

## CREATING WEB-BASED MATH LEARNING TOOL FOR TURKISH MIDDLE SCHOOL STUDENTS: Webquest

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### ABSTRACT

Internet is the most important product for the computer technology and it began to be used in many fields. Especially in the recent years, the usage of Internet has increased in the fields of communication, entertainment, advertisement, media, and technology. In Turkey, the usage of Internet is not used very common and active in primary and secondary education. The fast developments of the new technologies and the Web-Based Education Systems must be increased the importance of giving courses.

In this study, the information to be aimed at is to introduce the WebQuest system, which was developed at San Diego State University by Bernie Dodge. A webQuest can be used web-based math learning tool for Turkish middle school students. Therefore, an example of geometry education WebQuest is given to introduce WebQuest system because WebQuest will be active in geometry teaching similar to the other subjects. An overview of WebQuest technology application and several resources for teachers and students interested in creating WebQuests can be found on The WebQuest Page (Dodge, 2001). Table 1 lists web sites that have many of these resources.

**Keywords:** Web-based Learning; Web Technology; Internet, Mathematics education; Primary School; webQuest.

### INTRODUCTION

#### What is WebQuest?

A WebQuest is a structured, online learning activity. WebQuests provide inquiry-based activities that require learners to interact with internet resources. Because "there is questionable educational benefit in having learners surfing the net without a clear task in mind, and most schools must ration student connect time severely," WebQuests are structured with a consistent set of components (Dodge, 1997). The six components of a WebQuest are:

- an introduction that is designed to capture student interest;
- a description of the task(s) that learners will complete;
- the process, broken into steps that learners follow to accomplish the task(s);
- the information sources needed to complete the task(s);
- an evaluation that informs students of how their work will be graded (often in rubric form); and
- a conclusion.

A webquest can be used web-based math learning tool for Turkish primary school students at not only formal primary school but also open primary school. Table 1 lists web sites that have many of these resources.

**TABLE: 1**  
**Where to Find Help in Designing WebQuests**

Topic	URL
<b>The WebQuest Page</b>	<a href="http://webquest.sdsu.edu/">http://webquest.sdsu.edu/</a>
<b>What are WebQuest? Who developed the idea</b>	<a href="http://webquest.sdsu.edu/overview.htm">http://webquest.sdsu.edu/overview.htm</a>
<b>Types of WebQuest and WebQuest definition</b>	<a href="http://edweb.sdsu.edu/courses/edtec596/about_webquests.html">http://edweb.sdsu.edu/courses/edtec596/about_webquests.html</a>
<b>Steps in designing WebQuests</b>	<a href="http://webquest.sdsu.edu/designsteps/index.html">http://webquest.sdsu.edu/designsteps/index.html</a>
<b>WebQuest design templates</b>	<a href="http://webquest.sdsu.edu/designpatterns/all.html">http://webquest.sdsu.edu/designpatterns/all.html</a>
<b>Selecting and modifying existing WebQuests</b>	<a href="http://webquest.org">http://webquest.org</a> ,
<b>WebQuest examples</b>	<a href="http://educ.uidaho.edu/webquests">http://educ.uidaho.edu/webquests</a>

### **Creating a WebQuest**

A six-step process for creating WebQuests appears on The WebQuest Page (Dodge, 2001). Bernie Dodge, one of the developers of WebQuests, emphasized that the design process is not as linear as it is presented in the following sections, because each step may require students to revisit and modify work done in previous steps (Dodge, 2002).

**Select a topic.** This is one of the most difficult tasks, as some criteria should be met when selecting a topic for a WebQuest. The topic should be appropriate for learning via a WebQuest, and it should require students to apply higher-order thinking skills. The topic should also align with curricular standards. The sidebar (opposite) presents an example of a WebQuest that meets these criteria.

**Select a design.** This step is also challenging, but a variety of WebQuest templates with different design patterns have been created to present a range of learning tasks that emphasize specific thinking skills [10].

Templates for teachers to select based on their instructional purpose are available on The WebQuest Page (Dodge, 2001). The templates can be opened with a web-editing program (e.g., Dream weaver, Composer, FrontPage, etc.), so that the use of hypertext mark-up language (HTML) coding is not necessary to create the WebQuest. The templates include prompts at each component to assist the WebQuest author. Both student and teacher templates are available. When completed, student templates are what the student will see and use to complete the WebQuest. Teacher templates can be completed to provide the teacher with additional resources or instructional ideas when implementing the WebQuest. The WebQuest Page (Dodge, 2001) also provides examples of WebQuests that have been developed for each template presented. The generic template provides a good foundation for initial attempts at WebQuest design. Other templates can be selected that are suitable for meeting specific learning objectives or for interdisciplinary applications. Write up the tank.

This step requires you to describe what students will do as they engage in the WebQuest process. Here, the task is identified without the directions that the students will follow. Develop the student evaluation. Specify how students will be evaluated at this point. Clarity at this step will provide guidance for the procedural step that follows. Rubrics are often used to inform students of critical evaluation criteria and the possible ratings that students may receive for their work.

Create the process that students will follow. This task is the most time consuming in WebQuest development, as teachers provide students with guidelines and resources for completing the task. Teachers can also include scaffolding activities at this point if foundational knowledge is important. For instance, students may need to develop a vocabulary before deriving a solution to a problem.

Complete the finishing sections. At this point, WebQuest authors are ready to complete the introduction, conclusion, and credits sections, and are also ready to add graphics. Modifying an existing WebQuest is an alternative to developing a WebQuest from scratch. In his article "Adapting and Enhancing Existing WebQuests," Dodge (2002) presents online guidelines for using existing WebQuests.

### **Creating a Draft Web Page**

The first step in designing a WebQuest is creating a draft of the Web page. This can be accomplished by the teacher alone or with the input of the students. The initial information should include the classroom objectives. Once the teacher has determined when in the course of the unit of study the students will use the WebQuest, the objectives are easier to determine. Although it does take time for the teacher to create this type of lesson, it pays off in the classroom with an engaging, cooperative lesson that flows smoothly and incorporates a variety of skills. Collaborative problem-solving fits in nicely with the WebQuest lesson and is a proven way to identify barriers related to inclusion and to create ways to overcome these barriers. The cooperative learning and adapted curriculum approaches of the WebQuest format tend to increase the success of inclusive classrooms (Hobbs, 1998).

## A WebQuest Lighthouse of Alexandria

One example is "Lighthouse of Alexandria " a WebQuest created in coordination with seventh-grade (<http://www.ogu.edu.tr/~agunaydi/webquest>) students' geometry classes, Teachers can help regain motivation and improve the students' mathematics learning performance by connecting teaching activities with realistic experiences and real-life applications. In addition, the incorporation of self directed activities, such as the WebQuest lessons, invites collaborative learning and allows for varied forms of self-expression (Holloway, 1999). When working with students in an inclusive classroom, teachers need to create a learning environment that accommodates the needs of the students with disabilities without bringing undue attention to those students. Teamwork and cooperative learning are also important goals.

## WebQuest Components

The integrated WebQuest unit usually takes about four to five class periods (about 50 minutes each) to complete. The unit usually has six components: Introduction, Task, Resources, Process, Evaluation, and Conclusion.

## Introduction

The WebQuest's Introduction provides an overview and essential background information of the lesson. In our "Lighthouse of Alexandria" WebQuest, it explained that Lighthouse of Alexandria is traditionally considered one of the [Seven Wonders of the World](#). For sailors, it ensured a safe return to the Great Harbor. For architects, it meant even more: it was the tallest building on Earth. And for scientists, it was the mysterious mirror that fascinated them most. The mirror which reflection could be seen more than 50 km (35 miles) off-shore. It also explained that Lighthouse of Alexandria ceased operating and was largely destroyed as a result of two [earthquakes](#) in the 14th century CE; some of its remains were found on the floor of Alexandria's Eastern Harbour by divers in 1994 (See Figure: 1).

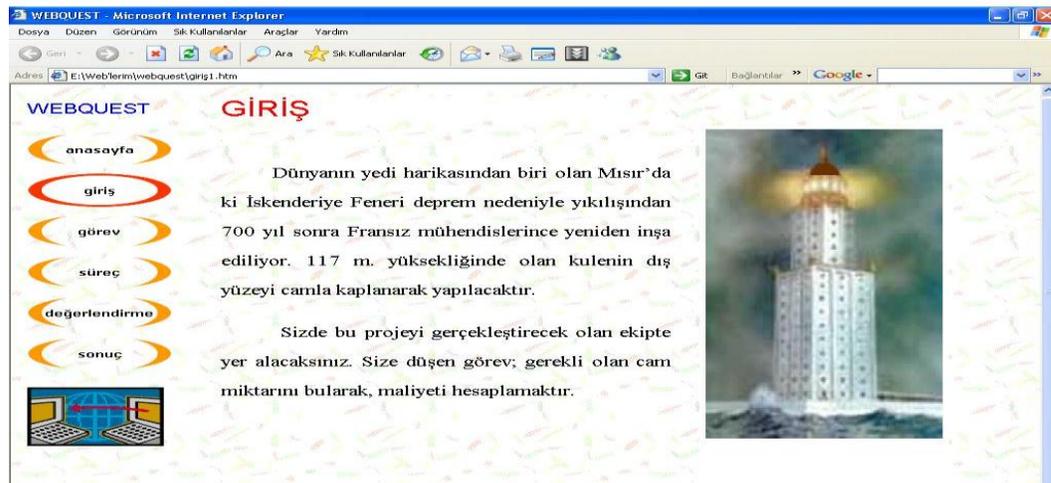


Figure: 1  
Introduction page of the WebQuest

### The Task

The next section of the WebQuest is the Task. It can also be referred to as the Problem because it states the student's role in solving a specific problem or situation. For example, the Lighthouse of Alexandria WebQuest states that the students assume the role of an engineer who has brought back to Lighthouse of Alexandria's former state.

In the Lighthouse of Alexandria example, students must research the building information and the details of the building measure and its picture (See Figure: 2). Students must find how much mirror need to building' restoration then charged with writing a report to the teacher towards their results.

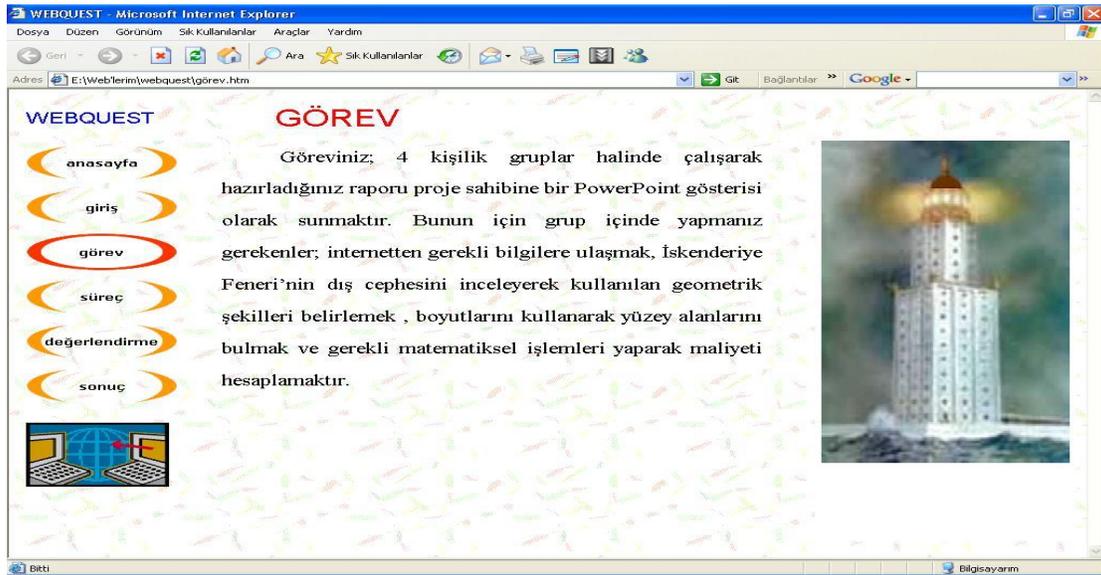


Figure: 2  
The task page of the WebQuest

### Resources

The third WebQuest section, Resources, consists of Internet links that the teacher preselects. Depending on the computer literacy level of the students, students may use this opportunity to search for relevant sites.

Compiling the Resources can take a lot of time; teachers may want to weed out any sites with extremely difficult readability or organization of information. By having these links, students do not need to worry about typing in a cumbersome URL address to a Web site; they simply click on the hypertext link on the Resources page.

This section can also be built in to the Process to aid students who have difficulties breaking the sequence of the steps to use the preselected links.

## Process

Process, the fourth component of the WebQuest, consists of steps that guide the students toward reaching their goal.

The Lighthouse of Alexandria WebQuest provided five steps clearly describing what the student was expected to do (See Figure: 3). Simplification of language due to low reading ability is very easy to incorporate in this stage. The steps can be broken down into as many as needed for the student to be successful. Students can also be helpful in creating this section with the guidance of the teacher in breaking down the sequence of the activity so that all students understand the task. If the Process steps are photocopied onto a transparency, all students can join in the discussion of how to make the steps easier to understand. Again, ownership of the activity helps increase student participation and success.

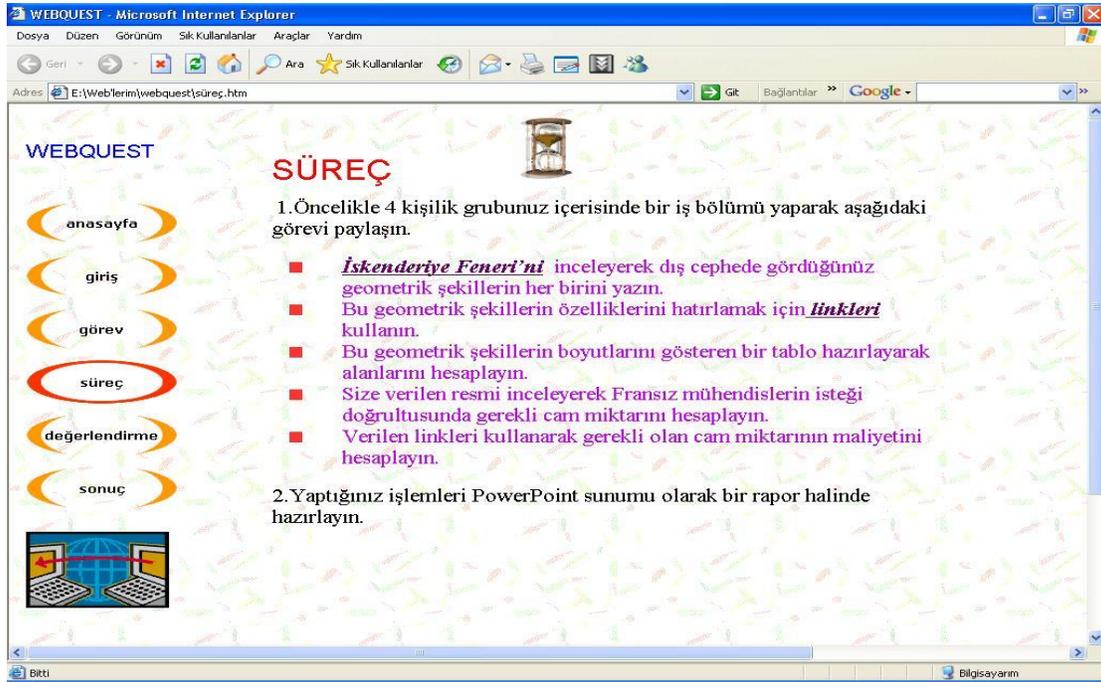
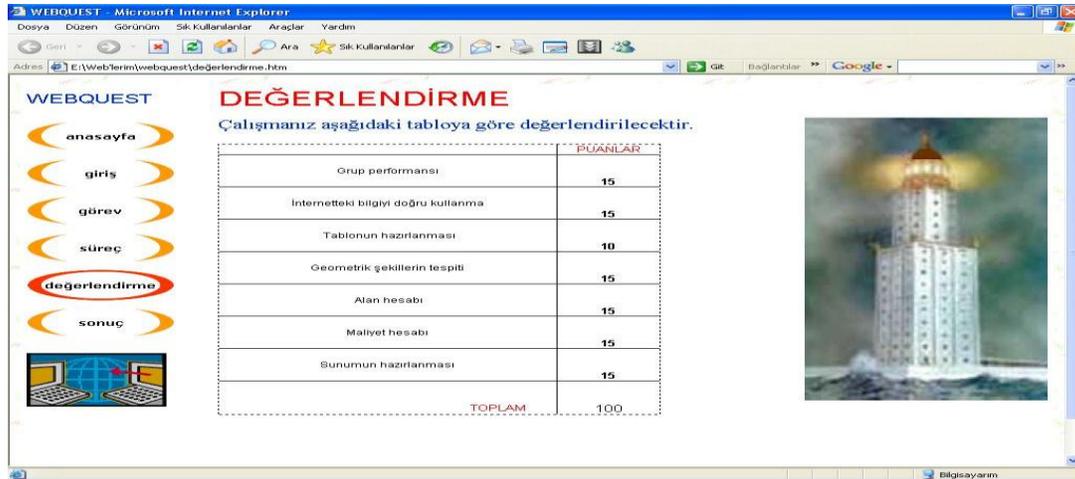


Figure: 3  
Process page of the WebQuest

## Evaluation

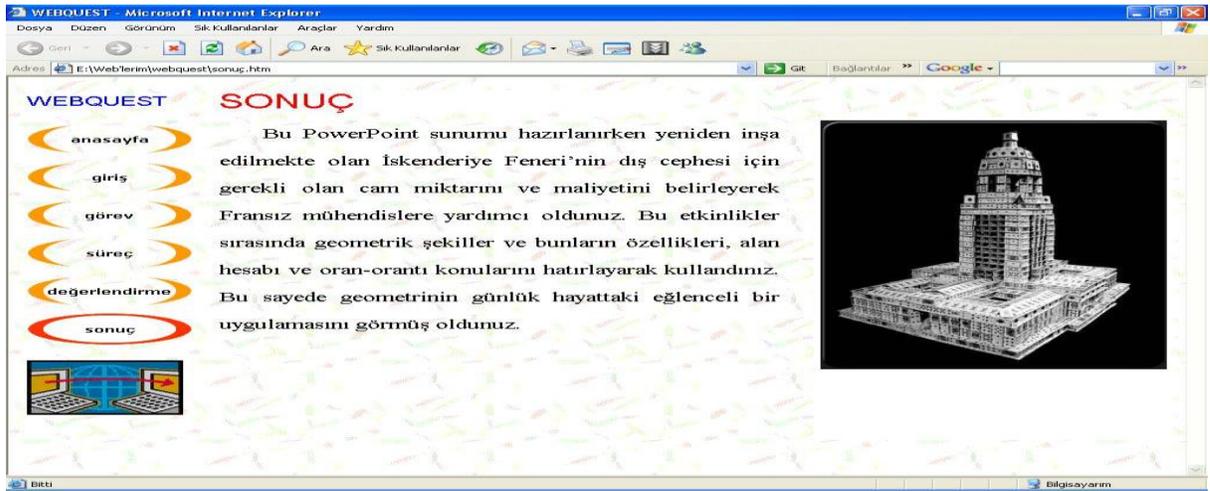
The next step, the Evaluation, tells students how they will be graded on completion of the lesson. For example, the Lighthouse of Alexandria WebQuest Evaluation section states that students will receive a grade consisting of 15% for group performance, 15% for using information about the subject which has been obtained by internet, 15% for preparing chart, 15% for definition of geometric shapes, 15% to calculate the surface area, 15% to calculate cost and 15% for presentation (See Figure: 4).



**Figure: 4**  
Evaluation page of the WebQuest

### Conclusion

The last part of a WebQuest is the teacher-written conclusion. Here, the teacher states the cross-curricular objectives that the student has successfully accomplished with the completion of the activity (See Figure: 5).



**Figure: 5**  
Conclusion page of the WebQuest

### Standards and WebQuest

WebQuest lessons offer connections to the curriculum standards while maintaining flexibility necessary to meet students' special needs.

Teaching to the content standards requires certain instructional approaches. New standards require students to apply, demonstrate, or use specific knowledge of skills, rather than just retain facts or demonstrate basic rote knowledge. Higher-order thinking and problem-solving skills are targeted, and more group projects and student collaborations seem to help in the instructional process (McLaughlin, Nolet, Phim, & Henderson, 1999). A one-computer classroom can encourage the class to work together to solve the problem posed. On the other hand, a computer lab facilitates using the approach with small groups of two or three students or with individuals.

## **DISCUSSION AND CONCLUSION**

Despite some application requirements, WebQuests provide another means of integrating computer technology into mathematical education classes in order to enhance student learning. Research in online learning shows that students can learn as effectively as in face-to-face instruction (Bennett & Green, 2001; GokKarp & Woods, 2003), although more study needs to be conducted in the area of mathematical education, especially in regard to how and why students learn online. The application of WebQuests may help answer these questions.

The WebQuestPage (Dodge, n.d.) provides teachers with additional information about WebQuests and their design and gives examples of existing WebQuest templates. Many authors of the WebQuest examples also grant permission for the use or modification of their WebQuests, so implementation is simpler. But all of these examples are English.

Turkish WebQuests need creating. The Lighthouse of Alexandria WebQuest (<http://www.ogu.edu.tr/~agunaydi/webquest>) creating for this paper is Turkish mathematics WebQuest. WebQuests provide mathematical educators with options for integrating online learning into their classes.

They may be used periodically during mathematical education class time, as homework, in other classes as a means for interdisciplinary integration. WebQuests have the potential to be powerful instruments for teachers interested in using technology in their instruction.

Although a number of excellent WebQuests are available, teachers should pay close attention to the practical points of implementing them in the classroom. Even though existing WebQuests may be modified for classroom use, this cannot be accomplished on the spur of the moment.

Because some WebQuests can last several weeks, educators need to ask themselves if the time spent on this activity meets academic goals and objectives.

The sections above will go a long way toward helping teachers provide a significant learning experience for students at all levels, but the decision to use WebQuests in the classroom should not be taken lightly.

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