpose and Benefits of the Cadastral Data Content Standard
ii. How the Standard Was Developed
iii. Other Standards and Related Activities
iv. Data Modeling Techniques, Rules, and Diagram Conventions
v. Crosswalks, Translations, and Examples
vi. Understanding Compliance with the Standard
vii. Maintenance and Support of the Standard
viii. One of the optional modules

c. Orthoimagery
i. Introduction to Orthoimagery
ii. Data and Orthoimagery Structures and Formats
iii. Data Sources
iv. Aerial Extent and Georeferencing
v. Understanding Resolution and Accuracy
vi. Data Quality and the Effect of Elevation

d. Addressing
i. Introduction and Understanding the Components of an Address
ii. Street Address Data Content, Part I
iii. Street Address Data Content, Part II
iv. Street Address Data Classification
v. Relational Data Models and Street Addressing Standards
vi. Street Address Data Quality
vii. Street Address Data Transfer

3. Create assessment devices
4. Evaluate the effectiveness of the curriculum using Delta State University students

Care is being taken to match and balance information about each standard with examples of implementation. In this fashion a user will not only learn about the standard itself, but gain a better understanding of why its implementation is important and how it can be implemented.

The following link represents two sample modules, addressing the need and use of the standard, the other for implementation as it applies to the US National Grid standard. Both use a Windows Media Player Format (when we serve the final versions, they will all use Flash, but we wanted to demonstrate the flexibility of what we've learned):

How to read US National Grid coordinates:

http://mississippi.deltastate.edu/data/FGDC/Talbot/Read_USNG/Read_USNG_media/Read_USNG.wmv

How to create use US National Grid map book page polygons for use in creating a map book in ArcGIS – note the zooming and highlighting tools used:

http://mississippi.deltastate.edu/data/FGDC/Talbot/Make_Polygons/Making_Final_media/Making_Final.wmv

Our next steps are as follows:

1. Create final drafts for each lesson plan (we are approximately 50% complete thus far)
2. Record each lesson using appropriate voice talent (this will required 80-120 hours of time using student voice talent)
3. Prepare assessment devices (approximately 20 hours)
4. Transfer results to FGDC and standard stewards for review (uncertain time frame – we are beginning to explore this now)
5. Post educational models to FGDC website and work with Vaishal to re-organize training section (this should take approximately 40 hours)

As of now we anticipate finishing this project on time, however it will be a close race. If an extension is required, we will not request additional funding unless the feedback from the stewards and FGDC require significant changes.