

## **Next Steps in Support of Developing a Quality Plan for DLESE**

On July 10, 2004 the DLESE Steering Committee approved the following modified recommendations in support of developing a Quality Plan for DLESE. In doing so, the Steering Committee stated, “The success of DLESE is linked as tightly to the quality of the user experience as to the quality of its individual resources. Hence, innovative forms of user interaction with DLESE will create opportunities for new quality metrics. These metrics could foster user participation in elevating DLESE quality and, as a byproduct, improve user effectiveness.”

The Quality team, working in close concert with the Steering Committee (SC), will create working groups for each of the major tasks below. To do this, we will tap the broadest expertise available across the DLESE community and even beyond. The working groups will ideally include at least one SC member, one person from the Quality team, representation of the diverse user groups within DLESE, and experts in the relevant science, technical, and pedagogical aspects of the proposed tasks. We seek 5-6 persons for each working group who will form a core group actively researching options and writing a final report. For each working group we also seek as many interested people as possible to act as a sounding board to the core team. The Quality team will identify an overall coordinator for the working groups who will report to the SC regularly and facilitate communication among co-chairs of the individual working groups.

Although there is significant overlap among the tasks, working group charters encourage cross group fertilization and understanding of useful interdependencies. Clearly, working groups for tasks 3, 4, and 5 have to work very closely. Task 6 cannot be accomplished in a meaningful way without the input from Tasks 3, 4, and 5 and recommendations from all working groups should be integrated in Tasks 1 and 2. Including at least one SC member and one person from the Quality team on each working group will facilitate sharing ideas on overlapping tasks as will use of the Library Quality discussion group ([www.dlese.org/MailingLists/](http://www.dlese.org/MailingLists/)). The working groups, being assembled now, will create a set of draft recommendations for the community to consider prior to the Quality workshop in October. These draft recommendations will be refined with the community input and then integrated into a comprehensive plan at the workshop. The plan, with specific recommendations for policy and procedural steps to improve the quality of the DLESE experience, will be presented to the Steering Committee for approval. If approved, the SC would provide guidance on its implementation.

### **Task 1: Create a framework for an Earth system library.**

**Starting Point** – Using the definition of the Earth system library developed by the Collections Committee and approved by the Steering Committee in April 2004, create a framework for establishing relevancy and scope of the resources to the Earth system. This framework would become an element in the review of all resources in the library. A framework that links each resource to an Earth process or sub-system will lay the groundwork for a visual browse interface (Task 6) that, in turn, clearly demonstrates how each resource is relevant to the Earth system. All other tasks related to ensuring quality across DLESE are dependent upon developing a clear and functional framework for evaluating the criteria of “relevant to Earth System education.” By

creating this framework, we will functionally define what the library collection should contain. As a starting point, the working group will consider the AAAS Strand Maps and the Bretherton Earth System Diagrams as potential models for the framework and its implementation as a visual interface.

**Short-term goals:**

- Creating a “road” or “strand” map — possibly following the structure of existing introductory college or high school Earth system science courses or a "classic" Earth system cycle diagram — for proactive use in defining the scope of subject matter falling within the framework.
- Setting priorities for gathering within that subject matter. For example, potentially giving decreasing priority to the following subject categories: earth systems content, earth science, environmental medicine, environmental law, etc.
- Developing evaluation criteria for determining whether and where a resource fits within the framework e.g. in what subject area.

**Long-term goal:**

- Apply the same strategies while engaging sub-communities in gathering and evaluating resources for other content “road maps” within Earth systems.
- Use the "road map" and evaluation criteria to look for gaps and thin spots in the library.

**Task 2: Create a framework for conducting high quality reviews of the instructional and supporting resources within DLESE.**

**Starting Point** – Review criteria and best practices for the DLESE Reviewed Collection exist and can be used to review resources through the Community Review System. Resource quality guidelines for the Broad Collection were reviewed by the Steering Committee in April 2004. The Committee recommended further study before adoption. Building upon these frameworks and feedback from the 2004 Annual Meeting (especially Strands 2 and 3), this working group will develop mechanisms that increase community participation and facilitate review of all resources submitted to the library. A goal of the review process is shaping DLESE to cultivate a scientifically discriminating community of practice. It is anticipated that the framework will incorporate multiple processes that address overall quality needs and community needs. The “high quality review” process is understood to embrace alternative quality metrics, such as collaborative filtering (e.g. teaching tips or other automated annotation or feedback systems similar to those on Amazon.com) and devices that encourage all DLESE users to become critical evaluators and thinkers. The task force will consider including “teaching boxes”, as innovative elements in the quality-process framework. For example, use of a resource in multiple collections or teaching boxes would be considered an indicator of quality.

Concerns about the unique challenges of evaluating educational resources for content and pedagogy suggest the need for a review process incorporating reviews with diverse expertise in science and education. The model of multiple, curated collections (perhaps with distinct editorial boards) within a broader collection, may be a more realistic than the model of a professional journal, because DLESE must serve widely differing audiences. The recommended review framework will also address issues related to review of existing and new collections.

**Short-term goals:**

- Develop a peer-review structure that is based on existing models used in science, medicine, law and other fields by funding agencies, journals, and digital libraries. The structure must allow for refinement as lessons are learned. In terms of evaluating scientific accuracy, other relevant models to consider include those in the legal system in which the concept of “legal sufficiency” is frequently used; that is, they do not claim total legal correctness, but that it is adequate for the intended purpose. The analogy for our introductory educational activities and interests would be that the science is adequate (or valid) for the intended instructional purpose. The recommended review structure should incorporate a cost-benefit analysis for review of the present and future holdings and address the question of “in what ways does establishing value or usefulness differ in a digital world than in the print or journal subscription world.
- Revise review criteria and tools as necessary to accommodate new demands of the peer-review structure and the Earth system framework developed in Task 1.

**Long-term goals:**

- Provide assurance of the quality of all DLESE resources.
- Build a DLESE community at the intersection of education, research, and technology.

*Tasks 3-5 revolve around the need for improved mechanisms for cataloging and retrieving resources. The recommended vocabulary framework is part of a bibliographic system, and the future of controlled vocabularies in such systems is the subject of important digital-library research. These working groups will consider alternatives to traditional controlled vocabularies, perhaps including the automated generation of queries (blending full text and metadata) from elements of the “relevance framework,” such as the “benchmarks” from the AAAS Strand Maps. Where appropriate, these working groups will be merged with the existing metadata working group. Two key elements of the work by these groups are identifying mechanisms that are amenable to automation and persistent growth. Frameworks that require high levels of human interaction are less feasible to sustain. Where human interaction is necessary, options should be explored to use the framework developed in Task 2.*

**Task 3: Recommend a framework for new vocabulary development and strategies for integrating it with the Discovery system.**

**Starting Point** - Facets or hierarchical frameworks are two options for vocabulary development. Are there other frameworks that present alternatives to controlled vocabularies? What are their strengths and weaknesses of these frameworks with regard to the existing infrastructure in DLESE? How can we most effectively acquire and integrate the new framework or vocabulary into the library? Presuming the vocabularies are not static and will grow over the life of DLESE, what framework is most easily and effectively updated? How should the new vocabulary be applied across the existing library resources? This working group would investigate these questions and make recommendations on how to proceed with vocabulary development or alternative strategies to controlled vocabularies and their implementation.

**Short-term goal:**

- Assess the existing metadata/vocabulary framework and alternative strategies to controlled vocabularies and formulate a plan with the goal of increasing the flexibility to accommodate long-term change and development of user needs.

**Long-term goal:**

- Allow continual refinement of vocabularies and their integration with the Discovery system using systems that require minimal time and effort yet, assure quality.

**Task 4: Develop an Earth System vocabulary reflecting subject matter that falls within the defined Earth System framework and reflects the diversity of users and resource types.**

**Starting Point** – Earth system and Earth science vocabularies have been constructed by a number of groups (Mogk et al., CSU Monterey Bay, ESSE, NASA, AGI). How can these existing vocabularies be integrated within the framework recommended under Task 3 for use by DLESE? What are the best strategies for creating the new vocabulary? How will the quality of the vocabulary be ascertained?

**Short-term goals:**

- Evaluate all known existing Earth system vocabularies for use in DLESE.
- Decide on the approximate initial size and granularity of the initial Earth system vocabulary list (e.g., 30, 300, or 3000 items) that will allow immediate and effective recovery of Earth system resources from the library.
- Develop a plan to get community involvement (K-12, collegiate, public outreach sectors) and appropriate technical expertise to formulate the vocabulary terms and definitions that serve a diverse audience (K-12 teachers, scientists, public).

**Long-term goal:**

- Implement a new Earth system vocabulary with the power to ensure accurate and useful returns on a search and the flexibility to be easily modified as the library and our understanding of the Earth system evolves.

**Task 5: Develop a vocabulary supporting cataloging of resources on teaching and learning about the Earth system and related areas.**

**Starting Point** – The current education vocabulary within DLESE is very limited in scope and has not been evaluated critically since its introduction. It includes terms from the Gateway to Educational Materials (GEM) and other entities but could benefit from a significant expansion of pedagogical terms as well as terms for resources on learning and cognition. How might existing vocabularies be integrated or adopted by DLESE? How can these existing vocabularies be integrated within the framework recommended under Task 3 for use by DLESE? Given what currently exists, what are the best strategies for creating the new teaching and learning vocabularies?

**Short-term goals:**

- Evaluate existing pedagogical/cognitive science vocabularies for use in DLESE.
- Decide on the approximate size and granularity of the initial pedagogical/cognitive science vocabulary list (e.g., 30, 300, or 3000 items).
- Develop a plan to get community involvement (K-12, collegiate, public outreach sectors) and appropriate technical expertise to formulate the vocabulary terms and definitions.

**Long-term goal:**

- Implement an expanded vocabulary with the power and flexibility to be easily modified as the library and our understanding of the teaching and learning about the Earth evolves.

**Task 6: Gather and critically evaluate a range of existing visual browse interfaces useful for teaching about Earth systems, present them to the community for exploration and debate, and make recommendations on critical elements for any new visual interface in DLESE.**

**Starting Point** – This is a relatively new and rich area of research in digital library development but some intriguing examples can be found that may stimulate ideas about what might work in developing a visual browser that facilitates retrieval of resources from the library while also educating the user about inter-relationships in the Earth system. What are the key elements that can provide rich information, in a simple to navigate, easy to interpret visual environment? Some sites and techniques of interest include – kartoo.com, thinkmap.com, strand maps, concept maps etc.

**Short-term goal:**

- Compile traits of innovative visual browse interfaces and assess strengths and weaknesses of different models.
- Explore mechanisms to use the Earth system framework (Task 1) and vocabularies (Task 4 and 5) as infrastructure for the visual interface.

**Long-term goal:**

- Implement a visual browse interface that demonstrates Earth system linkages and provides fluid access to DLESE resources.

Quality Team members:

Annette deCharon, Don Elthon, Michelle Hall, Kim Kastens, Cathy Manduca, George Matasumoto, Judy Scotchmoor, Jill Singer