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EDT 598

Inquiry Plan

The study that I will use for a model is Integrating Student Learning with Practitioner Experiences via Virtual Field Trips by E. Sam Cox and Tyng-yn Su at the Central Missouri State University. The purpose of this study was to address the rationale for virtual field trips as well as the content and design of virtual field trips. The authors wanted to see if VTFs gave learners a more valuable experience in a subject area than just reading a book or taking some notes. In the study, VTFs were created for a public speaking class because students often asked why they have to take the course or why they needed to be proficient public speakers. This is the biggest reason why I want to use a VFT in my math class. I hear too often the same types of questions so I want to make the content as authentic as I can. I can show the students how they are going to use their content and in a specific context as well as being able to bring in other content of other subject areas.

Research done in the area of virtual field trips supports the use of the medium in the classroom as a medium. A virtual field trip gives an authenticness that might not otherwise be accomplished through traditional teaching. Classes do go on field trips but they are not always realistic as a destination might be too far away or the cost of the trip is just too great. With the use of flash and other software, the idea of a virtual field trip is much more appetizing as it always seems like a learner is at the site. Research on virtual field trips is also being conducted by textbook companies. With the rise of technology is the past couple of decades, these companies have been incorporating more and more curriculum into CDs, websites, and such so virtual field trips are a natural extension of that process. The research has shown that virtual field trips are effective in the learning process as long as the educators take ownership of the activity.

Teachers who either create the activities or have vital roles in their development have much better outcomes than the educators who have very little to no ownership. Educators involved in the process have students who are more motivated therefore leading to higher understanding of the concepts as higher scores on post tests.

The problem is that students in high school geometry are not being motivated through authentic experiences. Students are inundated with theorems and formulas with no real vision about where they are used outside the classroom and how valuable can be. The biggest motivation for students is grades with no real sense about the usefulness of geometry and communicating their mathematical ideas through writing and presentation.

The activity that students will engage in is a learning project using a website utilizing a virtual field trip. Students will be given a problem about the packaging of soda cans by the manager of the company. The VTF will present the problem as a tour of the facility where they will meet various employees who will instruct the learners as to their needs. An engineer will discuss the area of circles and rectangles, getting into the more technical side of the problem. A graphic designer will talk about selling the product before a consumer even tastes the product and the importance of design in products. The manager will discuss the importance of cost effectiveness, including the cost of materials and profit. The learners will continue through the employees and then use that information to determine the most efficient way to pack soda cans in a box. The learners will present their findings as to the most efficient way to pack the cans, how efficient it is, and sketches of their final design. Included in their findings will be all of their work for the different arrangements of cans in a box as well the efficiencies of each.

The groups will consist of high school geometry students. The students will be primarily sophomores but will also include 15% freshman as well as 5% juniors. The students will be both

male and female and split very evenly between the two. The students will have already completed and passed Algebra I so they will be familiar with manipulating and solving of equations. Students will also have had exposure to area and specifically the area of rectangles and circles but not in recent math classes. Students will also be familiar with ratios and percents and how to calculate the percent of efficiency.

The objective of the activity is that students will be able to calculate the area of circles and rectangles. Students will also to able to organize data and present it in a professional manner in accordance to the Gilbert School's 20^{th} century skills initiative.

Materials that will be needed for this activity will be a computer for the students to conduct their virtual field trip. The students will use a website designed by the teacher as described in the activity. Other materials needed to build the website will include the Geometer's Sketchpad software in order to make mathematical designs with descriptions of circles and rectangles. Students' materials may require geometric tools such as a compass and straightedge. Students may also need poster board and colored pencils for their final design.

For data collection, I will use a pretest and a posttest to test the concepts of the activity. The pretest and the posttest will both consist of questions and problems about the area of circles and rectangles in general problems as well as in word problems. Improvement can be seen in general problem solving as well as in specific areas such as the area of circles and rectangles and problem solving in specific contexts. Besides the tests, I will use the final presentation from the activity as a way to determine if the correct objectives were achieved as well as where the virtual field can be changed in the future.

To evaluate whether or not the students are successful, I will both the final presentation from the activity and a post test. The final presentation will include both mathematical discourse and discussion so the students will have to use their 20th century skills in order to produce their final product. I can then use these final products as evidence with other professionals about the effectiveness of the virtual field trip. They will be able to see if the students were able to correctly do the mathematics as well as their communication of their work and their creativity with their design. I will also use a post test to see if my objective about the content was achieved and I can compare scores from different classes as well as from year to year to see if the virtual field trip needs to be changed or tweaked.

I will need about 7 class periods to carry out this activity. The first day will be the pre-test. The second day will be a lesson about the area of circles and rectangles with an appropriate amount of time for the students to practice these skills. The third day will be a trip to the computer lab to go through the virtual field trip and familiarize themselves with the problem. The fourth and fifth days will be time spent in class working on the problem, the designs, and the final presentation. The sixth day will be the presentations to the class and the seventh day will be the post-test.

There are a couple of ways that I can disseminate my work. I will show the students final products as well as the virtual field trip to my department head as well as to my administrators as they very much push 20th century skills and this is a perfect example of them. I can also send my results to the Mathematics Teacher, the NCTM's monthly publication which is basically the journal for high school mathematics teachers. Although they will probably not print my results, they would most likely get me in contact with somebody to refine this activity and do the

research in order to get it printed in the future or they may use the activity as part of their monthly problem solving calendar.