Virtual Observatory Concept

The eGY Education and Outreach Program is developing an education VO portal that connects teachers around the world, in a well-defined way, to the virtual observatory and then to the data. The serious question is: are these virtual observatories really capable of providing quality scientific data for teachers (and students) to use in lessons? What role do efforts such as virtual research environments play as an intermediary between the teacher and any particular virtual observatory which can be complex, jargon-ridden, acronym-laden, hard to navigate, and just different from another virtual observatory? An answer to both these questions, interestingly, also provides a valuable resource for virtual observatories themselves. The so-called ‘Use-Case’ methodology where a user writes down, in a well-defined way, to the virtual observatory and then to the data from a very basic viewpoint to an advanced and highly specialized user finds it hard or impossible to use a virtual observatory.

This presentation gives examples of use-cases, how to develop them, and how to lead them to requirements and system design. We also show why semantics and the use of formal methods such as ontologies can break down formidable vocabulary barriers and provide educators with useful tools.

What’s a Use-Case?

5th graders are preparing a lesson plan aimed at getting students to learn more about the ‘northern lights’, addressing NSES content standards in earth science. The teacher wants the students to learn the scientific terminology, where the phenomena occurs and retrieve some data on graphics for a recent occurrence. The goal of the lesson plan is the engage the students, using authentic data from the aurora, as part of an inquiry-based program.

The aim of this use-case is to translate the teacher’s requirements into a search for, and to find a specific dataset appropriate to the educational portal and then to view it provided in a usable format, as well as in a graphically accessible way.

At present, in order for a teacher to access VO data, he would need to know the appropriate scientific vocabulary, the types of data available, spatial location and directional operating modes of instruments (also models and indices) to be able to locate, retrieve and use the data from the VO. The use-case will demonstrate how ontologies, and semantically enabled interfaces can bridge the current gap in terminology and significantly reduce the level of detail that a person has to know about the data.

1. Goal
   - To develop an interface that allows teachers to access types of data, graphic representations and background information that can be used in standards-based, inquiry-based lesson plans.

2. Main Actors
   - Teacher.
   - The teacher is an individual with college education and knows in general terms what to search for and what hints a student may need to complete the assignment.
   - Students. The students are individuals as a part of a group at U.S. grade level 9 in the state of Colorado.

3. Preconditions
   - Teacher does not need any special permission, access requirements or additional resources to meet the goal. Students and teacher must be able to access all data, images, etc. over the Internet and be able to use the connection.
   - Other actors: VO services to locate the data, retrieve the data and provide additional support to access required services.

4. Characteristics
   - Each selection made by the teacher acts as a constraint for the presentation of selections on the next screen. For example, by selecting a particular phenomenon the teacher is presented with both more specific and related information.

   - The teacher is guaranteed, through the selections made, to obtain data, images and supporting information that are directly related to the topic area of interest (i.e. are not spurious).

5. Use Case is displayed in diagram form to the right.