

# TEACHING GEOMETRY USING WEBQUEST

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## Abstract

*The purpose of this current study was to investigate the use of WebQuest in teaching and learning geometry with 19-pre-service mathematics teachers. For this study the researchers assigned students to one of four groups with no more than 5 students in a group. All groups were assigned to create a WebQuest regarding triangles or quadrilaterals and suitable for 7<sup>th</sup> graders. All group members contributed to the WebQuest. After the process of creating WebQuests, the researchers interviewed with randomly selected persons from each group to obtain additional data on the use of WebQuest in teaching geometry. This presentation summarizes and analyzes the findings.*

## Introduction

The examination and understanding of the influences of learning theories on curriculum is a goal of the mathematics education teacher preparation program at Florida State University. In addition, preservice teachers are expected to be competent in the use of technology for teaching and learning.

Recent curricular developments in geometry have been based on the van Hiele model. Students were asked to use this model as a construct for organizing and presenting a geometric topic in their WebQuest. The study looks at how preservice teachers' understanding of teaching geometry is influenced by this instructional activity, which uses technology.

## Background

Many teaching and learning theories and models have been proposed, developed and implemented for more than fifty years in order to enhance teaching and learning of mathematics. The van Hiele model in geometry was theorized by Pierre Van Hiele and his wife, Dina van Hiele Geldof, in 1957. Both mathematicians described the theory for five levels of understanding which are visualization (level-I), analysis (level-II), ordering (level-III), deductive reasoning (level-IV) and rigor (level-V) (Mason, 1998). In addition, the van Hieles (as cited in Mayberry, 1983) proposed that movement from one level to the next level includes five phases: information, guided orientation, explication, free orientation, and integration.

Even though this model and other educational theories help teachers and students, it seems at times that the model is insufficient when applied to curriculum. Examining curriculum development based on these theories or models and which uses technology should expand our knowledge of the teaching and learning process. In particular, the use of computers with well-prepared educational materials not only in teaching and learning geometry, but also in other areas, arts and sciences, would enhance teachers' teaching and students' learning. This is evidenced by a recent increase in every discipline trying to adapt the use of computer somehow because everybody would like to benefit from its advantages. It is clear that the Internet has a great influence on both students and teachers. Although it has a lot of valuable information, it is also full of useless information on webs. The misuse of Internet or websites concerns parents,

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educators, administrators, teachers and others (Yoder, 1999 & March, 1998). One fast emerging use of the Internet is web-based activities. This study examines the development of geometric thinking in the process of developing a WebQuest.

What is WebQuest? It is a new computer-based learning and teaching model in which learners are actively involved in an activity or situation, and use the Internet as a resource. Today, it has been prominent in many educational areas and has received considerable attention from teachers and educators since it was proposed and developed by Dodge and March (1997). Dodge (1995) defined two types of WebQuest, short and long terms. According to him, the instructional goal of a short term WebQuest is the acquisition and integration of knowledge. At the end of a short term WebQuest, a learner will have gained a significant amount of new information and made sense of it. A short term WebQuest should be completed in one to three class periods. However, the instructional goal of a long term WebQuest is to extend and refine the knowledge. After completing a long term WebQuest, a learner would have examined a body of knowledge, transformed it in some way, and showed an understanding of the material or gained knowledge by creating something that others can respond to, on- or off-line. A long term WebQuest should be completed between one week and a month in a classroom setting. Both Dodge and March (1995) pointed out the critical attributes of the WebQuest. They defined these critical attributes as the following, introduction, task, process, resource, evaluation and conclusion (Dodge 1997; March, 1998; Kelly 2000; Yoder, 1999).

In short, today's students spend most of their time surfing the Internet. It is said that the Internet is a super information highway. So, how do researchers, educators and teachers utilize the Internet for educational purposes? We have to find a solution which has to be suitable for both parents' and teachers' expectations. A solution is WebQuest that relies on computer-based teaching. In this model students are learning by themselves on the Internet. The role of a teacher is to prepare his/her lesson on a website and give clear instructions with reliable links for his/her students. The role of students is to follow given instruction on the website and do the tasks by themselves responding to the expectation of teachers, which requires higher-order-thinking from the students.

### **Methodology**

19 pre-service secondary and middle school mathematics teachers were divided into four groups. The researcher introduced web-page editors, such as Microsoft FrontPage, Netscape Editor and Adobe Page Mill, explained the components of a good WebQuest and showed students how to create one. Each member of a group chose different tasks in their projects. This allowed one to contribute to the groups' WebQuests. After the process of creating WebQuests, groups presented their WebQuests. Both researchers surveyed the class and interviewed each groups' presenter. Data were collected, analyzed and a summary provided below.

### **Analysis and Conclusion**

A goal of the teacher preparation program is to help students learn about appropriate uses of technology in teaching mathematics. The activity developing a short-term WebQuests by preservice mathematics education majors appears to be

a meaningful way to encourage them to consider alternatives to traditional teaching. All groups provided positive responses to wanting to use WebQuest as a break from the textbook and traditional way of teaching. They felt that this environment allowed students to apply geometric concepts in real-life applications using technology. Projects included applications to solving problems related to topics, such as the Bermuda triangle, sports, and music. The use of a WebQuest provides K-12 students with appropriate educational uses of the Internet. WebQuests also provide a context for students to engage in group work. Limitations in using WebQuests include the possibility of lack of access to the Internet, the time spent by the teacher to develop a WebQuest, and finding reliable links for resources in the WebQuest.

In conclusion, there is support to encourage the further study of the use of WebQuest in teacher preparation programs. WebQuests, when done, can be meaningful teaching strategies that utilize student use of technology in the classroom.

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