Strickland, J. (2005). Using webquests to teach content: Comparing instructional strategies. *Contemporary Issues in Technology and Teacher Education*, *5*(2), 138-148.

Using WebQuests to Teach Content: Comparing Instructional Strategies

Janet Strickland
State University of West Georgia

Abstract

The purpose of this study was to compare the use of WebQuests with traditional instruction. Specifically, the study examined the end-of-unit exam scores for students who completed a WebQuest on the Texas Revolution and those students completing a poster activity. Both of the instructional activities were implemented as additional enhancement to close the unit. Results indicated that the control group, or those students completing the poster activity, scored higher on the end-of-unit exam than did the experimental group, or those students completing the WebQuest activity. A discussion of the possible reasons for this difference, practical implications of study and using WebQuests in the classroom, and directions for future research are included.

How is technology being used in schools to affect student learning? A stroll through a typical public school may reveal teachers using presentation software to enhance a lecture or students using the computer to publish a research paper using a word processing program. These types of activities, referred to as Type I technology applications by Maddux, Johnson, and Willis (1997), serve to make work easier and more convenient. Rarely are teachers and students using technology to engage in powerful, meaningful learning. VanFossen (2004), when referring the lack of Internet use by teachers, stated that one possible reason for the lack of technology use in the classroom

> is that sorting through the vastness of cyberspace is difficult. The process of finding quality information from among the millions of websites available on many topics has been likened to trying to drink from a fire hose. This problem, in turn, makes curriculum development difficult for already time-strapped practitioners. (p.13)

Simply put, teachers often lack the time to integrate technology effectively. Using technology to foster innovative teaching and learning, or Type II technology applications (Maddux et al., 1997), should be a priority for all educators.

Average middle school children today may know as much about technology as their parents do. In fact, some may know much more. Today's students have grown up in an environment with incredibly easy access to the Internet, email, word processing, and many other innovations. With advances in technology, it is safe to assume that in the near future most jobs will require at least a working knowledge of computers. If technology is so important to the future success of our students, it makes sense that it should also be an important part of our instruction. How, then, do educators ensure that students use technology to construct meaningful knowledge, skills, and, dispositions so that they will be able to work in a technologically advanced society?

Review of Related Literature

One Internet-based teaching strategy gaining in popularity is the WebQuest, an inquiry-based learning activity (Dodge, 1997). As of February 25, 2004, the WebQuest homepage at San Diego State University had received over 5.4 million visitors since its inception in 1998. Seeing the benefits of incorporating WebQuests into instruction, hundreds of schools, school districts, and universities have online collections of well-written WebQuests. Many teachers have been using WebQuests in the classroom for several years. But how does the use of WebQuests in the classroom affect student learning? Do students gain needed content and skills as a result of completing WebQuest activities?

Defining a WebQuest

According to Bernie Dodge (1997) from San Diego State University, a WebQuest is an "inquiry-oriented activity in which some or all of the information that learners interact with comes from resources on the Internet" (p. 1). WebQuests were created by Dodge in 1995, during the early stages of widespread Internet access. With the increase in Internet access in university labs, Dodge began to experiment with effective ways to integrate the technology into classroom instruction (March, 2000). As Dodge developed activities for preservice teachers, "he launched the WebQuest, arguably the most popular approach for integrating the Web in classroom learning" (March, 2000, p. 1).

A teacher conducting an online search of posted WebQuests will find many activities from all subjects and topics. Whether long term or short term, quality WebQuests have certain critical attributes (Dodge, 1997). These attributes include an introduction, a task, information sources, process, guidance, and conclusion (Table 1). Some attributes usually included, but not critical, in WebQuests are group activities and motivational elements. In addition, WebQuests can be interdisciplinary or within a single discipline.

Creating a WebQuest

Educators wishing to create their own WebQuests must begin by building a Web page. Many educators use popular Web page authoring software such as Netscape Composer or Microsoft Front Page. Some, however, simply build a page using Microsoft Word and save the file as a Web page. The actual program used to create the page is unimportant; the content of the page is critical.

Table 1
Key WebQuest Elements

Key WebQuest Elements	Function
Introduction	Provides background information on the topic and sets the stage for the investigation or activity.
Task	Includes an activity that is "doable" and is of interest to the students; often identifies roles for cooperative group members.
Resources	Provides links to high-quality Internet-based resources that students will use to complete the activity; links may be embedded in Process.
Process	Provides a step-by-step guide for completion of the activity; should provide a clear description of exactly what students should do to complete the task.
Evaluation	Should illustrate exactly what students should do to be successful; usually in the form of a rubric or checklist.
Conclusion	Brings closure to the activity and summarizes what you hope the students have learned as a result of completing the activity.

Quality WebQuests begin with an introduction. The introduction provides the students background information on the topic and sets the stage for the investigation or activity (Dodge, 1997). One critical aspect of WebQuests sometimes included in the introduction is that the students are presented with an open-ended, essential question (March, 1998). When students are presented with an essential question, "we encourage more advanced performances" (March, 2000, p. 56). The introduction should also motivate the students to want to learn more and explore the topic in depth.

The next section of the WebQuest is the task. The task includes an activity that is "doable" and is of interest to the students. March (2000) cautioned that "problems can occur, however, if people expect higher-order thinking outcomes from an assignment inviting copy/paste masterpieces. This type of sloppiness undermines the integration of the best practices we hope to support" (p. 56). Therefore, the task students complete should go beyond read-the-page-answer-the-questions activities. Peterson and Caverly (2003) stated that "to nudge students beyond introductory knowledge acquisition into the messy world of multiple texts and primary resources, the WebQuest should require critical thinking, rather than a scavenger hunt for answers" (p. 39). Likewise, WebQuests should be designed to "use learners' time well, to focus on using information rather than looking for it" (Chandler, 2003, p. 38). Dodge (1997) suggested that the thinking skills required in a quality WebQuest include comparing, classifying, inducing, deducing, analyzing errors, constructing support, making abstractions, and analyzing perspectives. The task also often identifies roles for cooperative group members. Each student is assigned a role to play as the group completes the assigned activity.

Next, the resource section provides links to high-quality Internet-based resources that students will use to complete the activity. Some WebQuests have a separate section for information sources, where some embed their resources in the WebQuest as anchors pointing to information on the Internet (Dodge, 1997). What is most important for this section is that the resources are high quality and developmentally appropriate for the targeted age group.

The process section provides a step-by-step guide for completion of the activity. The WebQuest should provide a clear description of exactly what students should do to complete the task. Again, the resources may or may not be embedded here as anchors to Internet sites.

Most quality WebQuests include an evaluation tool or assessment instrument as the next to last section. The evaluation may be in the form of a rubric or checklist. Because the task involves some type of inquiry learning, paper-pencil types of assessment will not work. The evaluation tool should illustrate to students exactly what they should do to be successful.

The last section of the WebQuest is the conclusion. The conclusion brings closure to the activity and summarizes what the teacher hopes the students have learned as a result of completing the activity. The conclusion may also encourage students to extend their recently gained knowledge to other domains (Dodge, 1997).

Taken together, these sections should form a WebQuest that is reflective, fluid, and dynamic (Watson, 1999). Students are motivated to engage in inquiry learning and are provided all the resources and guidance to do so. Students are aware of what they need to do to be successful. In addition, they are encouraged to use their newly acquired knowledge in different contexts. "Through these explorations, students can aim to answer questions and solve real-world problems that are relevant to both the social studies and to students' interests" (Molebash & Dodge, 2003, p. 158).

Why WebQuests?

Tom March, who is credited as being a major contributor to the development and refinement of WebQuests in the early stages, suggested that WebQuests promote student motivation and authenticity, develop thinking skills, and encourage cooperative learning (March, 1998). According to March, WebQuests increase student motivation by providing an essential question, real-life resources with which to work, and opportunities to work in cooperative groups. WebQuests, by their very nature, encourage the development of thinking skills. The assigned task requires students to "transform information into something else: a cluster that maps out the major issues, a comparison, a hypothesis, a solution, etc." (March, 1998, p. 2). In addition, WebQuests encourage cooperative learning among students. Because WebQuest tasks are often complex or involve controversial topics, students work in groups to complete tasks (March, 1998).

A handful of individuals have conducted research studies on the use of WebQuests. Lipscomb (2003) implemented WebQuests in his middle school social studies class. After receiving an orientation to WebQuests, which included a discussion of the key elements, resources available, and strategies for using time effectively, the class completed a WebQuest on the Civil War. The students were engaged in the learning process throughout the activity. The students completed journal entries which showed a "tremendous amount of creativity, in both appearance and content" (p. 154). As a result of his experiences, Lipscomb made the following suggestions for implementing WebQuests:

1. Choose your WebQuest wisely.
2. Gauge student technology proficiency.
3. Determine prior knowledge/content understanding.
4. Assess the availability of computers.
5. Have a backup plan.
6. Maximize class time on the computer.

7. Clarify student roles.
8. Continue working even after computer time is over.
9. Make assessment clear to students.
10. Be excited about the possibilities.

Milson (2002) examined students' involvement in the WebQuest activity. His findings suggested that students had difficulty appreciating the value of online sources, as they preferred to use print resources to gather information. The student initially organized their data in simple schemes, but the teacher was able to lead the students to more meaningful organization. Milson's (2002) study indicated that the students of differing abilities were able to complete the inquiry-oriented activities but that they approached the tasks differently.

Weinstein (2000) suggested that in order to foster critical thinking skills in students teachers must embed critical thinking in school subjects. Teaching critical thinking skills should not be viewed by teachers as an additional subject. Rather, it should be incorporated into the existing curriculum. Vidoni and Maddux (2002) compared the WebQuest format with the framework for critical thinking established by Weinstein and the Institute for Critical Thinking. They found that the WebQuest format meets the six key elements in critical thinking suggested in the framework.

Methodology

Rationale for Study

A search of several databases resulted in few empirical studies that look at the educational benefits of using WebQuests with school-aged students. Milson (2002) stated that the literature consists of "anecdotal accounts of success rather [than] independent research on this instructional technique" (p. 335). Several articles investigated the link between using WebQuests and fostering critical thinking. All of these articles support the notion that WebQuests are excellent tools for fostering critical thinking skills, but what about content?

The focus on high-stakes testing requires teachers to be more than a little concerned about the content students learn. Teachers may feel that WebQuests are useful for developing critical thinking skills, but they may choose not to implement them if they feel that the students are not learning the appropriate content. The search of databases resulted in no studies that examined the link between WebQuests and teaching content.

Research Questions

This study explores whether or not using WebQuests is appropriate for enhancing a unit on the Texas Revolution. Specifically, this study attempted to answer the following questions:

1. Do students gain needed content as a result of completing a WebQuest?
2. Is there a difference between the information learned by students who completed a WebQuest activity and those completing traditional classroom activities?

To answer these questions, end-of-unit exam scores for students who completed a WebQuest activity designed to enhance the instruction of a unit on the Texas Revolution were compared to scores on the same exam for students who completed traditional instructional activities.

Sample

A total of 86 seventh-grade students participated in the study. The control group, which completed traditional instructional activities, consisted of 38 students, 18 males and 20 females. The experimental group, which completed the WebQuest activity, consisted of 48 students, 24 males and 24 females. Both groups included two intact classes randomly selected from one teacher's list of Texas History courses. At the beginning of the school year, school administrators randomly assigned students to one of the four class periods. All classes were homogenous in terms of academic ability.

The study was conducted in a school system in metropolitan Dallas, Texas. The school district and all schools in the district are rated by the state of Texas as exemplary. The population of the school is 95% White, 3% Hispanic, and 2% African American. The study was conducted in a school in a wealthy area, and it serves students from high socioeconomic backgrounds. State standardized tests place this school and district as one of the best performing in the state of Texas.

Instrumentation

The end-of-the-unit- exam used to collect the data was created by the adopted textbook for the course. The test consisted of 15 matching items, 10 true/false items, and 7 multiple-choice items, all relating to dates and events of the Texas Revolution. Each item on the test was weighted equally (3.1 points) and the test was scored from a 100.

Teachers are strongly encouraged to use the textbook-created tests when evaluating content because of the objective nature of the standardized tests. Administrators want students to be familiar with the format of objective tests before they take the state mandated tests. The end-of-the-unit test may not be the most appropriate form of assessment for the performance-type activities, but administrative mandates require teachers to use them. Because of time limits and the mandate to use objective tests, rarely do teachers in this district use other formal forms of assessment. If teachers cannot see the benefits of WebQuests reflected in the objective tests, they are less likely to use the technology. Teachers are increasingly being held accountable for how students perform on standardized tests and are more inclined to teach and assess in ways that are consistent with the objective nature of these tests. For these reasons, the authors choose to use the textbook created test to gather data.

In addition to the objective tests, the experimental group was evaluated on their newscast presentations using a rubric. The control group was evaluated on their poster activities, also using a rubric. Because the rubrics were very different from each other, it was difficult to compare the data. However, teacher perceptions of how each group performed are included in the data.

Limitations

This study is limited in that it looks only at the content learned by both groups and not the skills. WebQuest developers and researchers have touted the innovation as one that fosters critical thinking. This study purposely chose the unit on the Texas Revolution based on the enormous amount of content included in the unit. The state-mandated tests seem to favor content over skills on this topic and teachers may be hesitant to use WebQuests if they are ineffective for teaching content. A second limitation of this study is that it only looks at one unit of study, one that is admittedly difficult for students.

Results

Prior to beginning the unit, students were tested to elicit prior knowledge of the Texas Revolution. The mean score for the experimental group on the pretest was 45.61 and 45.42 for the control group. An independent samples *t*-test was used to determine if there was a difference in the prior knowledge of the experimental group and the control group. There was no statistically significant difference in the scores of the two groups ($t = .074$, $p = .941$). The average scores indicated that the students knew very little about the Texas Revolution prior to the unit.

The classroom teacher began the unit on the Texas revolution with both groups at the beginning of the second semester of the course. Both groups were involved in traditional type learning activities, such as teacher lecturing, reading the textbook, studying vocabulary, reading historical fiction related to the Texas revolution, watching videos, completing worksheets, and participating in classroom discussions during the two weeks of the unit. Because the unit contained vast amounts of information, such as names, dates, and battles, the teacher opted to include hands-on learning activities for both groups that would allow the students to further construct their own knowledge of the material.

The control group was assigned a poster project, an activity commonly assigned to middle-grades students. The poster project was entitled "Roadmap to Freedom." Students in this group were required to individually create a poster that used road signs to symbolizing the major events in the Texas Revolution that led to independence. Events and road signs on the poster had to be in chronological order. The activity allowed students to think of the historical significance of each event and how it could best be symbolized with a road sign. For example, one student used a "Dead End" road sign on the poster to symbolize the battle at the Alamo, using the inscription "Santa Ana defeated the Texans with no survivors."

The experimental group completed a teacher-created WebQuest on the Texas Revolution instead of the poster activity. The task for this group was to create a news broadcast that included events that led to independence. Students were assigned to groups of four and chose a role to play in the broadcast. The roles included news anchor, feature correspondent, war correspondent, and graphic designer. All students were required to participate in Internet research to find the needed information to complete the task. Internet resources used included authentic documents, news accounts, simulated battles, and expert interviews. Students created background slide shows to enhance their broadcast using presentation software. The broadcasts were delivered live during the last week of the unit.

At the conclusion of the unit, all students took the end-of-unit test. The scores for the experimental group were compared to the scores for the control group using an independent samples *t*-test. The data analysis allowed the researchers to determine which group performed better on the test. A paired samples *t*-test indicated that there was a significant difference in the mean of both groups combined for the pre- and posttest. The pretest mean for both groups was 45.52, and the posttest mean for both groups was 81.73. This statistically significant difference ($t = -24.50$, $p < .001$) is an indication that the students benefited academically from the instruction.

Using an independent samples *t*-test, the scores for the end-of-unit test were compared. The mean for the experimental group was 78.59, with a standard deviation of 13.87, and 85.75 for the control group, with a standard deviation of 11.62. There was a statistically

significant difference in the scores ($t = -2.49$, $p < .05$). The control group scored higher on the end-of-unit test than did the experimental group.

The teacher reported that students in both groups completed the assigned tasks. The posters or the news broadcasts were graded using rubrics created by the teacher. Most students completed the tasks successfully, though several had to be given extra time to turn in their work. Students from both groups received individual grades for their completed work. The teacher indicated that the control group's poster activities scored better on the rubrics than did the experimental group. She stated that many of the posters showed a higher level of learning than the WebQuest group. The posters attempted to analyze the events of the Texas Revolution, where the newscast presentations included simple recall of the events.

Discussion

The results of this study seem to indicate that, for this unit, particularly, traditional classroom activities, such as creating unique posters, were more effective for teaching and reinforcing large amounts of content. One critical difference in the instructional strategies of this teacher and those of teachers relying solely on textbooks is the sheer variety in instruction. In essence, this study did not compare WebQuests to common instruction that relies on textbooks and worksheets for instruction. It looked at WebQuests compared to exemplary teaching.

The results of this study were surprising, given these students' previous success with WebQuests. This is not the first WebQuest these students have completed. Prior to completing this activity, all students completed a WebQuest on the geography of Texas. Each group had to select a major Texas city and prepare a presentation that would lure a lucrative boating business to their city. To complete the task, the students had to be knowledgeable of many aspects of the larger cities. The teacher was impressed with the quality of information provided in the presentations and the level of involvement from all students. She also indicated that the students were more competitive with the geography activity, which may have resulted in students being more motivated. Overall, the students seemed to have more ownership and sense of accountability with the geography WebQuest compared to the Texas Revolution.

One possible reason for the results may lie in the topic itself. The study of the Texas Revolution includes many dates, names, and battles. The WebQuest was designed to make the topic more interesting and inviting; however, the experimental group never seemed very interested in the assignment. In contrast, the road map activity allowed the control group to synthesize the information they gained into one graphic illustration. Deciding on road signs to symbolize the events of the Texas Revolution may have made the information more concrete.

Another possible reason for the results of this study may be related to student motivation to learn. Students tend to be more motivated when using novel instructional strategies. A previous survey of parents of children enrolled in this school found that 98% of the homes have Internet access. Using the Internet to learn may not be as motivating to these students as it would be for students with limited access to the Internet.

Practical Implications

Educators must critically examine the benefits of any type of instructional strategy before implementation. WebQuests and other technological innovations should be no exception.

Just because a strategy is novel does not mean that it is effective. Any effort to implement this type of technology into the curriculum is certain to be costly and time consuming. More evidenced is needed to justify the use of such technology in the classroom.

The empirical evidence is lacking, however, as to whether or not WebQuests are more effective than traditional instructional strategies when teaching for content. They do give teachers and students variety in their teaching and learning. Variety is critical to effective instruction because it ensures that teachers meet the needs of all students.

Evaluating WebQuests

Kennedy (2004) stated that there are two areas teachers should consider when evaluating a WebQuest. The first area is pedagogy. Pedagogy refers to whether or not the WebQuest is developmentally appropriate for the intended age group. Specific elements to look for included absence of threat, student choice, adequate time to complete tasks, collaboration, and meaningful content, to name a few. The second area is scholarship. Kennedy (2004) defined scholarship as "whether the content is factually accurate and presents different points of view for the young learners to consider" (p. 17). The WebQuest should be authoritative (hosted by a credible source), objective, accurate, current, helpful, and attractive.

Overcoming Barriers to Successful Integration

Allowing students the opportunity to use WebQuests activities to develop inquiry skills, learn content, and build technology skills is an endeavor not without obstacles. Lack of time for teachers to create and use their own WebQuests may be the most difficult obstacle to overcome. One alternative is to use what is already out there. Many Internet sites include collections of teacher-created WebQuests, the most impressive one being the WebQuest page at San Diego State University (http://webquest.sdsu.edu). For those teachers who want to create their own WebQuest catered to the needs of their students, the best advise is to start simple, designing and creating short-term WebQuests at first and moving toward more complex, longer-termed activities. Using Web page development software may be too time-consuming for some teachers, due to the time needed to become truly comfortable with the software. Web pages can easily be developed using Microsoft Word and Microsoft Power Point, software programs with which many teachers are familiar. It is as simple as saving the document as a Web page.

The high-stakes testing trend seems to be gaining momentum, and teacher autonomy is not likely to increase in the near future. It is crucial for teachers, administrators, students, and parents to understand that WebQuests are not designed just because they are "fun." While engaged in a WebQuest activity, students are not only learning factual information but, they are classifying, evaluating, synthesizing, forming and testing hypotheses, making decisions, forming opinions, and participating in many other higher level thinking activities. State and national standards can and should be incorporated into all technology-based learning activities. The best way to prepare students for success on state mandated tests is to focus learning on the state curriculum through exciting and meaningful instruction. WebQuests do just that.

Teachers and students who have never used computers or cooperative learning in the classroom should not expect smooth sailing at first. Students must have the social skills necessary to participate in cooperative grouping. These social skills are acquired only through practice. Teachers should expect confusion and management problems at first but be confident that the students will respond appropriately over time. The classroom

must be managed to optimize student engagement and teachers need to set clear boundaries. No one plan will work for all teachers, so teachers should develop their own management techniques. Once familiar with using computers and cooperative learning for learning activities, the task gets much easier. The very nature of the WebQuest should ensure that students engage in only those activities assigned by the teacher and visit only those Internet sites provided. However, teachers might implement a "Three Strike Policy" for students who wander from the Webquest sites. The first strike would consist of a warning, the second strike a warning and contact with parent, and the third strike loss of Internet privileges for a predetermined amount of time.

Finally, teachers can find peer support in schools, the local university, virtual communities, and anywhere else it may be available. The WebQuest page has several ways to join virtual communities. At http://webquest.sdsu.edu/community.html teachers can join a listserv created for the sole purpose of discussing the use of WebQuests in the classroom. The list is usually very active and teachers can receive support and ideas from all over the world. In addition, teachers can join monthly chats hosted by Bernie Dodge himself.

Direction for Future Research

Research on the actual educational benefits of WebQuests is lacking. Although there seems to be an abundance of descriptive writing related to WebQuests, the literature is quite sparse when searching for research. Empirical studies needed to further explore the role that WebQuests play in building critical thinking skills and content. Are WebQuests more effective for teaching skills than content? With the growing interest in WebQuests it is imperative that researchers explore ways to make it a more effective instructional tool. How can WebQuests be improved to better meet the needs of students and teachers?

References

Chandler, H. (2003). Concept mapping and WebQuests in social studies. *Media and Methods, 39*(3), 38-39.

Dodge, B. (1997). *Some thoughts about WebQuests.* Retrieved August 15, 2003, from the WebQuest Homepage, San Diego State University: http://webquest.sdsu.edu/about_webquests.html

Dodge, D. (2001) FOCUS: Five rules for writing great WebQuests. *Learning and Leading with Technology, 28*(8), 6-9, 58.

Kennedy, S. (2004). The well-constructed WebQuest. *Social Studies and the Young Learner, 16*(4), 17-19.

Lipscomb, G. (2003). "I guess it was pretty fun": Using WebQuests in the middle school classroom. *The Clearing House, 76*, 152-155.

Maddux, C. D., Johnson, D. L., and Willis, J. W. (1997). *Educational computing: Learning with tomorrow's technologies* (2nd ed.). Boston: Allyn and Bacon.

March, T. (1998). *WebQuests for learning: Why WebQuests? An introduction.* Retrieved August 15, 2003, from http://www.ozline.com/webquests/intro.html

March, T. (2000). WebQuests 101. *Multimedia Schools, 7* (5), 55-56, 58.

Milson, A. J. (2002). The Internet and inquiry learning: Integrating medium and method in a sixth grade Social Studies classroom. *Theory and Research in Social Education, 30*, 330-353.

Molebash, P., & Dodge, B. (2003). Kickstarting inquiry with WebQuests and Web inquiry projects. *Social Education, 67*, 158-162.

Peterson, C., & Caverly, D. C. (2003). Techtalk: Developing academic literacy through WebQuests. *Journal of Developmental Education, 26*(3), 38-41.

VanFossen, P. J. (2004). Using WebQuests to scaffold higher-order thinking. *Social Studies and the Young Learner, 16*(4), 13-16.

Vidoni, K. L., & Maddux, C. D. (2002). WebQuests: Can they be used to improve critical thinking skills in students? *Computers in the Schools, 19*, 101-117.

Watson, K. L. (1999). WebQuests in the middle school curriculum: Promoting technological literacy in the classroom. *Meridian: A Middle School Computer Technologies Journal.* Retrieved August 17, 2003, from http://www.ncsu.edu/meridian/jul99/webquest

Weinstein, M. (2000). A frame for critical thinking. *High School Magazine, 7* (8), 40-44.

Author Note:

Janet Strickland
State University of West Georgia
Email: jsmith9904@aol.com