Moving on from WebQuests: Are DiscoveryMissions the next big thing?

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This paper introduces a new teaching strategy called a DiscoveryMission, which builds on from and is a newer version of a WebQuest, which is a web-based learning experience for students. First year pre-service education students were introduced to the DiscoveryMission and completed one as part of an educational technology course. This paper describes a DiscoveryMission and presents initial findings of the data collected. Results include students being engaged and enjoying completing a DiscoveryMission and that they would use them in their teaching in the future.

Keywords: WebQuests, DiscoveryMissions, Pre-service teachers, teacher education

Introduction

In 1995, Bernie Dodge and Tom March introduced the concept of the WebQuest or a web-based learning experience that is "wrapped around a doable and interesting task that is ideally a scaled down version of things that adults do as citizens or workers" (Dodge, 2007). The initial idea of a webquest was to provide an inquiry orientated activity which allowed students to gain information from the Internet (Dodge, 2001). It also allows for students to engage with higher order thinking and problem solving (Dodge, 2007) through a guided experience using the Internet. Subsequent research has shown that WebQuests can be an effective way of encouraging students to engage in higher order thinking with one study suggesting this as part of an initial teacher training module (Allan & Street, 2007).

One of the great features of the WebQuest is its simplicity, in both creating them and for the learner. The WebQuest product itself as described by Polly and Ausband (2009) includes seven distinct elements:

1. Introduction
2. Task
3. Process
4. Evaluation
5. Conclusion
6. Credits
7. Teacher Page

These steps provide an easy to design template for creating web-based educational activities. Each of the elements is designed to either walk a student through a structured interaction with information on the web or provide teachers the resources they would need in order to incorporate the WebQuest into their own setting.

WebQuests can also provide a structure for teachers to scaffold students (March, 2003). In a world coming to grips with this vast amount of information available to teachers and students, the WebQuest became a hit early in the 21st Century. Thus, it is rightly seen by many as the gold standard for educational uses of the internet.

Although WebQuests are a fantastic initiative it has a major weakness that the design has not been able to overcome easily. This is that it hasn't adapted well to Web 2.0. The WebQuest is the perfect classroom application of Web 1.0 Internet tools, but it is designed to be a process that provides information to the students, even if students are creating their own WebQuests. For example, the creator of the WebQuest finds and organises all of the information that the user of the WebQuest will need. The developer envisions the task, outlines the process, creates the evaluation plan, designs the conclusion, and then provides this as a learning experience for users of the WebQuest. In this paradigm, the user of the WebQuest plays no role other than that of a passive recipient of the developer's guidance and materials, even though the tasks can be hands on and authentic. This type of one-to-many design works well in a Web 1.0 setting, but it doesn't fully leverage the capabilities of Web 2.0 technologies that easily allow creation of content. Understanding that, it is proposed that the DiscoveryMission is the natural next step in this progression.

The DiscoveryMission is a user-generated educational resource that includes the following elements:

1. Mission Goal
2. Mission Training
3. Mission
4. Mission Procedures
5. Mission Resources
6. Mission Completion
7. Mission Reflection

Specifically, these elements are broken into two broad categories that illustrate the roles of the different participants in the process of learning:

1. Teacher Lead (those elements that the teacher would identify):
    a. Mission Goal: The standards the student will meet.
    b. Mission Training: The background information that the student should have mastered in order to complete the current mission.
    c. Mission: The **specific question** the students will answer with their mission
2. Student Lead (those elements that would involve the students in designing):
    a. Mission Procedures: The instructions for students to complete their mission including getting feedback during this process.
    b. Mission Resources: Links to resources for the technology applications and/or additional content resources specific to the students' topic that can be used to complete the mission.
    c. Mission Completion: Final product. The intent is to share with parties beyond teacher and classmates.
    d. Mission Reflection: Students reflect on what was learned during the mission and how their project meets the mission goals.

The DiscoveryMission uses a student-centred, negotiated-learning approach that not only provides the opportunity for students to lead the development of learning tasks, but, in fact, requires it.

WebQuest Comparison

The DiscoveryMission has several significant features that expand beyond the capabilities of a WebQuest.

Firstly, the process itself inherently demonstrates a student-centred learning experience. The student is not passively receiving information from the teacher or the Internet. Rather, the student is bringing information into the classroom, which the teacher and his or her classmates can help evaluate and verify.

Secondly, the beginning of the DiscoveryMission can be duplicated or shared by other teachers. One of the strengths of the WebQuest model is that individual WebQuests can be shared. Once a developer has finished the creation of a WebQuest, other teachers can find that instrument and incorporate it into their own classes. This would not be the case with the DiscoveryMission because the benefit of the process is seen in the students' collection and/or creation of the content. In this case, the Mission, Goals and Training stages could be copied or

modified by other teachers, but the subsequent stages would be unique within the classroom setting of the new teacher due to the fact that they would be directed either fully by the student or in collaboration between the student and the teacher.

Thirdly, the DiscoveryMission model naturally leverages the vast array of Web 2.0 technologies that are currently available and which are yet to be designed. The Mission Completion stage could involve the use of wikis, blogs, podcasts, Twitter, social networking, grassroots video or any number of other technologies that ask users to create content. Any of these tools could effectively be used to provide the content that the students organize.

Finally, the DiscoveryMission model allows flexibility in order to incorporate both formative and summative assessments of work. The Mission Procedures, Resources and Completion stages can be seen as looping so that there could be several iterations of content created by students before the process completes. As students receive feedback, they can then refine the content that they have delivered, which could then be subjected to another round of feedback (by either the teacher or fellow students). There would be no limit to how often these elements could be looped aside from the education needs of the class and the time limits imposed on the assignment.

The Underpinning Philosophy

The underpinning philosophy on which the DiscoveryMission approach has been founded is that of constructivism and constructionism, and thus the student centred classroom. DiscoveryMission's build on the WebQuest environment which used a constructivism philosophy (Allan & Street, 2007; Tuan, 2011). Additionally, the philosophy of constructionism was also instrumental in the development of DiscoveryMission. Constructionism is an outgrowth of the constructivist philosophy, in that it depends on students constructing their own knowledge. The main difference is that constructionism focuses on the end product that is being developed as part of the process. Seymour Papert (Wikimedia Foundation, 2013), when defining constructionism, said that:

> (T)he word constructionism is a mnemonic for two aspects of the theory of science education underlying this project. From constructivist theories of psychology we take a view of learning as a reconstruction rather than as a transmission of knowledge. Then we extend the idea of manipulative materials to the idea that learning is most effective when part of an activity the learner experiences as constructing a meaningful product.

In a real sense, constructionism is constructivism in practice. Thus the DiscoveryMission pedagogy is designed specifically to demonstrate a way through which students can be put in charge of, or possibly be given a starring role in the development of their own educational experience.

The DiscoveryMission idea is founded by the notion that teachers can start the process of learning by giving their students a mission, and then have the students decide the direction by which they complete that mission. By letting students propose the procedures through which they would complete the mission, identify the resources that they need along the way, and identify the form of the completed product, the DiscoveryMission process empowers each student to take ownership of this process and thus the teacher can provide guidance rather than the content.

Methodology

Approximately 300 first year pre-service teachers were enrolled in an educational technology course. Most students enrolled are studying to be secondary teachers while a small number (n=17) were enrolled in a primary or 'middle years of study' course, which means that they will become either primary school teachers or middle years teachers at the completion of their four year course.

The DiscoveryMission was integrated well into the course in both the lecture for one week of the course and that same week's tutorial class. The week's classes were called 'Wikis, WebQuests and Collaborative learning' and prior to the lecture the students were required to watch a six minute video. This incorporated the above topics and included the co-author telling the students about DiscoveryMissions. During the interactive lecture the topic was further expanded upon and students were asked the question "how might you use a DiscoveryMission in your subject area"? The students reported their answers in the discussion area of their learner response system, Top Hat Monocle.

There are 15 tutorial classes held each week with approximately 20 students in each. These sessions are held in

two teaching laboratories containing a computer for each person. In the tutorial class students were given a scenario based on completing a DiscoveryMission. This scenario is described here:

- Mission Goal: Students will be able to make appropriate technology decisions concerning effective delivery of content in a Queensland public school.
- Mission Training: The Queensland public school system is a large one that attempts to provide enough ICT to its students across the state. However, not everything is able to be provided to meet individual class and student needs.
- Mission: You have been awarded a $10,000 - $20,000 grant to utilize technology to deliver academic content to secondary school students at your school. However, you can apply for a top up grant of up to $500,000. What technology would you use, why and how? Design an appropriate plan for delivery that content.

There were four students in each group, with one student acting as the 'teacher' in each group and they got to make up any rules regarding any questions about the mission. The three students in each group were then asked to work through the mission. Each group then reported on their class group Blackboard discussion board the responses to the DiscoverMission. This meant that all groups in each class could access this and they could comment if they wished.

As described below data were collected in several ways from the students who attended the lecture and/or tutorial class. These included through the learner response answers recorded by the students in the lecture as well as through the completion of the DiscoveryMission responses in Blackboard (from the tutorial). One week after the tutorial the students in the course were asked to complete a questionnaire on their experiences during the DiscoveryMission tutorial class. The questionnaire was completed at the beginning of the next tutorial class. Questions included asking the students if they watched the video prior to the lecture, and what they liked about completing the DiscoveryMission as well as the asking the students to record the reasons why or why they would not use a DiscoveryMission with a future class.

From the 291 students enrolled in the course there were a total of 190 students who responded to the survey. Students were asked what steps they took in the development process of the DiscoveryMission and if they were the 'teacher' in the group. The students were also asked if they had any difficulty understanding the purpose of the DiscoveryMission elements. The student responses were analysed for a positivity and negativity split for each individual response. Data were also analysed using coding to elicit themes that were emerging.

Results

Students were asked if they watched the video prior to attending the lecture, with 75% of the students who responded (N=120) stating they did. Of these students 69% of respondents felt that watching the video helped them to understand the DiscoveryMission process.

With regards to the question of 'what did you like about completing a DiscoveryMission' just under 11% of the responses were negative and almost 90% of the written comments were positive in tone. One student commented:

> It was a great idea that gave us a real life, practical purpose for us to complete the mission that was directly relatable to something we may face in our careers. The information provided was useful and I liked that we had roles within groups and that we also worked in groups to support each other with ideas.

The students were then asked 'why or why wouldn't you use DiscoveryMissions with your class'? Fewer than 18% of comments were negative, and another 14% were ambiguous (meaning they had both positive and negative elements). That means that nearly 70% of comments were strictly positive in tone. One student stated:

> I was finally able to understand discovery mission's in the hands on application in tutorial. I'm a kinaesthetic learner... I liked that the students are able to engage so thoroughly in conversation to get to the final solution to the posed question. I think this method of teaching also allows students to investigate and pose idea's the teacher initially didn't see as a possibility.

Other student comments include:

Interactive and engaging for students, another tool for teachers to generate interest, class discussion and conversation.

The level of student contribution as the Mission is largely student directed. Also that the process can be applied to mostly anything so it is a versatile tool.

They make you feel as though you've accomplished something and they are a concrete way to assess learning. Also the task was ambiguous so there were different interpretations on the Mission which lead to some great creativity amongst groups and lots of different responses.

Conclusions

This research involved using the newly developed DiscoveryMission with pre-service education students to explore in the tutorial classes of a first year education technology course. Initial analysis of the student results were positive, and indicate that the students who participated felt the DiscoveryMission process to be worthwhile. Additional qualitative analysis of the written comment will be done to determine what specific themes and trends can be seen within the different answers..

Previous research on WebQuests suggest that these increase student engagement and promote higher order thinking (Allan & Street, 2007). Initial data analysis suggests this is also true for the new DiscoveryMission.

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