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Mobile-Assisted WebQuest Reading for Learning Critical Thinking Skills

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Abstract: Previous studies on WebQuest, a pedagogical design to overcome navigational disorientation and information overload, have shown success in directing learners' inquiry on the Internet. Evidences were also found to respectively support critical thinking and reading comprehension through WebQuest reading activities; however, questions still remain as to which aspects of WebQuest activities contribute to their improvements. The present study was intended to advance our understandings of WebQuest-based learning by pointing out specific aspects that improved learners' critical thinking skills. Nine 11th graders from a senior high school in northern Taiwan were recruited to participate in a WebQuest-based English reading program on mobile devices. They joined two cycles of WebQuest reading, with each lasting four weeks. All of their in-class discussions were recorded and transcribed for analyses; and, they turned in their reflection journals and were interviewed after each cycle. When learning with WebQuest alone, our participants developed their critical thinking skills by establishing their criteria for screening information. Later, in their discussions with group members, they refined their critical thinking skills by constant negotiations. The present study attributed the participants' development of critical thinking skills to the presentations of sequenced reading tasks on WebQuest websites and the guided questions embedded in each WebQuest reading task. It also emphasized peer negotiations for sharpening their critical thinking skills.

Keywords: Critical thinking skills, English as a foreign language (EFL), WebQuest

1. Introduction

WebQuest, developed by Dodge and March (Dodge, 1997; March, 1998), offers an inquiry-oriented design that leads learners to explore information on the World Wide Web (hereafter, the Web) in an organized fashion. So far previous studies on WebQuest have been mainly devoted to investigating the instructional effectiveness of WebQeust. Learners' critical thinking ability, one of the higher-order thinking skills, has been improved by WebQuest-based instructions (Ikpeze & Boyd, 2007). And, in the field of teaching and learning English as a foreign language (EFL), empirical evidences have shown that using WebQuest has positive impact on learners' reading ability (Kocoglu, 2010; Tuan, 2011). Those findings of the effectiveness issue, important as it may be, did not extend our understandings of how, for example, the development of critical thinking skills by learning with WebQuest reading activities. Thus, the present study maintains that the process of learning with WebQuest activities be brought into central stage to advance our knowledge of learners' cognitive development, in the context of the present study, the development of critical thinking skills. The present study addresses the following research question: How do adolescent English learners develop their critical thinking skills when they are involved in WebQuest activities designed for English reading?

2. Literature Review

2.1 WebQuest

In 1995 Bernie Dodge and Tom March developed WebQuest in an effort to "help teachers integrate the power of the Web with student learning" (March, 1998). They viewed WebQuest as an inquiry-oriented activity "in which some or all of the information that learners interact with comes from resources on the

Internet" (Dodge, 1997). WebQuest offers not only access to online resources but also guidance directing learners to navigate with an objective in mind (Dodge, 2001).

2.2 Underlying Constructs of WebQuest

Four underlying constructs are claimed to support learning with WebQuest and they are critical thinking, scaffolding, cooperative learning, and knowledge application (Zheng, Perez, Williamson, & Flygare, 2008).

WebQuest is built around a series of engaging and doable tasks which elicit higher-order thinking of some kind (Dodge, 2001). They challenge learners to think and "support learners' thinking at the levels of analysis, synthesis, and evaluation" (Dodge, 2001, p. 7). Studies have shown that the use of WebQuest promoted students' critical thinking or higher-order thinking ability (Ikpeze & Boyd, 2007; Pelliccione & Craggs, 2007), and stressed the importance of critical thinking in the implementation of a WebQuest activity (Chang, Chen, & Hsu, 2011; Zheng et al., 2008).

From Dodge (2001), scaffolding can be seen as "a temporary structure used to help learners act more skilled than they really are" (p. 58); and, the role of scaffolding is to "transform what they read into some new form" (p. 58). With the appropriately-selected websites and resources made available to learners, learners are guided. The design helps learners manage the complexity of online information, from which they gradually become self-reliant and develop autonomy (Simina & Hamel, 2005).

WebQuest draws on the links of essential online resources and real-world tasks "to motivate students' [...] participation in a group process that transforms newly acquired information into a more sophisticated understanding" (March, 2003, p. 2). Cooperative learning is perceived to be an essential component in WebQuest activity by both teachers and students, either as a method of teaching or as a learning activity (Zheng et al., 2008).

Both as a medium and as a method, WebQuest scaffolds learners to probe into certain knowledge area and to develop individual expertise. Learners are able to conduct an in-depth exploration on a topic and gain content knowledge in a systematic way. Although WebQuest has been suggested for thematic and interdisciplinary teaching (Ikpeze & Boyd, 2007), findings on the effectiveness in knowledge gain have been inconsistent (Allan & Street, 2007; Chang et al., 2011).

The present study, though incorporating all aforementioned constructs of WebQuest designs, focused its efforts on describing the development of critical thinking skills of EFL adolescent learners.

2.3 Second Language Learning with WebQuest

In second language learning, for example, in EFL, WebQuest has been researched as a means of teaching instructions. The empirical studies were largely conducted on reading (Kocoglu, 2010; Tuan, 2011); and, the conclusions of the previous studies are consistent in that WebQuest enhances language learners' reading ability.

The present study continued this trend of research in WebQuest-based EFL reading and explored how WebQuest reading activities helped develop EFL adolescents' critical thinking skills.

3. Methodology

3.1 Participants

5 female students and 4 male students were recruited from a senior high school in the Northern Taiwan. Within each WebQuest activity cycle, they were divided into 3 groups, and switched members for the next cycle. In this way, they had opportunities to interact and cooperate with different group members.

3.2 WebQuest Design and Interface

The WebQuest design followed Dodge's (1997) framework, including two cycles of long-term WebQuest. The two WebQuests were created by the researcher and reviewed by a university professor

and an experienced senior high school English teacher. The topic of the first cycle was about heroes in tales and that of the second cycle was food culture around the world.

Each cycle was composed of three to four tasks and participants completed one task at one class meeting. Participants began with teacher-prepared materials of two to three web links and finished the reading comprehension tasks, which asked them to answer questions and discuss what they had read with group members. They then made a short presentation to the class based on their discussions. Later, they needed to search for more information online with guided questions and synthesize their findings and report to the class. After the report, participants received evaluations from peers and the teacher. Finally, the teacher wrapped up the session and led participants to reflect upon what they had learned.

3.3 Data Collection and Analysis

The primary data came from class observation, students' reflection journals, and student semi-structured interview. During the two cycles of WebQuest activities, the researcher observed each class and took field notes. Students' in-class discussions were audio-recorded and transcribed into written texts. Their reflection journals were collected on Google Doc. Based on the field notes and journal, the researcher prepared questions for the semi-structured interviews conducted in Chinese.

4. Results

The development of our participants' critical thinking skills took place in their interactions with online information and with group members. When reading online alone, our participants developed their screening criteria for selecting relevant information and constructed their knowledge about a topic. They then brought their findings into group discussions, where further analyses of collected information in peer negotiations were observed. The data supporting our participants' exercising critical thinking skills in establishing criteria and furthering analyses are presented below.

4.1 Establishing Criteria for Collecting Information

Our participants, during the process of inquiry, continuously evaluated as well as interpreted information retrieved from the Internet. To filter out unwanted information, they needed to establish their individual information-screening criteria. Language and ease of comprehension were the two criteria that our participants developed throughout the mobile-assisted reading program. Language in their screening criteria refers to the language that is used in the retrieved information. A typical quote emerging in the interviews was from Donna (pseudonyms hereafter).

> "If we are simply doing a searching task, that is, searching answers to guided questions, I use Chinese sources most. That is much easier, of course. If we are doing an analysis task, like integrating what we find and making a report, I look for English sources more. Websites written in English help me understand a topic better." (Donna Interview 2)

The degree of familiarity with the language used in retrieved online texts is the first and foremost criterion for collecting online information. Websites written either in Chinese, the participant's native language, or in English, the target language of learning, meet their needs well. Those in Chinese helped them quickly skim and scan for necessary information so as to answer some comprehension questions prepared by the teacher. For those written in English, they provided various information, both linguistic and topical, for our participants so that they could perform such tasks requiring higher-order thinking skills as synthesis.

Ease of comprehension of retrieved information is of practical importance. Information causing comprehension problems, not only for readers-presenters but also for audience, is filtered out. In an entry of his journal, for example, Steven stated: "I always gathered information that can be easily understood." The reason was simple: "It helped me understand a topic quickly" (Steven Journal 3). Also, their audience play an important role in their choosing information easy to comprehend.

> "Websites containing profound professional knowledge would be excluded. For example, when searching for the Plasticizer, we encountered many incomprehensible jargons. We thought if we included the information in our presentation, our audience would have difficulties understanding. So we turned to other sources that provided useful and correct information, and at the same time wouldn't cause comprehension problems for our audience." (Lily Interview 2)

Our participants' decision on whether or not to read relevant information was made by the level of difficulty presented in the online information. Due to their limited worldly knowledge, our participants could only process information without too much advanced knowledge. Their comprehension of the retrieved information was the other criterion for reading about a designated topic, based on which they built their knowledge, prepared their presentations and delivered their presentations to their audience.

4.2 Furthering Analyses of Collected Information

Group discussion in WebQuest opened up a channel for our participants to exchange ideas and thoughts. They were involved in an interactive process of negotiation. The following excerpts illustrate what our participants did in this process of negotiation in their group discussions. In Excerpt 1, Donna, Kelly and Brad were reviewing the three hero stories, focusing on the motive behind heroes' actions.

Excerpt 1
Donna: their motive ... Do they have motive?
Kelly: How about Shrek's?
Brad: Shrek's motive was ...
Donna: to protect the princess?
Kelly: No. He wanted to drive [that] away nearby his house
Donna: Right.
Brad: drive away ... but unexpectedly he fell in love with Fiona
Kelly: Right.
Donna: (laugh)
Brad: We are discussing this one. Shrek ... Achilles ...
Kelly: His friend was killed.
Brad: He revenged for his friend.
Kelly: So he went to ... [Donna: revenge for his friend] the H- what?
Donna: went to find the ...
Brad: and Beowulf was for ... the crown?
Donna: Who's Beowulf? Is he a real person?
Brad: He is a character in the Greek mythology.
(In-class Discussion 1002 G3)

In the in-class discussion, every member proposed what he/she learned from the stories and clarified others' misunderstandings. They ensured that everyone had the same understanding of the story. They reviewed the stories to better comprehend the reading materials. Donna later wrote: "Listening to other's thoughts increases my understanding of the story line" (Donna Journal 2). Their exchanging ideas about the story enhanced their comprehension.

Excerpt 2 below presents another example of group discussion (Group 3 Cycle 2), where group members compared and contrasted each other's findings. Having finished teacher-prepared materials, Flora, Lily, and Brad took turns comparing each other's findings.

Excerpt 2
Brad Flora, any other reasons? for the difference in amount?
Flora The reason may be … could be…
Brad Economics, mainly because of economics. How do you say the price of product? It should be due to economics?
Lily Right. As for America, they have a great variety of snacks.
Brad kind
Lily They … right. And I found that they consumed lots of soda.

Brad Almost every European family is … It seems that every Western family has a bottle of cola on the table.
Lily Right.
Flora But what's strange is that although the price of food is high, they consume the most amount of food.
Brad Maybe because … um …
Flora And most of their food are so-called dairy product, such as milk, cheese, and egg.
Lily They really consume a limited amount of vegetables.
Brad The second question is asking the similarities and differences among these countries.
Lily Let me check. The second point is the difference. Then how about the first point?
Brad Why do people around the world eat different food and in different amount? Economics. [Lily: Climate?] Climate, environment … should be environment. Because of the climate, they have different environments.
Lily Not really. Landforms could be a reason.
(In-class Discussion 1106 G1)

In the in-class discussion, group members offered his/her understandings of the passage. They checked each other's understandings and accuracy as one of the members wrote in his journal: "We first shared which picture impressed us most and explained the reasons. We then went through the questions and proposed some answers. And we ended it by giving a conclusion from all of our answers" (Brad Journal 4). Their discussions helped the group members enhance their comprehension of the reading materials. Because of the benefits, many participants cherished group discussions most in the reading program.

> "Sometimes I may misunderstand the meaning of the passage when reading. In group discussion, everyone proposes his own thoughts, making me reflect my interpretations of the passage. Sometimes you can learn more details about the passage, which I failed to notice, from the peers, classmates, and the teacher." (Steven Interview 2)

To our participants, individual learning and understanding the reading materials was a prerequisite to group discussions. It was in group discussions that each of them could share their own opinions, compare and contrast their ideas with others, and maximize their comprehension of a topic.

5. Discussion

WebQuest activities in the present study involved our participants in setting criteria for selecting information and in further analyzing information with group members. Their information searching and information analysis helped to exercise their critical thinking skills. In the instructional design of WebQuest, the two information processes were facilitated by learning tasks and group discussions. The details of the two aspects are discussed below.

The learning tasks prepared by the teacher, first, established the goals of reading and provided careful guidance. They were designed in sequence, mapping out our participants' way of thinking and supporting their reading. In terms of the way of thinking, the learning tasks presented each topic in multifaceted view, leading our participants to approach a knowledge area from different angles. To ensure their understanding of a topic, the learning tasks were embedded with guided open-ended questions. Our participants were guided to search for needed information. Reading the teacher-prepared materials in sequence helped our participants construct their knowledge of the topic in question; answering the teacher-written guided questions helped refine the existing knowledge of the topic. Their frequent interactions with the texts improved their reading comprehension (Ikeda & Takeuchi, 2006). Their constant online inquiries required them to analyze, synthesize and evaluate information, the whole process of which is considered critical thinking (Saadé, Morin, & Thomas, 2012).

Group discussion, the other aspect of a WebQuest design, occupies a vital position in facilitating our participants' critical thinking skills. After individual searching, our participants joined in group discussions, where they become mutual scaffolders, giving and receiving support as they interact with group members. The context of learning with peers deepens and strengthens their

comprehension of a topic. Additionally, our participants were involved in intensive negotiation as well as communication with respect to knowledge inquiry. This finding resonates with the study of Chang et al. (2011) in that opportunities for expressing oneself in WebQuest activities foster their critical thinking skills. The WebQuest activities led our participants into a process of inquiry, in which they learn to propose questions and look for answers to the questions by critically reflecting the data gathered. They developed screening criteria for collecting information and for evaluating information collected. Our participants at last demonstrated their understandings in presentations. It was the sequenced tasks with guided questions that initiated their critical thinking; and it was the group discussions that helped them shape their critical thinking skills.

6. Conclusion

The purpose of the present study was to examine Taiwanese EFL learners' development of critical thinking skills when they were engaged in WebQuest reading activities. The development took place in a continuous process of information analysis within learners themselves. When navigating online, learners set their screening criteria. Language and ease of comprehension were the two criteria learners established to collect needed information. These criteria reflected the concerns learners addressed in selecting online information. The information analysis proceeded in group discussions. Group discussions engaged learners in a process of negotiation and contemplation. Each member presented and explained his/her selected information and gave comments on others'. When fully discussing group members' collected information, participants critically reflected upon their own selections. That is, they experienced a process of information analysis, synthesis, and evaluation. In addition to prompting our adolescents to analyze information, WebQuest presented topics in multifaceted perspectives, leading them to consider each topic from various angles. Eventually, our participants could construct their own knowledge of given topics and offer their unique interpretations.

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