Teaching Box Builder: Customizing Pedagogical Contexts for Use of Digital Library Resources in Classrooms

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ABSTRACT
This poster and accompanying demonstration introduces the Teaching Box Builder application that, as being implemented, supports the development of pedagogically rich inquiry-based earth science lessons using digital library resources.

Categories and Subject Descriptors
K.3.1 [**Computers in Education**]: Computer Uses in Education – *Computer-assisted instruction (CAI)*. H.5.2 [Information interfaces and presentation]: User interfaces – *User-centered design*.

General Terms: Design, Human Factors

Keywords
Teaching box, user interface design, web services, contextualize

1. INTRODUCTION
Although digital libraries enable science educators to access a much greater amount of immediately available scientific resources for use in the classroom than was previously possible, educators must still face the complex task of developing dynamic learning environments in their classroom. As more educators go online to find quality resources for use in the classrooms, they would benefit from viewing comprehensive and customizable examples of how these resources can be integrated into lessons. The Digital Library for Earth System Education (DLESE) Teaching Boxes project (http://www.teachingboxes.org), which explores the creation of scientifically accurate inquiry-based lessons using digital resources, is a collaborative effort undertaken by DLESE, the University of Colorado at Boulder, University of California Berkeley Museum of Paleontology, San Francisco State University, United States Geological Survey, and a selected group of California middle and high school science educators. This demonstration presents Teaching Box Builder, an application that assists educators in designing and customizing teaching boxes which are sequences of lessons that provide instructions and rationale around the pedagogical use of digital resources.

2. FEATURES AND FUNCTIONALITY
The Teaching Box Builder will allow educators or content administrators to input a hierarchical set of concepts constructed by educators to indicate the path of intended student conceptual progression. Using the completed application, educators can search for and create personal collections of digital resources they find potentially pedagogically relevant. Educators can also record pedagogical notes for resources that are context specific (i.e. notes for the use of a resource in a particular activity). They can directly incorporate resources from their searches or personal teaching box collections into their lessons. Because the application will be completely integrated with the DLESE search web service, educators can also view the full metadata of a resource from within the application. The application will allow teachers to begin with loosely defined ideas for lessons and then develop tentative relationships between these ideas and resources in their personal collections by forming activities, iteratively refining and making concrete the content of their teaching box.

3. TECHNOLOGY & CONTRIBUTION
The Teaching Box Builder is being implemented as a web service (implemented using JAVA servlets) on top of the FEDORA digital object repository [2] that integrates with DLESE search web service. Our application contributes to the existing technology in several ways: 1) a teaching box model is defined as a FEDORA content model that allows for searching across relationships between components, 2) an application layer is developed that serves as a connectivity layer between the user interface and the FEDORA repository and 3) a lightweight user interface is developed that allows teachers to create and modify teaching boxes while supporting dynamic, iterative lesson refinement and brainstorming.

4. FUTURE WORK
Further usability studies of the application will be conducted in 2006. Future features include: the ability to denote a teaching box as a private or publicly accessible version; the ability to search across or select from state science standards from all states to support teaching box customization to local contexts; and providing information to DLESE search engine to allow the tagging of resources as being members of a teaching box.

5. REFERENCES
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