Ogata, H. et al. (Eds.) (2015). Proceedings of the 23rd International Conference on Computers in Education. China: Asia-Pacific Society for Computers in Education

A WebQuest-based Instruction Model for Aboriginal Students in Mathematics

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Abstract: Nowadays, mathematics achievement gap exists between aboriginal students and the other students, and WebQuest instructional model seems to be a suitable strategy to solve the problem. In this paper, we present a WebQuest-based instruction model for aboriginal students in learning mathematics. The participants in our experiments are thirteen high school students in Taiwan, and a qualitative study and questionnaire will be conducted to evaluate performance. We expect that using the WebQuest teaching strategy in math courses can improve aboriginal students' learning attitudes and can deeply understand aboriginal students' learning perspectives.

Keywords: aboriginal student, WebQuest-based instruction.

1. Introduction

In recent years, multicultural thinking spreads out the world. This phenomenon causes the minority-related and underprivileged minority-related issues be concerned. Hence, the problems about Taiwanese aboriginals have become an important issue. Numerous researches indicated that the academic achievement of aboriginal students was relatively weak than other students in Taiwan (Yang, 1997). For instance, Hsu and Yang (2009) mentioned that aboriginal students' achievement in every aspect was lower than other students except the level of familiarity with their traditional cultures, especially the mathematical skills. As a result, more and more researchers make efforts in this problem.

Many researchers discovered the problems in mathematical learning and learning preferences of aboriginal students. Consequently, selecting a suitable teaching strategy which can solve the problems of aboriginal students in mathematical learning and deeper understanding the learning perspectives of aboriginal students are urgent.

WebQuest has become an important teaching strategy in recent years. Dodge (1995) described that WebQuest is an inquiry-oriented activity which leads learners to use the online resources. Lipscomb (2003) stated that one of the advantages of WebQuest is that it can encourage collaboration, which is suitable for aboriginal students' learning preference. Hence, WebQuest seems a suitable strategy that can improve the problems of aboriginal students in mathematical learning.

In this paper, we present a WebQuest-based instruction model for aboriginal students in learning mathematics. The participants in our experiments are thirteen high school students in Taiwan, and a qualitative study and questionnaire will be conducted to evaluate performance. We expect that using the WebQuest teaching strategy in math courses can improve aboriginal students' learning attitudes and can deeply understand aboriginal students' learning perspectives.

2. Literature

2.1 Aboriginal students' mathematical learning

Many research indicated that aboriginal students feel difficult in learning mathematics (Jian, 1998; Yang, 1997). Hsu and Yang (2009) noted that there were two factors influencing aboriginal students' mathematical learning. One of the factors is that students' learning habit influence mathematical learning. Students are unfamiliar with mathematics concept, and they do not get adapted to the teaching model of focusing on conceptual understanding. However, there didn't find a suitable strategy for aboriginal students breaking out the obstacle to mathematics learning.

Some researchers also noted that aboriginal students were partial to peers learning in mathematics (Tai & Liu, 2008; Tan & Lin, 2002). Huang (2006) mentioned after aboriginal students conducting cooperative learning in mathematical symbol concept, students' mathematical symbol concept have changed and they felt interested in learning together and discussion to each other, for this reason, their learning interest has been increasing. From the above, use cooperative learning replace conditional teaching strategy can effective improving aboriginal students' learning attitude.

2.2 WebQuest instructional model

WebQuest instructional model was proposed by Bernie Dodge and Tom March in 1995. According to Dodge (1995), Crawford and Brown (2002), a good WebQuest should include six parts below:

- Introduction: Giving a theme that attracted to students.
- Task: Having real and interesting tasks.
- Resource: Teachers select the resources that are useful to students solving tasks online.
- Process: Students can follow the process step by step finish the task.
- Assessment: In order to know student's learning condition.
- Conclusion: After the end of activities and conclude the content that students have learned.

Students have to learn how to make good use of internet and reach the educational purpose rather than using internet to play games or chat with others (Bezzina, 2008).Besides, most students expressed that they enjoy the process of inquiry-oriented learning (Calder, 2013), and some researchers mentioned students' learning attitudes toward mathematics had been improved after they learned through WebQuest (Üzel, 2012; Yang, 2014).Thus, our study examines the implementation of WebQuest strategy in aboriginal students' learning attitudes in mathematics.

3. Instructional content design

In this paper, we utilize the unit of data analysis in mathematics as materials in high school, and follow the WebQuest instructional model to design WebQuest educational platform, which includes six parts: Introduction, Task, Process, Resource, Evaluation and Conclusion, as shown in Figure 1.

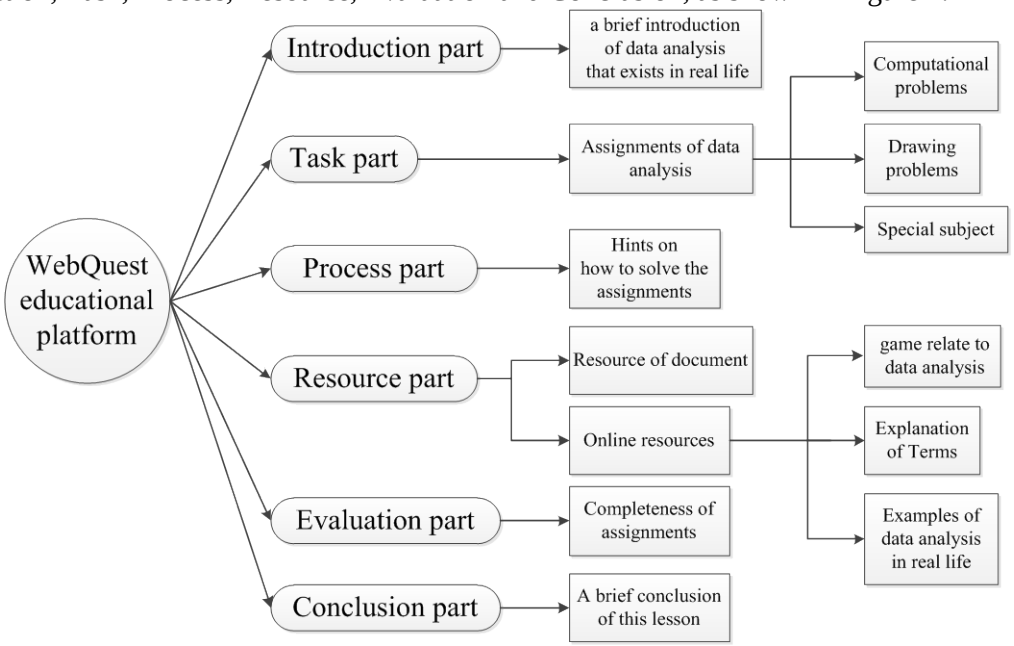

Figure 1. WebQuest-based course design for the "data analysis" unit in mathematics.

4. Experimental design and expected results

In this paper, a qualitative interview will be conducted because of the number of aboriginal students in the school is few, and thirteen high school first grade aboriginal students will participate in experiments. A mathematics unit "data analysis" is chosen as the teaching target in our experiments. Before the

WebQuest courses, students will receive a pre questionnaire of mathematics learning attitudes about data analysis. The WebQuest courses have 200 minutes. After the courses, students will receive a post questionnaire of mathematics learning attitudes about data analysis. After all, we will interview all students to collect the qualitative data for further analyzing students' learning perspectives. Data will be collected through the interview and pre and post-questionnaires about mathematics learning attitudes and the t-test analysis will be conducted for data analysis.

In this paper, we expect that using the WebQuest instructional strategy in mathematics curriculum of high school can significantly improve aboriginal students' learning attitudes towards mathematics and can help us to deeply understand students' learning perspectives.

Acknowledgements

This study is supported in part by the National Science Council of the Republic of China under contract numbers NSC 102-2514-S-152-005-MY3.

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