Effect of Inquiry Web-Based Learning Competition for Gifted Students in Junior High School

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Abstract: The study was designed to explore how to proceed an Subject-Inquiry-Based Learning and enhance their knowledge about weather through joining the Inquiry Web-Based Learning competition held by the Department of Education of Taipei City Government. The purpose was to find out how they completed the assigned tasks and what they learned from the process of this Web-Based Learning competition. The subjects were 30 gifted students in one junior high school. The results show that most of the gifted students completed the tasks by using the database in Central Weather Bureau and Taipei Weather Inquiry-Based Learning Network (TWIN). After the Web-Based Learning competition, they learned how to reflect better from their peers‘ reflection and gained additional knowledge about and emotional support from their peers‘ comments. There are some effects such as their attempt to apply the knowledge into practice, change of their beliefs and the gain of additional perspectives.

Keywords: Inquiry, Web-Based Learning, Environmental Education

1. Introduction

Inquiry-Based Learning is a kind of way of learning which is concerned about how students study actively by themselves. It could be practiced widely in all kinds of subjects. Recently, more and more nations have started to care about the students' abilities of inquiry, problem solving and so on. However, the implementation process of Inquiry-Based Learning still meet a lot of restriction and difficulties (Edelson, 1999). In this modern Information Age (or New Media Age), if we could merged Inquiry-Based Learning into teaching through new Web-Based Learning models, we would offer a new beneficial environment for students to study easily.

Web-Based Learning Competition is constantly held by the Department of Education of Taipei City Government. Through the Web-Based Learning Model created by themselves, the government hopes to encourage students studying junior high school or elementary school to use the learning model as a kind of tool to express their ideas and communicate with one another, and increase the ability to evaluate through the reflection and peers' comment. The topic is about the phenomenon of the weather such as climate change, global warming or extreme weather. First, all the participants are asked to form a team including 1 to 3 members and at least one coach who could be teacher or parent. Then, they are able to begin to collect the information such as the temperature or rainfall as much as possible to come to their own conclusion. They are suggested to use the database in Central Weather Bureau, Taipei Weather Inquiry-Based Learning Network (TWIN), or others.

Figure 1. The Front-page of Taipei Weather Inquiry-Based Learning Network (TWIN).

2. Relevant Literature

The technology of computer network is able to not only satisfy the learning motivation, provide the multiple content and create a kind of learning environment full of resources but a online social network. (Linn, 2003) Online social networks (OSNs) are increasingly attracting the attention of academic and educational researchers intrigued by its affordances and richness. OSNs provide powerful means of sharing, organizing, as well as finding contents and contacts. A large-scale measurement presented the study and analysis of the structure of OSNs. According to Chinn *et al.* (2011), the general conceptualization about the nature of epistemic cognition development not only makes its theoretical and empirical boundaries wider, but it also represents one of the main hypotheses of several stage-development models.

Moreover, the website for the Inquiry Web-Based Learning competition is capable of recording the discussion between participants and coaches so that all the participants could watch other's ideas and reflections. Writing reflection enables school teachers to examine the relevance of the training content and improve their teaching practice to meet the constant change of students‘ learning needs (Killeavy & Moloney, 2010). We could regard it as another advantage for all the participants during the process of this competition.

3. Method

3.1 Research Design

The study was designed to explore how to proceed an Subject-Inquiry-Based Learning and enhance their knowledge about weather through joining the Inquiry Web-Based Learning competition held by the Department of Education of Taipei City Government. All of the students were asked to complete all the tasks in different stages in the Inquiry Web-Based Learning Competition including Learning Sheet, searching the useful data and writing their reflections. We collected all the information recorded in the Taipei Weather Inquiry-Based Learning Network and analyze it, and then interview some of them if we need and the teacher.

3.2 Subjects

30 8th grade students were involved in this study led by a science teacher who had some experiences in the Inquiry Web-Based Learning competition. Those students are gifted students studying in the advanced science class. All of them were asked to join the Inquiry Web-Based Learning Competition and finish all the tasks.

3.3 Materials

The process of the Inquiry Web-Based Learning competition is divided into four stages. Each student has to complete the task on time so that they can enter to the next stage. The goals of the task in different stages are as follows: (1) to decide their own research questions; (2) to decide the data which will be chosen, the range, and how they intend to collect the data; (3) to analyze the data and draw the chart or diagram; (4) to finish their own report about the Inquiry-Based Learning. Not only completing the task but peers' comment between different coaches could each team pass into the next stage so that all the participants are capable of collecting more ideas to modify their research.

3.4 Data Collection Procedure

This study adopted the constant comparison approach. All reflections and comments posted onto Taipei Weather Inquiry-Based Learning Network were copied onto a word document. The reflection expressed by the first participant were read carefully in paragraphs, and the way of writing reflection was color coded for easy recognition later. After analyzing all reflections of the first participant, the researcher compiled the codes to further consolidate common themes. The coding process continued in a similar way with the rest of the participants. If a new theme was emerged, it was added to the theme list. After reading through all reflections, common themes were summarized. The themes were further compared and combined. A list of two to four themes was finally generated. The same approach was applied to analyze the comments.

4. Results

4.1 Reflection

Altogether 120 individual reflection were found in Taipei Weather Inquiry-Based Learning Network and 132 codes were labeled. Three main themes emerged from the reflection, which were:(1) elaborating on the content; (2) applying the new information into practice; and (3) changing beliefs.

Reflecting on the topic content was a basic requirement for the individual reflection. The participants elaborated on the content in a little different ways. The most of them often used was that they simply repeated what they had learned from the data downloaded or added certain personal understanding without in-depth explanations (N = 40, 30.3%). Another way was that they elaborated on the content further by adding some new information (N = 34, 25.8%). It was evident that they went to the Internet to search for additional information for better understanding of the contents about the topic that were new to them. In their reflection, they shared the additional information. An additional way of writing reflection was they elaborated on the content by connecting it to previous lessons, reflection, or content learned from other classes (N=10, 7.6%). It seemed that they attempted to integrate the newly learned content into their existing knowledge structure.

Two ways of applying the new learned information into practice was found. One way was that they applied those new information into practice (N=22, 16.7%). The other way was they attempted to explain certain existing weather phenomena by using the new learned information (N=15, 11.4%). Some of them even mentioned that they might share those information with their family members. Another theme emerged from the reflection was the new information inspired them to rethink about their original beliefs and as a result their assumptions started to change (N=11, 8.3%). For example, before joining the Inquiry Web-Based Learning competition, some of them thought that the network was only a tool for sharing information with classmates. They seldom thought that it could be used as a type of learning tool. After finishing the Web-based competition, their opinions started to change and recognized that using technology to study was not that difficult. Besides, some of them also mentioned that they have learned a lot of knowledge about the weather they did not know before.

4.2 Comments

Altogether 40 individual comments were found in Taipei Weather Inquiry-Based Learning

Network and 88 codes were identified. Also, three major themes became obvious in their comments: (1) commenting on the content; (2) expressing encouragement; (3) commenting on the way of writing reflection.

Peers used to further elaborate on the reflection content in their comments (N=32, 36.4%). To some extent, different ways of making comments were noticed. One way was that they picked up certain keywords or points from the reflection and elaborated further by adding new information or explanations. Another way was they tried to offer some useful explanations to the problems mentioned in the reflection or to explain why the problems existed. Part of them might add personal experiences or additional arguments to support the opinions expressed in the reflection (N=25, 28.4%), or disagreed with certain ideas in the reflection by providing with different examples or perspectives (N=8, 9.1%). In some comments, peers also stated what they learned from the reflection (N=6, 6.8%). Some of them indicated that they benefited from the reflection in an indirect way as certain ideas in the reflection stimulated them to search for more information or study further.

Peers also expressed encouragement in their comments (N=10, 11.4%). Generally, peers gave encouragement in two varied situations. One was that they gave positive comments or encouragement when the reflection writer presented good ideas, comprehensive summaries, or constructive suggestions. The other way was that peers gave encouragement when they realized the reflection writer had certain problems or difficulties. In this case, they encouraged them to face the difficulty positively. Sometimes they did not comment on the reflection content, but on the way of writing reflection (N=7, 8.0%). What impressed them most was the responsible way of writing reflection, or the positive attitude towards reflection writing or learning in general.

4.3 Interview of the teacher

According to the reflection of the teacher after the Inquiry Web-Based Learning competition, there are some points mentioned. Among the positive responses, the following reasons appeared: (1) writing reflections through Taipei Weather Inquiry-Based Learning Network could help students study more efficiently; (2) with the aid of Taipei Weather Inquiry-Based Learning Network, students get more useful ideas and encouragement during the process of learning; (3) students are able to learn how to tell and pick up what is the useful information and improve their ability of inquiry.

However, there are some restricting part mentioned by the teacher as follows: (1) some students may not have enough time to finish their task completely; (2) before joining the Inquiry Web-Based Learning competition, all students need to be well-taught to have the ability to search the data and explain it correctly.

5. Conclusion and Suggestion

The study has some implications for using Taipei Weather Inquiry-Based Learning Network. some participants were more experienced or responsible and their reflection was in more depth. The others commonly indicated that they learned how to reflect from these learners. Besides, the result also suggest that involving some higher ability or more experienced learners would show a positive sample to others and hence has the possibility to promote collaborative reflection to a higher level. In this study, all the participants are gifted students in the same class. That is why they could explain the same content or phenomenon from different perspectives, or give varied interpretations so directly. This result also implies that being familiar with one another would increase the likelihood of gaining more benefits from peers in the collaborative reflection process.

Furthermore, in addition to learning content directly from the lesson or the instructor, the participants in this study also shared their understanding with peers. Through the sharing, peers learned additional information, different perspectives, or the way of writing from the reflection. Collaborative studying can also lead to higher level thinking and transformational changes. It involves both cognitive and affective processes.

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