

Creating a ‘real’ WebQuest: Instructional design point of view

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Abstract: This paper presents what I believe is an innovative approach to enhance students’ learning, WebQuest, that has been widely adopted in educational settings. Despite its popularity, questions remain about the qualities of WebQuests that are being used by learners. The focus of this paper is, therefore, to provide information for creating WebQuests that is discussed in the relevant literatures. The issues and challenges surrounding the construction of WebQuests are also presented in order to enhance the quality of the WebQuests. This information might assist teachers to create and develop a successful WebQuest that help students to acquire meaningful learning.

Keywords: WebQuest, Instructional Design

1. Introduction

WebQuest has commonly been equated with the internet (e.g. Kundu & Bain, 2006; Maddux & Cummings, 2007; March, 2004; Milson & Downey, 2001; Russell et al., 2008; Wang & Hannafin, 2008). The World Wide Web, as the most popular element on the internet, provides abundant resources and allows learners to learn in resource-rich environments. However, the Web comes with unsystematic structures (Brabazon, 2002) that could cause confusion for learners who might want to access the internet for important activities. A large-scale study by Trotter (2000, cited in MacGregor & Lou, 2004) indicated that having access to the internet in the schools did not impact on students’ academic performance. This means that exposure to internet resources alone is not sufficient to improve student learning. Therefore, teachers need to provide strategies that help

learners to be knowledgeable about how to select sites, how to evaluate information from those sites and how to synthesize that information in meaningful ways. Regarding this, teachers are challenged to create meaningful web-based activities for their students (MacGregor & Lou, 2004, p. 2).

In 1995, Bernie Dodge at San Diego State University and his colleague, Tom March, raised a solution for this problem by creating the WebQuest approach. This approach is suitable for those who are interested in using the internet to help students acquire meaningful learning in a safe and dynamic way. It is also appropriate “to focus on using information rather than looking for it and to support learners’ thinking at the levels of analysis, synthesis, and evaluation” (Dodge, 2001, p. 1). Since its development, the WebQuest approach has been widely adopted by educators (Wang & Hannafin, 2008). According to Dodge (1995, cited in Dodge, 2001), “the WebQuest model has been incorporated into hundreds of education courses and staff development efforts around the globe” (p. 1). The popularity of webquest can also be seen through the numerous WebQuests on the internet that have been created and published by teachers of mostly primary to secondary levels of education.

Despite its popularity, questions remain about the qualities of WebQuests that are being used by learners. Maddux and Chummings (2007) expressed their concern about the developmental appropriateness of WebQuest. They stated that “thousands websites devoted to WebQuest revealed that webquests are being suggested for use at all grade levels, including very young children” (p. 121). Tom March (2004) also asserts that many WebQuests are simply Web-based activity that use the internet as the main source of activity without transforming the learners’ understanding. Accordingly, the first developer of WebQuest, Dodge (2001, p. 1), points out that the quality of WebQuests published on the internet varies widely from WebQuests that are properly designed and updated while being implemented, to some WebQuests that “do not represent the model well at all and are merely worksheets with URLs”. Further, he argues that so many WebQuests are typically presented in a form of some web links which simply asks learners to read them and turn them into a PowerPoint presentation which is not engaging higher levels of thinking. Those WebQuest are not a real WebQuest because they are just summarizing or retelling (Dodge, 2008).

Driven by curiosity to create a ‘real’ WebQuest and implement it in teaching and learning, I formulate my question as to how WebQuest should be constructed. Since the design of technology and communication can be viewed from two lenses; instructional design and technical design, I frame the discussion in this paper within the instructional design context which I consider as more relevant to create effective settings for learning. Although important, the technical design, including visual appeal, navigation, accessibility, is not directly discussed in this paper because of its linkage to a vast area of study and because in many ways, technical design has always been embedded in instructional design. The paper is organized as follows. The first section describes the motivation for using the WebQuest as a learning tool and the underlying principles of the WebQuest. The second section outlines the factors that are critical to the design and development of WebQuest from the frame of instructional design, with which the guidelines for creating a well-developed WebQuest can be constructed. In addition, some conclusion and suggestion are drawn from the discussion.

Before going on further to discussing the webquest, it is important to provide a definition of the keyword that will be used extensively in this paper. From the WebQuest site, **A WebQuest** is defined as “an inquiry-oriented lesson format in which most or all the information that learners work with comes from the web” (Dodge, 2007a). Whereas, **Instructional Design** is “a systematic guide for planning instruction or a lesson” (Shelly, Cashman, Gunter, & Gunter, 2006, p. 356), which usually consists of the process of analyzing, designing, developing, implementing, and evaluating instructional material (Revees & Oh, 2008).

2. WebQuest

As has been outlined above, WebQuests were first modeled in 1995 by Bernie Dodge and Tom March as an inquiry-based activity in which most or all the information that learners work with comes from the web (Dodge, 2007a). From its definition, as the prominent resources for doing the WebQuest's activities come from the web, WebQuest can be categorized as a type of "web-based learning" that could be used to support knowledge acquisition (MacGregor & Lou, 2004, p. 2). WebQuest is also more like "a lesson plan" created by teachers that requires learners to perform certain intellectual activities such as problem solving and collaborative learning while using the Web (Kelly, 2000, p. 1).

In Dodge's article outlining WebQuest entitled "Some Thoughts about WebQuest" (Dodge, 1997), he notes that WebQuests have 2 structures that should be distinguished from one another; short-term WebQuest (to be completed in one to three class periods) and long-term WebQuest (to be completed between one week and a month in a classroom setting). The goal of each structure is also different. In a short-term WebQuest, the goal is knowledge acquisition and integration, meanwhile in a long-term WebQuest, learners have to analyze, transform and demonstrate their understanding of knowledge (Dodge, 1997).

Further, Dodge (1997) identified in more detail six critical attributes and three non-critical attributes of a WebQuest. The six critical attributes of a WebQuest include an introduction that describes the purpose of the WebQuest and some background information, a doable and interesting task to be accomplished by learners, a listing of resources to complete the task, a clear process that provides steps for learners to complete the activity, guidance for completing specific elements of the process, and a conclusion. Some other non-critical attributes of a WebQuest include group activities, motivational elements and single discipline or interdisciplinary approaches. While the six critical attributes are the basic elements of the original WebQuest model that should be embedded in the design of WebQuest in order to effectively achieve the goal of learning and to be "rightfully called a WebQuest" (Russell et al., 2008), it is not clear about the function of the three non-critical attributes. Perhaps, they may or may not be embedded into WebQuest design, but are essential to shape and focus the WebQuest activity during implementation.

In addition to providing educators with the most complete and current source of information about WebQuest, Dodge created the WebQuest page (<http://webquest.org/index.php>) that has gained so much attention from educators around the world. Lamb and Teclehaimanot (Lamb & Teclehaimanot, 2005) reported that The WebQuest page has received more than five million visitors since 1998. Meanwhile, the number of sites dealing with WebQuest has increased dramatically. More than one million websites revealed from the result of the search "WebQuest" from Google search which are mostly expressed their positive perception to the use of WebQuest (Maddux & Cummings, 2007). With all of these phenomena, a question needs to be addressed as to why WebQuest is so popular and what theoretical principles underly the WebQuest which in turn motivate many educators to apply WebQuest's approach. The next section will discuss the motivation for using WebQuest and the theoretical perspectives of WebQuest which I believe are important to know how WebQuest is perceived by many educators.

3. Motivation for using WebQuest

Educators have demonstrated the advantages of incorporating WebQuest into teaching and learning. Some of the key advantages are discussed as follows. First, WebQuest provides a highly structured format consisting of the six critical attributes by which teachers can easily design a lesson (Maddux & Cummings, 2007). The systematic nature of WebQuest is not only beneficial to teachers, but also for students. Students are given a structured means for collecting data available

from the internet and for finishing the activities on the WebQuest (Milson & Downey, 2001). Students with special needs also gain advantages while using WebQuest. Kelly (2000) used a WebQuest to help students with disabilities within the general education classroom. According to Kelly, the reasons for doing the WebQuest is that students with special needs require lists or steps that are easily followed as they sometimes experience information overload when first learning about technology (p. 1). Besides, WebQuest also promotes problem solving and participation of learners which automatically creates fun and excitement among students with disabilities (Kelly, 2000). In this regard, WebQuest has also addressed the needs of diverse learners through technology.

Second, since the internet has influenced the way students learn, teachers are mostly concerned about students having free access to the internet. Students might face inappropriate or inaccurate content in internet resources from their search. By using WebQuest, students are provided with meaningful links to resources from the internet that will enable them to use their time wisely and efficiently (Milson & Downey, 2001; Russell et al., 2008). The organized structure of websites as part of the WebQuest resources also has the potential to help students focus on their lesson (Perkins, 2003).

Third, WebQuest has some characteristics that distinguish it from other educational technologies which are commonly used for enhancing students' learning such as PowerPoint and online games. Kundu and Bain (2006) argue that unlike PowerPoint, which is more teacher-centered and linear in direction, WebQuest is learner-centered. Moreover, they add that, unlike online games, which are appropriate for competition or entertainment, WebQuest intends to engage learners in meaningful activities related to the internet (although while doing these activities, they often find it to be fun). From their experience, several students commented that they also have engaged in critical thinking, problem solving and creativity experience (p. 10). In short, they find WebQuest is rewarding to use.

From the discussion above, it seems that educators have gained many advantages from using WebQuest. This is probably the reason why more and more educators are attracted to incorporate WebQuest in a teaching and learning. In addition, the strong theoretical foundation of WebQuest may have also contributed to its popularity (Dodge, 2001), as will be discussed next.

4. The Theoretical Perspectives of Webquest

From theoretical perspectives, WebQuest is recognized as incorporating some underlying principles such as promoting higher-order thinking skills (Dodge, 2001; Kelly, 2000) and scaffolding (Zheng, Stucky, McAlack, Menchana, & Stoddart, 2005).

a. Higher-order thinking skills

Higher-order thinking skills are an important construct in WebQuest (Dodge, 2001). From the early years of its conception, Dodge encouraged the use of WebQuest to promote higher-order of thinking (Lamb & Teclehaimanot, 2005). Shelly, Cashman, Gunter, and Gunter (2006) define higher-order thinking skills as "the abilities to solve problems, engage in critical thinking, and interpret and solve complex issues" (p. 349). Technology has addressed the above definition by providing a resource-rich environment beyond the classroom that allows for higher-order thinking skills. Benjamin Bloom, an educational psychologist at the University of Chicago, identifies six levels of competencies moving from simple to complex that can be used to understand the hierarchy of higher-order thinking skills. This hierarchy is known as Bloom's taxonomy (Shelly, et al., 2006). The following table describes Bloom's Taxonomy and indicates student activities appropriate for each level.

Table 1. The Six Levels of Bloom's Taxonomy move from simple to complex (Shelly, et al., 2006, p. 390)

Competencies	Activities
Knowledge: Learner can recall information	Arrange, repeat, recall, define, list, match, name, order, write
Comprehension: Learner can explain and predict	Discover, classify, explain, discuss, give examples, identify, explain, translate
Application: Learner can solve problems and use information	Apply, demonstrate, solve, write, discover, experiment, interpret, show, present
Analysis: Learner can see patterns, organize parts, and recognize hidden meanings	Analyze, experiment, examine, compare, contrast, associate, dissect, conclude, test
Synthesis: Learner can use previous ideas to create new ones, and relate ideas from several areas	Collect, assemble, compose, develop, design, invent, create, plan, revise, write, theorize
Evaluation: <i>Learner can compare and discriminate between ideas, judge, and value ideas</i>	Compare, assess, contrast, criticize, evaluate, judge, value, predict, estimate, appraise

According to Kelly (2000), the WebQuest format allows students the opportunity to incorporate basic skills with higher-order thinking skills. Students commented that the thinking process in WebQuest activity is more difficult than merely completing the blank. Students realized, however, that they had a better understanding of the material when required to participate in a WebQuest activity (Kelly, 2000). This view is justified by MacGregor and Lou (2004) who mentioned that using WebQuest requires students to exercise information seeking, analyzing, and synthesizing strategies, thus represents a higher-order use of technology (p. 1). Perkins & McKnight (2003) comment that as students are involved in the webquest, they are performing real research. The problems they are trying to solve are real and relevant to them. Students are challenged to solve the problem that the webquest poses for them. This contributes to the students using higher order thinking skills.

b. Scaffolded learning

According to Sharma and Hannafin (2007), scaffolding refers to an activity in which the expert provides support and assistance for a novice learning. Dodge (2001a) stated that "scaffolding is a temporary structure used to help learners act more skilled than they really are". Seen from these two definitions, the main idea of scaffolding is to provide 'temporary support systems' for learners. When learners gain their competence, the support systems needed to be faded out.

Sharma and Hannafin explain this process by dividing it into two steps. First, the expert provides appropriate support to identify strategies for accomplishing individually unattainable goals, and in the second step, the expert gradually reduces support as the learning progresses to the point where the learner has become increasingly competent (p. 29). Studies show that scaffolding

has positive impacts on student achievement (Lim et al., 2001; Baylor, 2002, Cho & Jonassen, 2002, cited in Zheng et al., 2005, p. 42).

The scaffolding principle is embodied in the webquest design, as March (2004) states, “scaffolding is at the heart of the WebQuest model” (p. 43). By saying that he means that WebQuest provides a way to integrate sound learning strategies with effective use of the Web. The way WebQuest provides scaffolding to help students’ learning occurs in many forms, including resource link, compelling problems, template for students’ production, or guidance for specific skills (Dodge, 1998, cited in Lamb & Teclehaimanot, 2005, p. 85).

A Webquest may provide many advantages for learners, built on strong theoretical principles, and as a result gain popularity throughout its development. To create a ‘real’ WebQuest, however, we need to have a complete picture of the WebQuest, which is not always good. In the following section, a number of studies criticizing WebQuest will be described.

5. Issues Surrounding WebQuest

Previous research indicates that even though WebQuests are promising, results of their implementation often were not as good as WebQuests’ designers expect. King (2003), for example, carried out an empirical study investigating elementary pre-service teachers’ self efficacy and outcome expectancies related to using WebQuests as a strategy to develop inquiry skills among elementary students. Participants were separated into two groups. The first group, the experimental group, consists of pre-service teachers who had to design WebQuests and implement them in actual classrooms. Another group, the control group, also consists of pre-service teachers, but they were not required to implement WebQuest in the classroom. The result of this study showed that the group of pre-service teachers who implemented their WebQuest design in actual classrooms demonstrated a decrease in outcome expectancies compared with the group of pre-service teachers who did not implement their WebQuest design.

A similar finding was found in Lou and MacGregor’s study (Lou & MacGregor, 2001, cited in MacGregor & Lou, 2004). They conducted an exploratory study related to the implementation of WebQuest design. Two classes of pre-service teachers created WebQuests based on the design guidelines. Afterwards, the teachers implemented them with elementary age children they knew. Contrary to the prior expectation that their designed WebQuests were perfect, during the implementation teachers found that their WebQuest needed to be redesigned more carefully and provide more supporting activities and materials (p. 4).

Some less successful implementation of WebQuest revealed from these studies may be associated with the quality of the WebQuest itself. Maddux and Chummings (2007) mentioned that teachers are often too focused on the attractiveness of new methods and techniques for using IT in schools. As a consequence, the quality or efficacy of new technique such as WebQuest, is neglected. Maddux and Chummings further argued that many WebQuests are developed without concern for the developmental levels and any other learner characteristics such as age appropriateness. This view is added by Weeks (Weeks, 2005) who was concerned about the race representation on WebQuest. Weeks stated that the topics, resources, and images used in the sample WebQuests mostly represent white people (2005).

Perkins and McKnight (2003), in their research on teachers’ attitude toward WebQuest, raised several important issues. First, the time consuming nature of the task is usually a common concern for teachers regarding creating a WebQuest. Some teachers commented that they spent a lot of time to create a quality WebQuest. Second, the varying qualities of WebQuests available on the internet have become another major concern of teachers. “There are too many errors in most WebQuests and they are not very well prepared” (Perkins & McKnight, 2003, p. 9).

Many web-inquiry projects come up on the internet which are labeled as WebQuest, but actually not fit the basic criteria of ‘real’ WebQuest, have become the hardest challenge for the first developer of the WebQuest, Bernie Dodge and Tom March (Dodge, 2001; March, 2004). In this regard, they have provided certain guidelines for educators to create a ‘real’ WebQuest as will be discussed next.

6. Creating a real WebQuest: Instructional design for creating WebQuest

Dodge (2007b) states that creating a real WebQuest requires addressing the following principles:

- A real WebQuest is wrapped around a doable and interesting task that is ideally a scaled down version of things that adults do as citizens or workers.
- A real WebQuest requires higher level thinking, not simply summarizing. This includes synthesis, analysis, problem-solving, creativity and judgment.
- A real WebQuest makes good use of the web. A WebQuest that is not based on real resources from the web is probably just a traditional lesson in disguise
- A real WebQuest is not a research report or a step-by-step science or math procedure. Having learners simply distilling web sites and making a presentation about them is not enough.
- A real WebQuest is not just a series of web-based experiences. Having learners go look at this page, then go play this game, then go here and turn your name into hieroglyphs does not require higher level thinking skills and so, by definition, is not a WebQuest.

To address these principles, Dodge has made a design model which aligns with many existing instructional designs. Before embarking the WebQuest design model, this paper will describe the existing instructional design model.

a. Existing instructional design model

Ragan and Smith (2004, 1999) noticed that instructional design provides educators a systematic process of converting principles of learning and instruction into instructional materials (Ragan & Smith, 2004, 1999, cited in Weeks, 2005). There are many instructional designs available, from which we can choose to assist teachers in integrating technology into teaching and learning. For example ASSURE Model, ADDIE Model, Kemp Model, Dick and Carey Model, and the Diamond Model (Shelly et al., 2006, p. 356).

While these models have attempted to address technology integration, they are often criticized for being too linear as they provide a precise prescription approach to the design of the learning environment (Boyle, 1997; Weeks, 2005). However, Smith and Ragan (1999, cited in Weeks, 2005, p. 30) argue that although the models seem to be very formal, “the actual design activity is interwoven and non-linear in nature, and that some of the phases may actually occur simultaneously”. In my view, applying good principles of teaching and learning into instructional material such as WebQuest is not easy, therefore, instructional design is still relevant to use. It plays an important role in the design of instructional material. In other words, it serves as a tool to provide basic guidelines for creating well-designed instructional material.

b. WebQuest Design Model

Although many instructional design models have been established, WebQuest has its own design.

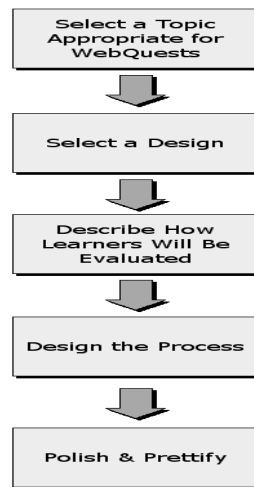


Figure 1. WebQuest design model (Dodge, 2004)

Selecting a topic

As not every topic is appropriate for WebQuest (Dodge, 2004), selecting a topic may be the hardest part of creating WebQuest. The topic must pose at least four elements: requires deep understanding, uses the Web well, fits curriculum standards, and is difficult to teach well in ordinary class settings (Dodge, 2004). Accordingly, March notes that if “students achieve this learning just as effectively without the Internet... let's save the bandwidth for something better” (p. 43). By this, March means that if the selected topic could be done just as easily using resources other than the internet, for example paper-based resources and spreadsheet, the selected topic might not be the best option for a WebQuest.

Selecting a design

According to Dodge (2004), selecting a design involves task analyzing. Selecting which design pattern will make the most of certain topics requires the applicability of a desired task. Normally, the process of selecting a design and conducting a task analysis can be conducted simultaneously. With regard to design, Dodge lists design patterns that represent a broader way of thinking about what a WebQuest should look like. The total numbers of design patterns he has created are 26, categorized into 5 dominant thinking verbs. They do not only symbolize the highest levels of Bloom's taxonomy (Dodge, 2002) but also characterize the type of task that designers might want to choose from. From the list of design patterns offered by Dodge, it can be understood that this list is only the basic guideline from which educators can communicate their ideas into the form of structured design. For those who can not find a design pattern to fit their need, they are free to make their own design as long as it mentions the critical attribute of WebQuest discussed earlier.

Describe how learners will be evaluated

The third component of WebQuest design is to determine how students will be evaluated throughout completing the WebQuest activities. Part of the evaluation step is creating a rubric to measure students' performance. Using rubrics, teachers have an opportunity to justify the expected outcomes of learning and students can see the minimum criteria of achievement they should obtain (Dodge, 2007c).

Design the process

In designing the process, a list of resources to assist students in completing the task is crucial (Dodge, 2004). The practice of locating resources needs to be conducted carefully to avoid students accessing irrelevant sites and broken link sites. Other considerations such as current resources and visual appeal of resources need to be taken into account. After selecting the resources, teachers outline specific steps to guide students to be successful at the assigned task. This includes giving a clear role for any participant to get the job done.

Polish and Prettify

The final step is polish and prettify. This step provides opportunities for teachers to complete any critical attributes of WebQuest including introduction, conclusion and credit (Dodge, 2004). Also, teachers need to improve the technical design of WebQuest, such as graphics, fonts, navigation and accessibility.

From the instructional design of WebQuest above, I found that it does not mention any guideline for WebQuest designer about the importance of considering the developmental levels (Maddux & Chummings, 2007) and cultural representation (Weeks, 2005) of students. In an attempt to accommodate the criticism of Maddux and Chummings and Weeks, I think it will be more beneficial if through these steps (starting from selecting topic, selecting design, analyzing task, selecting resources, and selecting images), the designer of WebQuest considers the appropriateness of topic, task, and resources for any differences of learners, including but not limited to age, grade, and culture (e.g. race, gender, religion, language).

"Econ-o-mania" a WebQuest about economics, which targets grades 2-3, perhaps can be used as an example of the lack concern for the developmental appropriateness of students. This WebQuest requires students to perform certain economic activities inside Econ-o-mania, a place designed to learn economics. It gives a lot of information about consumers-producer, profit-loss, natural-capital resources, scarcity, opportunity cost, production, pricing strategy, and many more. I personally think that this WebQuest should be done with 4th graders and no younger due to the complex economic activities and many difficult vocabularies used. Moreover, regarding gender representation, this WebQuest contains 7 mono-images, all of which are cartoons of men. Does it mean that men always dominate economic activities? Is not there a certain place for women to contribute in such activities?.

With respect to multi-religion in a classroom, I critique two WebQuests about religion: "Islam and its place in world history" and "Growth of Islam". Both of them intend to help students learn about the religion of Islam, but they treat it from different perspectives. The first WebQuest, "Islam and its place in world history", poses a statement on the introduction, "Islam is a religion that is growing at a fast pace throughout the world, but it is also one that we are very ignorant about". This statement explicitly indicated that all people are unaware of Islam. Unless all students in the class come from religion other than Islam, I do not recommend this WebQuest to be implemented in the classroom. The second WebQuest, "Growth of Islam", however, makes good

use of scenarios. I really like the introduction to this WebQuest. The scenario of having students become foreign 'non-Muslim' exchange program students, who will live with a Muslim family for a semester and learn Islam from their daily customs, will help students to understand and respect other religions and cultures. To summarize, I believe that considering and respecting differences of learners through the WebQuest design process will have a positive impact on students' performance as they do not feel marginalized or embarrassed. Moreover, students will be able to complete the WebQuest activities successfully that is appropriate to their age/grade.

7. Conclusion and Suggestion

This paper offers information on how a real WebQuest should be created along with issues surrounding its initial instructional design and implementation. Most literatures regarding the process of authoring WebQuest come from its inventor, Bernie Dodge. Although it may not be possible to criticize the instructional design of WebQuest, a few educators have actually challenged the design of WebQuest. Educators such as Maddux and Chummings (Maddux & Cummings, 2007) and Weeks (Weeks, 2005) for example, have given significant efforts to maximize the potential of WebQuest by providing supplementary elements to WebQuest design, regarding the developmental appropriateness and any other characteristics of learners such as age, grade, and race. Language, religion, and gender of learners should also be considered. This means that there are many things that need to be taken into account before a high-quality WebQuest can be fully developed.

Additionally, while WebQuest is originally "a teacher-created lesson plan" (Kelly, 2000, p. 1), to provide students more meaningful activity, rather than teachers creating WebQuest, Ammons and Mills (2003) placed the students in the role of the WebQuest's author. In this case, students would have to conduct research, reorganize information they obtain from that research, and communicate their own knowledge representation in a hypermedia document from which others could learn (p. 4). This view is consistent with literature suggesting that students learn more if instructors place them in the role of designer of their own materials (Jonassen 1996, cited in Kelly, 2000, p. 6). However, this point of view should be adjusted to take account of students' condition. Research concerned with the role of students as WebQuest designers should be conducted and analyzed to determine the efficacy of this approach.

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2. **Islam And Its Place In World History**, made by Jerry Anema
<http://www.denver-christian.org/anema/webquests/webquest2.html#Introduction>
2. **Growth of Islam**, made by Judy Houson
<http://score.rims.k12.ca.us/activity/islam/index.html>