

Developing an Electronic Archive: MetaData, Learning Objects, and Quality Control Carl Rosen

Programmatic Significance

During 2003, we completed the *e-Soils* TEL project; a database of learning objects that can be used to develop “just in time” courses, modules, and or presentations to address local situations and needs within communities. We envisioned *e-Soils* as a model for distributed core knowledge; core knowledge that could be used as an ongoing source of information as well as used to create and address “teachable moments” as the need arose.

Under the guidance of the Digital Media Center staff, the goals for *e-Soils* were refined and grew to incorporate meta-data standards for our learning objects — a methodology for the purpose of enhancing and sharing educational resources.¹ Additionally, we soon discovered (through one of the DMC Workshops) that, in order to be most useful, our initial 64 learning objects were in need of further division (over 600 learning objects have now been identified). These factors led us to reexamine our software choices for database development and we determined that, in order to be most helpful to the University community, we should develop a database and Web architecture that could easily be transferred to those who may want to use the *e-Soils* electronic archive framework.² Although the above refinements extended the time commitment to the project, we will eventually have a product that will be more successful and long-lived, and meets, not only the needs of our department, but can be of value to other members of the University as well (see Appendix A for a complete description of *e-Soils* outcomes).

Project Description

We are proposing *Phase Two* in the development of our electronic archive. Deliverables from this phase will include the following activities and learning outcomes:

- Develop criteria for defining a learning object; criteria that best suits the purposes and functions of an educational electronic archive such as e-Soils.
- Develop a “quality control rubric” that involves self-assessment standards as well as a quality control process which ensures that the *e-Soils* database is populated with consistent and adequate educational material.
- Populate the database in accordance with the above standards.
- Evaluate content accuracy and relevance as well as user satisfaction and effectiveness.
- Create a process document (in conjunction with the DMC) that explains the steps needed to set up and populate an electronic archive (information gathered from both grant years).
- Determine how to share (and then share) the *e-Soils* framework, and the process document described above, with the University community in accordance with DMC guidance.

¹ We choose the Dublin Core Education metadata standards (www.dublincore.org). The objectives of the Working Group are to develop standards for the use of Dublin Core metadata in the description of educational resources; educational resources applicable for many national education communities and cross-sectoral communities.

² E-soils was built to run on a Gentoo Linux Web Server using PHP scripts with a MySQL database backend. The metadata for e-Soils is kept in a MySQL database and all educational files are stored on a Departmental server. The interface was built using University of Minnesota Web site templates (see <http://webdepot.umn.edu/>).

As such, *e-Soils* will affect those courses and communities outlined in our original proposal, as well as be available to fulfill multiple course requirements and multiple outreach functions throughout the University.

Collegiate and Departmental Support

In addition to matching funds from SWAC, there are potential avenues for revenue production through content delivery (outlined in original grant). *e-Soils* also addresses COAFES strategic initiatives through its potential for education and outreach. *e-Soils* innovations will include:

1. an improvement in departmental teaching through an increase in information access and consistency in core knowledge delivery.
2. an exchange of knowledge with both rural and urban communities by providing online courses, presentations, and/or employee training.
3. the creation of “teachable moments” with “just in time” modules that respond to local problems and address local needs.
4. an intensive evaluative and feedback process that will guide both the development and content accuracy/relevance of nodes and variables as well as the quality of information delivery and audience uptake.

Sustainability

We believe the *e-Soils* TEL grant would be sustainable in the following ways:

- *Experience.* The experience of developing an electronic archive will be valuable to others within the University community. As such, we have developed a Web site (esoil.soils.umn.edu/esoils/) where we will describe our “lessons learned,” and post all process documents. This URL also contains the interface/infrastructure for our database.
- *Mentoring.* Dr. John Lamb, Professor of Basic Soils 2125, has agreed to employ *e-Soils* as an online course during the spring of 2005. We also hope to identify other mentees — one at the level of interaction with the public (e.g. an extension presentation to meet local needs), and one in industry/government (e.g. employee training programs).
- *Sharing.* In addition to being of value to SWAC personnel, we hope to share our methods and electronic archive framework with the University community.
- *Publishing.* In conjunction with the DMC staff, we would like to publish our findings (e.g. related process documents) in a relevant discipline-specific journal or a peer-reviewed publication.

Appendix A: Outcomes from 2003-2004 *e-Soils* TEL Grant (Swenson Investigator)

Outcomes from our TEL project included creating a new database/search engine, developing a new Web-based architecture and interface, reviewing and implementing meta-data standards, and refining our definition and creation of "learning objects." These modifications have slowed the completion of our TEL deliverables, however, we hope to have a finished product by Fall semester of 2004. Although the progress towards task completion has slowed, the guidance that the TEL group has given us has produced a project that better addresses our TEL grant deliverables and has greater potential for cross-application to other meta-data/learning object projects. Project deadlines and priorities have changed due to the following:

1. Initially we had proposed building upon the technology of two previously funded TEL projects (i.e. *e-Course 2002* and the *e-Library* prototype -- developed by the Department of Rhetoric and the College of Agricultural Food and Environmental Sciences). While using the general principles of uploading and managing documents from these projects, after a deeper investigation we realized that there were better programming options available and chose not to utilize these projects' basic framework and software. *E-soils* was built to run on a Gentoo Linux Web Server using PHP scripts with a MySQL database backend. The metadata for *e-Soils* is kept in a MySQL database and all educational files will be stored on a Departmental server. The interface was built using University of Minnesota Web site templates (see <http://webdepot.umn.edu/>). This part of the project was not planned for and, although it has taken a fair amount of time, we believe that we now have a product that better addresses our TEL grant deliverables.
2. The TEL grant team guided us toward the concept of "Meta-data" (attaching global/identifying elements to our data). We reviewed several different meta-data standards and decided to use the Dublin Core meta-data standards as developed by their Education Working Group (see www.dublincore.org). Part of our reasoning for using Dublin Core standards was that it only had 15 required metadata elements as opposed to other standards that used up to 75 elements per item entered. Again, this was not part of the initial project, however, we have created an interface that allows for entering meta-data while uploading education nodes and, in the end, are able to deliver a TEL project that has more potential for cross-applications.
3. A total of 64 educational nodes were identified and developed based on a logical breakdown of our Basic Soil course (Soil 2125). However, the TEL grant team guided us toward a more refined understanding of "learning objects" and we soon realized that we had many more nodes than originally anticipated (600+). While we are satisfied with the amount of progress we have made on the initial sixty-four nodes (i.e. completed task 2 and 4 of the original grant), we have quite a bit of work ahead of us to further divide these nodes into proper "learning objects" before we will enter them into the *e-Soils* database.
4. Due to the above-mentioned changes and additions to our TEL project, we are still making progress toward completion. We plan to submit a follow-up grant in order to complete the *e-Soils* project.