

# Effectiveness of Web Quest in Science Studies for teacher Education

Seema Potphode & Zareen Baksh<sup>1</sup>  
Department of Education  
St. Aloysius College, Jabalpur-482001 M.P.

## Abstract

Web quest method on science teaching was examined in this study as being one of the most important reflections of technology to the education and it was shown that students structured the knowledge in the coordination and enjoying with this method. Web Quests provide the opportunity to combine technology with educational concepts and to incorporate inquiry-based learning. Web Quests also have the ability to integrate on-line resources with student-centered, activity-based learning. Web Quests are problem-solving activities for students that incorporate the Internet, computer-based materials, and other available resources. In science education, Web Quests provide the opportunity for students to actively engage in learning by connecting their interests with various content areas. Web Quest is an instructional tool; which is one of the e-learning applications in education in enhancing science studies. This study aimed at examining the effectiveness of using Web Quest in Science studies. The purposes of this study are to analyse and discuss students' opinions and reactions towards the use of this teaching and learning strategy in science. Thus, this study aims at showing whether students 1) gain a higher motivation in learning science, 2) have improved their digital competence.

**Keywords:** e-learning; Web Quest; teacher education;

## Introduction

In science studies education, Web Quests provide the opportunity for students to actively engage in learning by connecting their interests with various content areas. Science studies educators, similar to those in other content areas, must adapt their instructional practices to accommodate the needs of their students. Through a Web Quest assignment, a student is given a task to direct his/her inquiry within the content. This approach allows the instructor to direct the student-centered learning experience without too much control over the process. The objective is to extend and process the knowledge about a specific field or topic. Learners have to process the new information through complex cognitive processes such as induction, deduction, classification, abstraction, etc. After having completed it, they have to "transformed it in some way, and demonstrated an understanding of the material by creating something that others can respond to, on-line or off-line". All in all, according to this classification, it is crystal clear that we can implement WQ depending on complexity of the cognitive processes we would like to work with. Consequently, it should be advisable to bear in mind students' age, students' level, prior knowledge of the topic, etc; and obviously all these features can alter the timing of the WQ.

## Web Quest

Definitions according its developers. Dodge (2001) described the WQ an inquiry-oriented activity in which most or all of the information used by learners is drawn from the web. Web Quests are designed to use learners' time well, to focus on using information rather than looking for it, and to support learners' thinking at the levels of analysis, synthesis, and evaluation. According to March (2003), A Web Quest is a scaffolded learning structure that uses links to essential resources on the World Wide Web and an authentic task to motivate students' investigation of a central, open-ended question, development of individual expertise and participation in a final group process that attempts to transform newly acquired information into a more sophisticated understanding. The best Web Quests do this in a way that inspires students to see richer thematic relationships, facilitate a contribution to the real world of learning and reflect on their own metacognitive processes.

Web Quest is a way to inquire knowledge by introducing it through the web in an inquiry activity, as Dodge (1997) emphasized that it is an activity in a form of inquiry where the learners interact with some or all the information from resources on the internet. Web quest technique being one of the web-assisted teaching methods was used in this study. Web quest is a method that students performing research-based activities by organizing knowledge they have obtained by internet are in interaction with each other (Dodge, 1997). Purpose of web quest is to use technology during learning-teaching process and contribute to positive development of the student (Leahy and Twomey, 2005). Web quest being one of the roots of constructivist approach allows performance of research-based activities and enables student to practice, brings high thinking ability (Lahaie, 2008). Many studies show that Web quest is highly efficient to develop the ability of problem-solving, high level thinking and creativeness, to increase motivation, critical thinking, and active learning and to correlate with the content (Abu-Elwan, 2007; Lim and Hernandez, 2007).

Web quest provides more efficient high cognitive thinking than some other activities and strategies (Kanuka, Rourke, and Lafiamme, 2007).

Moreover, web quest allows using the internet in an enjoyable way and improves attitude towards the lesson positively and it is a method that students are engaged in upper cognitive activities and persistency of learning activities are achieved. In order to understand how a WQ works, first it is needed to take into consideration the

## E-learning

E-learning is understood in the eLearning action plan of the European Commission (2005) as “the use of new multimedia technologies and the Internet to improve the quality of learning by facilitating access to resources and services as well as remote exchanges and collaboration”.

In contrast to e-learning, blended learning or b-learning is an educational approach that combines distance learning with face-to-face teaching. Technological progress, electronic communication and the impact of globalization have increased the need for raising the educational level of the citizens that has led to greater demand on distance learning. This fact is leading to the use of tools such as Web Quests that can be used in all forms of learning such as classroom teaching or distance learning.

## Components of Web Quests

1. Introduction: Where topic can be presented in a short statement or paragraph.
2. Task: Students can be informed what they are expected to achieve after completing the Web Quest.
3. Process: A detailed information can be given to students about how they can complete their mission with directions.
4. Resources: Resources and Process can be combined in one page or at a one procedure as one component of the Web Quest. The Author of the Web Quest has to present the resources and hyperlinks needed to navigate to information, but it is not in necessity to contain merely online resources.
5. Evaluation: Author can present the rubric of how the student can be evaluated.
6. Conclusion: A paragraph can be added which contain what have been learned and a higher objective can be added.

## Web quests Use in education

Web quests can be a valuable addition to a collaborative classroom. One of the goals is to increase critical thinking by employing higher levels of Bloom’s Taxonomy and Webb’s Depth of Knowledge. Since most web quests are done in small collaborative groups, they can foster cooperative learning and collaborative activities. Students will often be assigned roles, allowing them to role play in different positions, and learn how to deal with conflict within the group.

Web quests can be a versatile tool for teaching students. They can be used to introduce new knowledge, to deepen knowledge, or to allow students to test hypotheses as part of a final interaction with knowledge. The integration of computers and the Internet also increase students’ competency with technology. By having specific task lists, students can stay on task. By having specific sources of information, students can focus on using resources to answer questions rather than vetting resources to use which is a different skill altogether.

In inclusive classrooms (classrooms that have students of varying exceptionalities interacting such as learning disabled, language impaired, or giftedness) tasks can be differentiated to a skill level or collaborative groups for the same level of task. A skill level may have students with learning disabilities working on a basic task to meet the minimum standard of learning skills and gifted students pushing their task to the higher end of the learning skill. More commonly, groups are composed of learners of all skill levels and completing the same level of task. This is typically easier because the teacher is only creating one webquest, but can cause less student interaction from lower students and less learning from higher students.

## Web quest level

Dodge indicates that there are two levels of web quest: short term and long term.

**Short term web quests** are, as their name implies, designed to be completed in a brief amount of time. They serve well as an introduction to new material or a shallow overview of resources.

Use short term web quests for:

- Introducing a new concept or focus of study to learners

- Familiarizing learners with internet resources
- Review of material covered in a previous course or pre- requisite
- A few external links and a brief reflection
- Exam review
- Exploratory activities

A short term web quest could easily be administered in the D2L quiz tool. Links, photos and videos can be placed in the quiz tool and students can answer reflective questions about these resources.

**Long term web quests** are not as activities but larger projects. After a long term web quest, a learner should have digested and compared the information in a wide variety of resources, going more in depth than the 'summary' most short-term web quests ask for. At the end of a long-term quest, learners typically create an artifact of some form, be it an essay, project, multiple essay questions, or other assignment that the instructor can use to gauge their assimilation of the material.

Use long term web quests for:

- Specific topics within a broader context
- Final projects
- In-depth examination of a particular or focus of study
- Summative assessment for a significant grade

## Methodology

The WQ is an inquiry-oriented activity in which most or all of the resources and scaffolds used by learners are drawn from the web (Dodge, 1995). This web environment promotes the autonomous learning by means of the digital tools. This kind of teaching is in connotation with a learner-centered approach (March, 2003). This approach involves a different role for the teacher, since he becomes a guide helping students to form groups, checking learners understand the tasks and controlling individual and group work. Furthermore, this web-based model fosters autonomy in the sense that it includes scaffolding as best suits learner by increasing or fading it (March, 2003). Not to mention, group work which is also key in this kind of methodology since every member must contribute to the fulfillment of the final task.

## Application of web quests

Web quests can be modified in many different ways to meet the needs of all students, and modifying a web quests is no different than modifying other learning material. Modifications can include assigning takes as individual or group work, assigning different takes to be completed or varying materials to be used based on student abilities and needs. Providing for this differentiation may be time consuming for the teacher, at least during the creation phase, but may ultimately be needed to ensure that all students in the classroom are learning the required material.

Web quests should not be used in isolation, rather, they should be connected to the curricula or specific students being studied, and should link to previous and subsequent classroom topic, themes, and activities. The other teaching strategies highlighted on this website can be used with a web quest as they would with other tools and methods. In facts many strategies, including study guides and graphic organizers, help students to comprehend and identify key information.

## Conclusion

In this paper, an innovative activity and methodology have been implemented for teaching science study. Internet offers students more relevant and more complex learning activities than traditional learning models. In this sense, the WQ provides them with a great amount of new information which is facilitated by the teacher. In the light of the above, using technology and Internet in classroom might have positive effects on students' perceptions and motivation. Students' motivation increases while working with computers in class because it gives them another perspective of the topic. It is obvious that textbooks cannot give the appropriate information for the current context we are living, as it was stated before, many changes are occurring. Therefore, it could be argued that the use of WQ in classroom can be a positive tool to teach content to students.

The WQ is a useful and motivating activity worth of taking into consideration due to the fact that it encourages students' towards the acquisition of the science using a wide range of resources. Other drawbacks related to the design of the WQ have to be noted.

It should be taken into account that although many templates are available on the Internet to design a WQ, teachers have to have a basic idea about creating web pages as well as web editor programs, since these are needed. Finally, time has been a strong restriction in order to implement the WQ. After having analyzed and discussed students' opinions and feelings in the participation of the WQ the main conclusions are drawn:

- The WQ has helped students to learn more about the different knowledge of science.
- The WQ has improved the digital competence of students.

As a result it is seen that the web quest usage did not affect the attitude of students toward science and technology but it affects the storing level in a positive way. In order to increase the effectiveness of this method, while preparing the web quest, degrees of students and their science and technology acquisitions and individual and group working opportunities should be considered. In addition to this, parents should be aware of technology and technologic developments and should encourage the teachers and the students in web quest usage.

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