5th World Conference on Educational Sciences - WCES 2013

# A WebQuest Example for Mathematics Education

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**Abstract**

In this research a WebQuest that can be used in mathematics education is prepared. It was designed to teach coordinate system to seventh grade students in an entertaining way. The prepared WebQuest is published in mathematicswebquest.sitemynet.com web site. The aim of this project is to increase the effectiveness of learning process and enrich the course visually and provide interaction of students. Literature survey method is used in the research. The emergence of WebQuest, preparation process, design steps, important points for effective usage, usage of it in Turkey, advantages & disadvantages and limitations of the system are indicated. The history of WebQuest in Turkey, teacher and student perspectives are also implied in the study. The general view defends that this kind of activities can make a positive contribution on affective and cognitive abilities of learning environments. On the other hand, when the existing structure of studies taken into consideration, some negative situations about the technical deficiencies and teacher/student competence are observed.

*Keywords:* WebQuest, mathematics education, seventh grade students

## 1. Introduction

The emergence of the Internet has provided to participate web sites which are source of information in learning environments especially since the beginning of the 1990s. This situation gives importance to student-centered and constructivist learning approach. According to Becker & Riel (2000) the reason of the relationship between computer and constructivism probably arise from unlimited access to information owing to computer technology and internet which allows students to conduct research and to test their own ideas.

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### 1.1. Emergence of WebQuests

WebQuests are discovered by Bernie Dodge and Tom March at San Diego State University in 1995. Since the beginning of this process, teachers have adopted WebQuests as an interesting way to give students ways of thinking that requiring in the 21st century and to use internet well. With the constructivist theory, sources of information on the Internet combined with WebQuests developed by Dodge (1995, 2001) and March (2005).

WebQuests are defined as "A research and inquiry-based activity that some or all of the information is acquired from the Internet by students" by Dodge in 1995.

Another definition of WebQuests is "A study on teaching how to learn, a research-oriented activity those requiring students' interactions and providing knowledge from sources on the internet completely or a certain extent or via video conferencing." (Dodge, 1997).

A teacher can search for WebQuests on a specific topic or develop a WebQuest on his/her own by using a web editor such as Microsoft FrontPage or Dreamweaver. Publisher Inspiration, MS Word, PowerPoint, Access, Excel etc. also allows you to prepare a simpler level WebQuests. A WebQuest is not necessarily to design as a real website. Less advanced technological capabilities can be used. For example, it can be saved as a word document on a local computer.

### 1.2. The structure of WebQuests

According to the creators of WebQuests, a WebQuest should consist of six main sections; introduction, task, process, resources, evaluation and conclusion. Bernie Dodge gives place sources of information in the part of the process. The part of task is referred as the part of the process in some sources (Dodge, 2001; March 2000).

#### 1.2.1. Introduction

The introduction part should lead learners to the subject and what he/she is waiting for, inspire the students' interest in different ways, lay down the situation and provide preliminary information on the status.

In this section, there is a short paragraph that promotes lessons and activities that students do. If there is a role or a scenario that you think appropriate for the students, the pupils should get ready in this section. It should be noted that the introduction part is in order to motivate and prepare students.

Also, on this chapter, the question (problem) about the main center of the WebQuest is also introduced to students. It should be doable, interesting, motivational, original, and must be directed by the student. At the end of the activity, there should be a description of what the students should do.

#### 1.2.2. Task

Part of the task should be interesting, motivating, doable, and authentic and should be directed by the student and should include a description of what the students do at the end of the activity and it should include an oral presentation or a product.

#### 1.2.3. Resources

This part includes addresses of web sites determined by the teacher to help the student carry out the process. It may also contain other sources besides web sites. All resources may not be used by anyone. It may include links that are necessary to perform the operations.

#### 1.2.4. Process

It consists of the steps of process that is clearly defined. It provides a review of process that needs to be carried out in order to achieve the operation. It may also include recommendations for learning. The steps that students must perform should present to the students by dividing clear and concise steps.

#### 1.2.5. Evoluation

This part includes how the information gathered will be organized, how to evaluate the results, what evaluation criterias are. In general, assessment is performed using grading scale (rubric).

### 1.2.6. Conclusion

This is the stage of reminder what the students have learned and what they have managed or terminate the web query. Students are encouraged to broaden their experience to other areas. Thoughts on the results and achievements are shared with students

It is used to terminate the web adventure. In this section, the students can find a summary of the information about what they have learned and what they achieved. They are encouraged to expand their experiences to other areas.

### 1.3. Related Studies

In the literature, there are many studies on preparation of WebQuest activities and use of them in the classroom (Gaskill, McNulty & Brooks, 2006; Kanuka, Rourke & Laflamme, 2007; King, 2003; Leahy & Twomey, 2005; LoParino, 2005; McGlinn & McGlinn, 2003; Wagman, 2005; Halat, 2008).

Looking to work for teachers' and pre-service teachers' thoughts about WebQuests, in one of them, the effect of using WebQuests in lessons on students' research / inquiry skills was investigated and the expectations about the results for pre-service teachers were studied (King, 2003). According to results, in the science methods lessons, expectations about the results for pre-service teachers in the experimental group decreased.

One another study was done with 300 third grade students from faculty of education (Leahy & Twomey 2005). In this study, by preparing WebQuests by the research groups of a maximum of three people, thoughts' about co-operation, assistance, planning, decision making, time management, project management and design were determined through a survey about WebQuests. The pre-service teachers expressed that they would use WebQuest activities in their lessons.

300 pre-service teachers participated study that is done by Leahy and Twomey (2005) planned WebQuest activities in groups and then a survey is carried out. According to the survey, pre-service teachers have positive views about the activities and in general; they think that they would include WebQuests in their teaching process.

Researches have shown that computer-assisted instruction affects student achievement positively (Baylor, 2002; Bereiter & Scardamalia, 1984; Cho & Jonassen, 2002; Lim et al, 2001).

## 2. Purpose

In this study, a WebQuest was prepared that can be used in mathematics education. It is designed to teach coordinate system to students at seventh grade students in a more fun way. This WebQuest is as an example of activities that makes the teaching-learning process more effective and ensures the participation of the students by enriching visually.

In primary mathematics curriculum, in the learning field of algebra and in sub-learning field of equations for seventh grade students, there exists an acquisition like this: "Explains and uses a two-dimensional Cartesian coordinate system."After sixth grade students learn the subject of integers and understand negative and positive integers, they can learn easily the regions that are including ordered pair in the coordinate system. In the eighth grade, by improving the learned object in sixth grade, in the sub-learning field of transformation, students can do some various movements like symmetry, rotational, translational with the objects given in two dimensions (triangles, polygons, etc.). When passed the level of secondary education level and then higher education, the three-dimensional coordinate system is passed through (MoNE, 2009). Therefore, the two-dimensional coordinate system

learned in the seventh grade will be the basis for the subsequent years. Thus, it is important to learn this issue permanently.

## 3. Methodology

A literature review method was used in the study and the study was carried out in two stages. In the first stage, the emergence of WebQuests, the drafting process, design steps were studied and a comparison was made to create a WebQuest that can be used in mathematics lessons by the help of examining the literature. In the second stage, with the help of the information obtained from the first stage, a sample WebQuest which is about the coordinate system was created for mathematics lessons.

## 4. Information about Prepared WebQuest

Information about which steps should exist on the WebQuest was summarized above. Based on this information about the WebQuest prepared for study is as follows:

Once WebQuest page is opened, a homepage appear in front of the students. On this page, the name of activity is called "Let's Travel The Earth!". In addition, a returning world picture is remarkable.

At the entrance of the WebQuest, a scenario with a small picture is given to motivate students and to gather their attention. Scenario was built on finding positions of the countries located in different continents on Earth.

At the task section expectations from the students have been listed in detail. It was asked to work in group consisted of four people after this task expected to make a power point presentation.

The part of sources of information can be given on the part of task, but on this WebQuest, it appears to be a separate section. Examples of WebPages are given to guide learners in terms of fulfilling their duties.

On the step of the process, by giving a table, after writing the latitude and longitude values of countries, to show their on the world map is asked.

A rubric for assessment is created by the researcher. On this rubric, tasks defined previously to students are presented in 7 items and 3-grading were formed according to each suitable level of item.

In the part of the conclusion, by giving information about what the result obtained at the end of this activity is and what gains they can reach beyond them, the students have been encouraged. A logo that shows their greetings has been given.

## 5. Conclusions and Recommendations

The most important influence of WebQuest on the learners in the learning process is interest and curiosity. Because of consisting actively interact with the computer and internet; it increases the interest and curiosity of learners in learning. It can be motivating and it can improve the capabilities of students. The students included in the subject starts all relevant stages with their existing skills.

In addition, the use of WebQuest as a teaching material motivates students. Especially in the teaching of mathematics courses including abstract concepts as the structure of it, this part is very important. The constructivist learning takes part by researching easily with the sources on their own. A support done in this way can be used in the science or social areas, and even decision-making about the condition of the real-life experiences. According to McKenzie (1999) the support is defined as "While learner is searching for the answer to any problem or any question, to organize and support the study or inquiry wanted from learner in order to avoid too much away and lost on the road."

It ensures the learning process enjoyable and allows opportunies to people who prepares while expressing their self-expression. An opinion on this subject is as follows:

The most important component in learning with WebQuest is to develop in students the ability to apply new knowledge to learned previously (Pohan et al, 1998). According to Dodge (2001), Web adventures must go beyond telling again, learn the true knowledge thoroughly, practice the knowledge, and use this knowledge in problem

solving, creativity, design and trial. Research data shows that the application of knowledge is supporting the relationship between knowledge, meaningful and deep learning.

According to Johnson and Johnson (1994)'s theory of collaborative learning, Web Adventures is designed to give positive dependence, individual and group responsibility, interpersonal and small group skills. According to Brucklacher et al. (1999) to improve the students' social skills, cooperation, positive dependence, and individual responsibility extends the effectiveness of learning. In creating an effective collaborative learning environment, WebQuests design lie.

The most important obstacle of WebQuests is that the network connection. In general, in centers, with ADSL and in the villages with dial-up connections, the internet connection is provided in almost every school. Do not have much information on the use of computer, except the games, effect the the use of effective impact.An in-service training for teachers may be useful to comprehend the importance of using WebQuests in education process and to overcome the lack of use of the computer.

In higher education, in the teacher training programs, practical courses that may develop the skills required for effective new approaches. Co-operation environments between teachers at school can be supported. For example, the teacher and the computer teacher at the school work with the creation of WebQuest activities.

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