

Creating Reusable WebQuest Objects with WebQuest Authoring Engine

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Abstract

WebQuest is a constructivist lesson format for web-enabled inquiry-based learning. A WebQuest exists in form of a Web site that contains a collection of Web pages. In this paper, we define the "WebQuest Object" which is basically a learning object. We also present the WebQuest Authoring Engine which enables one to generate WebQuest objects without the knowledge in Web page construction and publishing. The WebQuest Authoring Engine also allows ones to edit the metadata of the WebQuest so as to facilitate the reuse of the WebQuest objects.

1. Introduction

WebQuest [1] is a constructivist lesson format for web-enabled inquiry-based learning. It is proposed by Professor Bernie Dodge at San Diego State University in 1995. Nowadays, WebQuest is widely adopted around the world. In fact, vast number of pieces of research (such as [2-4]) has demonstrated that WebQuest is an effective approach for inquiry-based learning, scaffolding, and collaborative learning.

A WebQuest exists in form of a Web site. Conventionally, skills and knowledge in Web page construction are required to create a WebQuest. However, teachers are either too busy to perform the Web construction tasks; or they do not possess the necessary skills required. Therefore how inspiring the new inquiry-based pedagogy is, not every teacher can afford creating a WebQuest that best tailor-made for his or her educational needs.

Moreover, unlike learning objects which are created according to common E-Learning standards such as SCORM [5] and AICC [6], there is no specification in the metadata format for WebQuests. Very often, teachers are only able to access scattered WebQuest resources with loosely defined descriptive information.

In view of these, we propose a WebQuest Authoring Engine, which provides:

1. Easy generation and publishing of WebQuests (or WebQuest objects, to be defined in Section 2.1) through keyboard-entry and mouse-click.
2. Editing of metadata for the resulting WebQuest objects.
3. Passivation and activation of intermediate WebQuest objects.

2. Defining WebQuest Objects

A WebQuest object is basically a learning object. That is, it is a piece of instructional material with well-defined descriptions. We view a WebQuest object as a collection of Web pages that compose a WebQuest. These Web pages should work together to convey the purpose of typical WebQuests. In addition, a WebQuest object possesses the following characteristic:

1. It contains metadata that includes descriptive information such as the title, target audience, key learning area (KLA), learning objectives, and prerequisite.
2. It is reusable. That is, one can use an existing WebQuest object for other learning objectives with slight modifications.
3. It is portable. That is, the WebQuest object is platform independent and can be easily migrated from one Web servers to another. In fact, the WebQuest objects can be accessed by virtually any Web browsers.
4. It is interoperable. It is possible to use several WebQuest together seamlessly.

3. The WebQuest Authoring Engine

The WebQuest Authoring Engine is an intelligent web-based engine that enables users to create WebQuest objects from a browser on a Client. Under

the step-by-step procedures, users can input their contents and select pre-build styles for their WebQuests. Incomplete WebQuest objects will be returned to the users (*passivation*) so that they can upload them to the server to continue the edition sometime later (*activation*). Through the WebQuest Authoring Engine, the author can edit metadata about the WebQuest object. The Engine also provides a functionality to deploy the finished WebQuests to user-specify Web server (the Destination Web Server).

3.1. Metadata

Authors can edit the metadata for a WebQuest object with the WebQuest Authoring Engine. Since WebQuest itself is a collection of Web pages, a WebQuest object exists in XML, while its metadata is included within the XML document. Each piece of descriptive information is contained in an XML element and its content.

Metadata for a WebQuest object include the followings:

1. A title for the WebQuest.
2. A text description of the overall WebQuest and for each structural component.
3. Location (URL) of the WebQuest front page.
4. The maximum time allowed to complete the WebQuest and the action to be taken when the time limit is reached.
5. The mastery score.
6. Any other special information that the WebQuest will need once it is launched.

An example XML element is:

```
<title>Discovering Hong Kong</title>
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3.2. Passivation and activation

The concepts of passivation and activation are adopted from the EJB (Enterprise Java Bean) of J2EE (Java 2 Edition, Enterprise Edition) [9]. To passivate an EJB means to save the state of a bean to persistent storage, then swaps it out of the active application environment, while to activate an EJB means restores state of a bean from persistent storage, then swaps it into the active application environment.

When using the WebQuest Authoring Engine to construct a WebQuest object, one can passivate an intermediary, that is, “packaging” an incomplete WebQuest object and return to the user for persistent storage. One can also activate the passivated object and continue the previous authoring.

The front page of the WebQuest Generation Engine is illustrated in Figure 2.



Figure 2. WebQuest Authoring Engine

4. System architecture

We present the system architecture of the WebQuest Authoring Engine in this section.

The WebQuest Authoring Engine contains five modules:

1. WebQuest Authoring Manager
2. Pre-built Theme Repository
3. WebQuest Generation Module
4. Passivation/Activation Modules
5. Deployment Module

4.1. WebQuest authoring manager

The WebQuest Authoring Manager is a module that interacts with the users to collect their inputs (including files and images) and preferences. It also accepts incomplete WebQuest files resulted in last edition. The corresponding data (and files) will be feed to the Activation Module as well as the WebQuest Generation Module for further processing.

4.2. Pre-built theme repository

The Pre-built Theme Repository contains a collection of pre-built themes that the user can apply to their WebQuest objects according to their preferences.

4.3. WebQuest generation module

The WebQuest Generation Module it is the core module that responsible for the generation of the html files of the WebQuests based on the preferences entered in the WebQuest Authoring Manager.

4.4. Passivation / activation modules

The Passivation Module and the Activation Module work in pair. With the Passivation module, incomplete WebQuests is “passivated” and returned to the users. In next editing, the passivated WebQuests are passed to the Activation Module to be “activated” again.

4.5. Deployment module

The Deployment Module is responsible for the deployment of completed WebQuest objects to web servers specified by the users (the Destination Web Server). It requires the users to input the destination path, username, and password of the corresponding Web server.

The system architecture of the WebQuest Authoring Engine is illustrated in figure 3.

5. Concluding Remarks

In this paper, we have presented the WebQuest Authoring Engine, which enables one to author WebQuests without the knowledge of Web page construction and Web publishing. We also introduced the concept of WebQuest objects and define the associated metadata.

It is foreseen that with the WebQuest Authoring Engine, one can construct WebQuest easily and the number of WebQuest objects will be increased. We suggest storing these WebQuest objects in a WebQuest repository which allows searching, location, and reuse of the WebQuest objects. The reusability is further enhanced by the metadata we have proposed in the paper.

6. References

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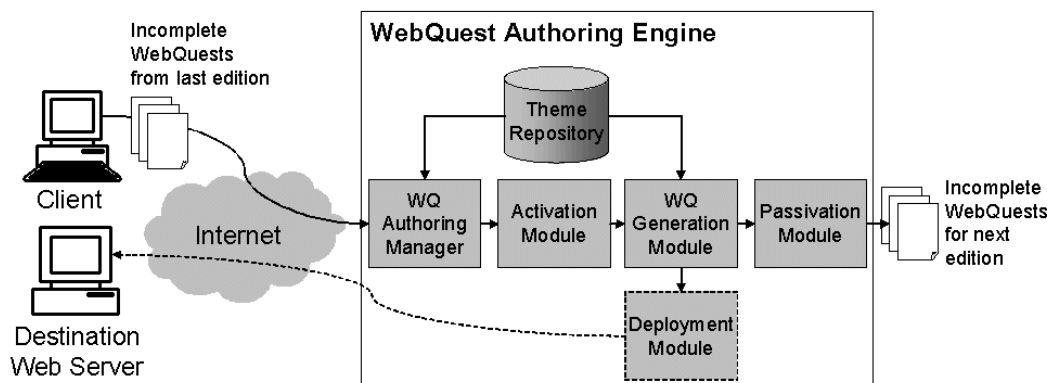


Figure 3. System architecture of WebQuest Authoring Engine