Revisiting the Treasure Hunt Format to Improve Reading Achievement

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Introduction

The WebQuest is widely accepted as a structure to support inquiry learning. However, with the pressures on assessments from NCLB, teachers cannot always afford the time required to complete a WebQuest and resort to shorter web-based activities such as the Treasure Hunt to support instruction. Guidelines for developing Treasure Hunts have not been fully explored. This research examines strategies for improving the design and implementation of Treasure Hunts to better enhance reading comprehension when reading on the Internet. The purpose of the study is to determine a better way to design and implement the Treasure Hunt that is aligned with research based recommendations for teaching reading.

The research on Treasure Hunts is sparse, yet a Google search reveals that the strategy is frequently used. Filamentality even has an online tool to host Treasure Hunts. March (2001) explains that when creating Treasure Hunts, "… you gather 10 - 15 links …. After you've gathered these links, you pose one key question for each Web site you've linked to." However, March's description does not indicate the types of questions that would best support comprehension. An analysis of 11 Treasure Hunts selected randomly from the Internet revealed that of 151 questions posed, 90% of the questions were literal, 7% were interpretive, and 3% were applied. Also, there was no consistency from site to site in the layout of the linked web pages. Reading electronic texts requires students to utilize skills that differ from those needed for print text. Low level questions and varied web design prompted the authors to explore the design and implementation of Treasure Hunts.

The Study

The current emphasis on increasing reading comprehension for all students combined with the growing use of Treasure Hunts and electronic text by classroom teachers have prompted the authors to pose and attempt to answer the following questions:

1. What effect does the revised Treasure Hunt format have on student achievement?

2. What effect does the teacher's introduction of the Treasure Hunt have on achievement?

Method
Background

For the purposes of this study, the structure of the Treasure Hunt was revised in several ways. In addition to beginning with the standard introduction as described by March, the Treasure Hunt began with an enduring understanding statement (Wiggins & McTighe, 1998). This statement identified an overall purpose for reading the various web pages and answering the questions. It communicated the understanding that K-12 students should have when they completed the Treasure Hunt. For example, a Treasure Hunt on the Treaty of Versailles began with this statement of enduring understanding, "Though the Treaty of Versailles ended World War I, many believed that it led to the beginning of World War II." Likewise, a Treasure Hunt on the Oregon Trail began "Travelers of the Oregon Trail faced many hardships and obstacles while on the long journey to the west."

The body of the Treasure Hunt was revised to require use of all four types of questions in the Question Answer Relationship (QAR) method (Raphael, 1984). This type of questioning was selected because it is a questioning strategy that prompts readers to locate explicitly stated information and to delve deeper, making inferences, drawing conclusions, and connecting information within and beyond the text selection. The QAR includes four types of questions: 1) Right There, 2) Putting it Together, 3) Author and Me, 4) On my Own. While there is nothing inherently wrong with "Right There" questions if used judiciously, research on questioning has found that reading comprehension is increased when readers understand where and how to develop answers to questions and when higher order thinking, interpretive and applied comprehension, is fostered.

Instead of ending with a "Big Question" as described by March, the conclusion of the Treasure Hunt was revised to include a "Putting it All Together" activity. Most "Big Questions" in Treasure Hunts fail to integrate the information addressed in the prior questions. Using a final activity is a much more effective way for teachers to engage students in demonstrating that they have acquired the enduring understanding. For example, the Treasure Hunts might end with "Putting it All Together" activities such as: create a journal, complete a Venn diagram, write a paragraph, design a poster, write a story, create a brochure, or create a treaty. This revised structure for a Treasure Hunt was used to create the Protist Treasure Hunt used in this study.

Theoretical Framework

This study was framed by the work of several authors. First, Wiggins and McTighe (1998) discuss the need to develop enduring understandings and essential questions. Second, Reinking, Labbo, & McKenna (1997) identify unique characteristics of electronic texts: interactivity, fluid texts; multimedia and hypermedia texts merged with prose; alternative textual structures that are not linear and hierarchical; and expanded boundaries of control for readers. Third, questions that require students to integrate information from a text "will promote deeper processing, and therefore more learning and better remembering than questions that require

recall of specific facts only" (Sundbye, 1987, p. 85). Finally, Royer and Richards (2004) conclude that the majority of students transfer what they know about reading print text to the electronic medium, such as utilizing headings and topic sentences. However, the majority of the readers do not strategically utilize the features that are unique to the web, such as hyperlinks and graphics.

Participants

The participants in this project were 48 students in two grade 9/10 biology classes in a public high school. Students in the class were grouped homogeneously by academic achievement representing the middle 60% of the student population.

Method

Working with the classroom teacher, one of the researchers designed a *Protist Treasure Hunt* (http://facultyfp.salisbury.edu/rdroyer/thunt/protist.htm) utilizing the revised treasure hunt format developed for this study. The *Protist Treasure Hunt* included an understanding statement, questions that utilized the Question Answer Relationship (QAR) method (Raphael, 1984), and a final performance assessment. Using the QAR format, the treasure hunt had six Putting it Together type questions, four Author and Me type questions, and two On My Own type questions. See appendix. One class served as control and the other class served as the treatment group. According to the teacher, one class consisted of reluctant, below grade level readers. These students regularly struggled to complete classroom assignments and often chose not to attempt the assignments at all. Since the purpose of the study was to enable struggling readers to be more successful when reading electronic text, it was decided to make this the treatment group. Both groups were given the *Protist Treasure Hunt* to complete. The control group was instructed to complete the Treasure Hunt, given the instruction typically provided by the teacher. The treatment group received explicit instruction in how to navigate each linked web page and utilize its web components prior to completing the Treasure Hunt. The teacher observed such things as completion, time on task, and amount of teacher assistance requested while they were working. After the students completed the Treasure Hunt, the teacher was interviewed. The teacher evaluated student work to compare the groups' responses to questions and the Putting It Together performance task. A T-test was used to determine if the results are significant.

Data Collection

Data collection consisted of quantitative and qualitative data. For quantitative data, student grades for terms 1 and 2 were averaged and compared using a T-test to determine if the two classes were equal in ability to achieve in the science classroom. Student scores on the QAR questions within the Treasure Hunt were compared using a T-test to determine if the types of questions enabled students in both classes to comprehend science concepts related to protists. Student scores on the Putting it Together concept map were compared using a T-test to determine if the students in both classes were equal in their ability to demonstrate their

comprehension of the understanding statement. For qualitative data, the researcher interviewed the classroom teacher following completion of the instruction using the *Protist Treasure Hunt*.

Findings

Analysis of the term grades for the two classes revealed that the classes are not significantly different in their ability to achieve in the science classroom. Table 1 reveals the results of an independent sample T-test for term grades.

Variable	N	Mean	Standard Dev.	T-value	Df	2-tailed
Period 6 (treatment) term grades	25	79.2	8.8	-1.7	46	.08
Period 7 (control) term grades	23	83.3	6.8			

Table 1: T-test on term grades

Analysis of the responses to the QAR questions within the Treasure Hunt revealed that the classes were not significantly different in their ability to complete the QAR questions within the *Protist Treasure Hunt*. Table 2 reveals the results of an independent sample T-test.

Variable	N	Mean	Standard Dev.	T-value	Df	2-tailed
Period 6 (treatment) QAR questions	21	28.9	1.7	-1.2	39	.231
Period 7 (control) QAR questions	20	29.4	1.1			

Table 2: T-test on questions

Analysis of the concept maps completed as the Putting it All Together activity revealed that the classes were not significantly different in their ability to complete the concept maps and demonstrate their comprehension of the understanding statement.

Variable	N	Mean	Standard Dev.	T-Value	Df	2-tailed
Period 6 (treatment) concept maps	19	23.5	7.1	-.315	36	.755
Period 7 (control) concept maps	19	24.4	10.2			

Table 3: T-test on concept maps

The teacher felt strongly that the results of the quantitative data did not tell the full story. According to the teacher, these classes were quite different in their ability and motivation to compete work in this science classroom. The teacher explained that the students in period 6 (treatment group) were poor and reluctant readers and seldom completed assigned work. Their term grade point averages more clearly revealed this difference. "These classes aren't equal. One is a very low Certificate of Merit class and the other is a true Certificate of Merit class. Yet there wasn't a single person in that lower class that got less than a B+ and the majority of the students on the questions and the performance task got A's. The scores on the concept maps are bit lower but they are still very good".

The teacher explained that the types of questions and the introductory activities were instrumental in making this a successful activity, which he described as "some of the best instruction I've used in the class all year." To introduce the Treasure Hunt with the period six treatment class, the teacher previewed the questions and the linked web resources. He explained

that, "Before we went to the lab, we went over the intro and then I projected the web site on the TV. They had in front of them the worksheet (with the printed questions from the treasure hunt). I pointed out where to go in navigating the sites. I went through six of the sites and pointed out navigation strategies such as scrolling to the bottom of the page, etc. Even through it said in the directions where to find the answers, actually showing them made it easier….We talked about how some questions are opinion and at the end they will be making a concept map. And that they should put answers in their own words.   In the showing of the web site it became clear that the answer was not a right there question".

As the teacher observed the period 6 class at work, he noticed that during the treasure hunt activity the students stayed on task. He explained that it "was great to see everyone working independently. I had to help students here and there but they obviously didn't have too much difficulty finding the answers to the questions, which were fairly difficult given this level class. Almost everyone did all the work which was phenomenal. Usually they don't work independently. They usually struggle unless they have help".

When asked if the QAR types of questions were different from the types of questions he usually asked, the teacher replied, "Yes, there were very few literal questions. They (students) had to read and synthesize. They did that………….I'm just amazed. They even bulleted their lists. It is all very different from the typical handouts that come with the book. They look up the answers and they don't have a clue what the answers mean. With this they had to think".

The researcher prompted the teacher to introduce the *Protist Treasure Hunt* to the period 6 class (treatment) by clicking on each of the linked web resources and discussing the page layout and identifying where on the page the answers could be found. When asked what difference this type of introduction made the teacher replied that

I'm not sure that there will be a big difference (between the two classes) in the results but if I had not done this I would have seen a big difference. Without this help they would have been all over the place. The difference that it made was it brought the low class up the level of the other class. They really needed that kind of instruction. The other class is good enough and they have learned to do this. But for the average class, they need this. This happened once before when we used the Internet; we just threw them in there and they were lost. With this, for two days I never had to worry about them being on task. They really engaged in the activity. If you look at the answers, they are their answers. They had to come up with their own. Their scores are not higher than the other class but they certainly are higher than they would have been. Getting that class to do anything academic is just a struggle. One student who failed my class before (I don't ever remember failing anyone who came to class all the time. I always give them plenty to do so that they cannot fail. But she consistently chose not to do it.) had an A on this activity. She is one of the kids who wanted to go back an extra day because she didn't get her concept map finished. It is refreshing to see so much thought put into answering the questions. Students rarely put much thought into chapter review questions that come with the text.

Discussion

      1. What effect does the revised Treasure Hunt format have on student achievement?

The revised Treasure Hunt format appears to have a positive effect on student achievement. On average, the students were able to answer 29/30 of the questions correctly. The teacher commented that he believed that one of the reasons for the success of all of the students on the Treasure Hunt was the types of questions. He believed that the students were more motivated to answer the QAR questions, which were more engaging than the literal level questions associated with their text. In addition, the Understanding Statement guided the teacher as he created the questions for the Treasure Hunt, so that each of the questions focused on the narrowed topic and guided student understanding. Finally the Putting it All Together task provided an activity which required students to synthesize what they had learned.

      2. What effect does the teacher's introduction of the Treasure Hunt have on student achievement?

The teacher's introduction which included a preview of the linked web sites seemed to have a positive effect on student achievement. The average scores for the concept maps, which summarized student understanding on all of the previous questions in the treasure hunt, were less than one point apart. The teacher explained that this was unusual and attributed the achievement of the treatment group to the effects of the introduction of the Treasure Hunt and types of questions combined.

      Given the success of the students in completing the *Protist Treasure Hunt*, the researchers have concluded that the revised Treasure Hunt format may have the potential to increase student achievement by better scaffolding their reading comprehension of electronic texts. Further investigation of this format seems warranted.

Limitations of the Study

      The limitations of the study prevent generalization of the results beyond this classroom. The groups were selected by convenience and not by random selection. The teacher graded the work of the students in his own classroom. Finally, the students did not complete an assessment to determine their reading skills prior to completing the Treasure Hunt activity. Future studies should continue to examine the effects of using this revised model for Treasure Hunts on student comprehension.

Implications for Practice

      With the spotlight on increasing reading achievement to meet the mandates of NCLB, too many teachers and administrators believe that they do not have time in their curriculum to integrate technology, even though they acknowledge that students are likely to be motivated by the use of it. What many educators are overlooking is that in addition to bringing information into the classroom, the Internet can also be a vehicle for teaching reading comprehension skills and strategies. The positive effects on students' reading performance because of motivation and interest, as well as the social and cultural authenticity of using technology, may be

underestimated. This study is designed to provide teachers with better guidelines for teaching with the web. The authors hope that it will encourage teachers to use the Internet not only as an informational source in the classroom but also to help students learn to better comprehend electronic informational texts, literacy skills needed in the 21st century.

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Protist Treasure Hunt

Understanding Statement: Protists, which live in water environments such as ponds, rivers, and bays, are complex, single-celled organisms that move using cilia, flagella, and pseudopodia.

Questions: Before you begin: The last question in the treasure hunt asks you to write your own question about protists. As you read on the Internet about protists, be thinking about what question you have about these unique creatures. You may or may not find the answer to your question in this Treasure Hunt activity. That is OK. Write your question as question #12 on this answer sheet.

1. Describe the behavior of the paramecium including its movement and avoidance behavior.

2. What are the roles of food and contractual vacuoles in the physiology of the paramecium?

3. Using the drawing on this site and images of the paramecium on the previous web page, draw a picture of a paramecium and label the macronuclei, food and contractual vacuoles, and cilia.

4. What are three easily identifiable parts of an amoeba?

5. Describe two functions of pseudopodia in the amoeba.

6. Examine all of the pictures of volvox on this web page and read the first two paragraphs. After reading, list 5 characteristics of volvox.

7. Compare and contrast volvox and Euglena. Using the 5 characteristics that you listed for volvox, make a chart. Give your chart an appropriate title. Down the left side of the chart list the characteristics. Across the top of the chart, make two columns, one for similarities and one for differences. Put an X in the appropriate box to indicate how these to protists are alike and different.

Title:		
Characteristic	Similar	Different
1.		
2.		

8. You may have seen dinoflagellates during the warm months of summer. These species reproduce in such great numbers that the water may appear golden or red, producing a "red tide". Read about dinoflagellate "armor" and flagella and then make a drawing of a dinoflagellate identifying these two parts.

9. Examine these images of stentors. Describe 1 way that they are similar to other protists and one way that they are different.

10. Now that you know what is in a drop of pond water, you can understand why you should not drink it. But why should we be mindful not to pollute it? What are protists good for? Read this article about protists and explain why protists are important to life on earth.

11. Why do you think pseudopodia, flagella, and cilia are important to protists?

12. Write your own question here. If you have found the answer, write that too.

Putting it All Together: Use the back of this sheet to create a concept map for the concept "protists". Include in your map types of protists, methods of locomotion, and structures.