

Using Computer Simulations in Elementary Social Studies Classrooms

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ABSTRACT

Previous research of the use of simulations in social studies classrooms has shown mixed results. Research has shown that students have found simulations motivational. However, they have not learned significantly more information than students who have learned the information by more traditional methods, such as reading and lecture. This study examined the thinking process of elementary children as they engaged the simulation the Oregon Trail II. The participants in the study were eleven students from a rural school in the southwest United States. The students' teachers also participated in the study. After completing the simulation the students and teachers were interviewed.

Students from the first group reported that they thought the simulation was a valuable use of class time because it gave them the opportunity to apply the information they had learned. Three students from the second group reported the Oregon Trail II was a valuable use of class time, but only because it was fun. One student reported he learned more information from the textbook and he did not see the value in the simulation. Two students from the second group believed the simulation was a good use of school time because of the educational benefits of the simulation.

Introduction

A prominent challenge to today's history teachers is to make history more relevant and interesting (Kingsley & Boone 2008; Hootstein, 1995; Schug, Todd & Beery, 1984). Much research reveals that students' learning increases as they are more active participants in their learning (Booth 1984; Hallam, 1979; Inhelder & Piaget, 1958). However, most American teachers continue to rely on the lecture method to convey information (Shaver, Davis & Helburn, 1979; Wiley, 1977). Goodlad (1984) reported

somewhat similar findings: Students spent their time listening, reading the textbook, completing workbook/worksheet assignments, and taking tests/quizzes. To be sure, many teachers appear to lack the necessary background knowledge to teach history effectively (Yeager & Davis, 1994, 1995a, 1995b.). Consequently, many teachers closely follow the textbook and rely on the textbook as the main source of information.

Abt (1968) postulates that one reason why children may not learn history beyond rote memorization, is that they rarely, if ever, have the opportunity to write history, make history, or solve historical problems. In other school subjects such as mathematics and chemistry, students typically are engaged in the processes of the field. That is, they learn by doing, by constructing mental models. Subjects such as mathematics also offer students opportunities to err and, in turn, to learn from their mistakes. A mathematics teacher who simply required her students to memorize the answers to selected problems from the textbook and then tested her students over the chapter surely would be criticized for her poor teaching. In history courses, such procedures are tolerated, if not considered acceptable teaching.

One opportunity for students to engage history more directly is through the use of simulations. Some educators consider simulations as recreational games, and, therefore, they do not consider simulations a serious or effective method of teaching (Boocock 1968). Although simulations are often referred to as games, the two terms do not have identical meanings. There is some disagreement in the literature regarding the differences between games and simulations. Teague and Teague (1995), for example, believe that the main differences between games and simulations are that games lack two important dimensions offered by simulations, realism and relevance. This realism and relevance, according to Teague and Teague (1995), make simulations an effective learning tool.

Simulation as a Teaching Tool

Alessi and Trollip (2001) discuss three advantages of simulations. They hold motivation to be the major advantage. Many students find simulations motivating. Students prefer to use simulations more than they want to engage textbooks or lectures. Even in studies which indicated no significant differences in the learning between students who used a simulation and students who read or listened to a lecture, students who used the simulation were more motivated to learn the material than were the other students (Cherryholmes, 1966). Second, Alessi and Trollip noted the importance of transfer of learning. Because simulations afford students practice and the opportunity to experiment with a real situation, students who use the simulation should be better prepared than those students who only read the subject matter. The third advantage was efficiency. Students who use a simulation should use less time to learn the same amount of material than students who merely read or listen to a lecture.

In addition, simulations provide students an active learning opportunity, as well as the chance to test decisions and make mistakes and, thus, to learn from the mistakes. Simulations possess the advantage of permitting students to make mistakes without having to pay the consequences, unlike consequences in the real world (Boocock, 1968). Simulations actively involve students by challenging them to make decisions based on

the situations which arise as the simulation is engaged (Thurman, 1993). Diulus and Baum (1991) state that simulations have potential as effective educational tools, because they offer the students a realist activity. In addition, "One of the great strengths of simulations is the demand for participants not only to think of ideas but to implement strategies and solutions" (Diulus & Baum, 1991, p. 36).

Purpose of the Study

The purpose of this study was to the effect of a computer simulation as a learning tool by elementary school students. Several questions motivated this study.

1. How did students in two different classes reach decisions as they proceeded through The Oregon Trail II? For example, did students guess at what they believed to be the best answer? Did students rely on their available historical knowledge base, or did students actively seek assistance with the problem? Did students use some combination, such as utilizing their historical knowledge and guessing, to solve problems encountered during the simulation?
2. Did students change their thinking as they gained more experience with the simulation? Clegg (1991), for example, pointed out that most studies of simulation require subjects to encounter (go through) the simulation only once. Boocock and Schild (1968) postulate that much research underestimates the amount students learn from simulations. In fact, most of the reported research involved students using a simulation only one time. Currently, no research exists that investigates possible benefits from multiple uses of the simulation. If students improved in their performance, what factors appeared to relate to this improvement? Did only the skills at engaging the Oregon Trail II improve, or did the students' knowledge of the content improve as well? Improved performance of the Oregon Trail II is defined as:
 - a. Did students increase the number of miles traveled,
 - b. Was the health and well being of the wagon train members as good or better than on previous encounters with the Oregon Trail II simulation, and
 - c. Did students manage supplies more efficiently than during previous trips?
3. What were students' opinions of the simulation? Did students find the simulation motivating even after having engaged (played) the simulation three or four times? Did students believe the simulation was a good use of instructional time? Did the simulation help the students understand the material?
4. What were the roles of the teacher while students were engaged in the simulation? Did teachers believe that the process of debriefing improved students understanding of the content? Did teachers think that simulations were/are a wise use of instructional time?

Review of the Literature

Bozeman and Wright (1995) reported that simulations have been around for thousands of years. Sparta used military simulations to train soldiers for combat. Nesbitt (1971) reported that Sissa, a fourth century wise man from India, created the precursor of chess. Chaturanga, as the simulation was known, was designed to teach the valor of decision, vigor, endurance, circumspection, and bravery. In time, chess spread to China and England after the Norman Conquest and eventually to Prussia (Burson, 1996). In England, mainly nobility played the game. However, in Prussia, the Prussian Army used the game as a combat simulation to prepare officers for battle (Bozeman and Wright, 1995; Nesbitt, 1971). Recently, simulations have been used to train individuals in a variety of areas including, but not limited to, flight, medicine, electronics, city planning, and in teacher preparation.

Current Uses of Simulations

The military has been one of the greatest supporters of simulations (Cruickshank, 1977). One reason for this emphasis is a mistake on the battlefield can be costly. As Cruickshank (1977) stated,

If a soldier can perform adequately under simulated conditions there is no assurance, he will behave well under real conditions. However, if the soldier does not perform well under simulated conditions there is no reason to believe he can perform well in combat. (p. 17)

Thus, the military has used simulations extensively to prepare troops to perform under combat stress.

One current example of how the army is using combat simulations is the Simulation Networking (SIMNET). SIMNET is a virtual training program in use at Fort Knox, Kentucky (Shlechter & Burnside, 1996). The SIMNET training program takes army personnel through a series of training exercises. Each trainee is placed in a situation in which his/her platoon is in either an offensive or a defensive position. The exercises begin with fundamental training and become progressively more difficult as the trainees advance through the exercises. SIMNET has allowed the army personnel to complete more combat training exercises in a shorter period (Shlechter & Burnside, 1996). Furthermore, SIMNET observers noted that participants in the SIMNET training made fewer errors and needed less coaching as they progressed through training than did participants in other training methods (Shlechter & Burnside, 1996).

Other branches of the armed services, such as the Air Force and Navy, have used simulations extensively to train personnel. The Air Force is credited with being the first branch of the military to use a computer simulation with the system training program (Fletcher & Rockway, 1986). Both the Navy and Air Force use flight simulators to train pilots. Flight simulators were used first in World War II to train pilots how to use the controls in the airplane. Flight simulators are a classic example of the use of a training

simulation. Using real planes to train new pilots how to fly risks the loss of both lives and expensive equipment. Using flight simulators reduces the cost of training, and does not endanger lives (Bozeman & Wright, 1995). Flight simulators provide pilots an experience based learning opportunity to learn the sub skills and knowledge necessary to be a successful pilot (Andrews, Bernell, Mattoon & Thurman, 1996).

Air traffic control students have also benefited from the use of instructional simulators (Treiber, 1994). Treiber (1994) reports that before 1991 simulators were a little used training device. However, because of growing dissatisfaction with the results of on-the-job training, a new, more efficient method of training future air traffic controllers was sought. Treiber (1994, p. 23) concluded in her study of the Minnesota Air Traffic Control Training Center that, “simulation has the ability to teach airspace procedures and operations more effectively than on-the-job training.”

Simulations in Medicine

The medical profession is another field that involves life or death situations and the use of expensive equipment. For this reason, medical schools use simulations to train medical students. Experienced physicians, as well as nurses and physician assistants, use simulations to learn how to operate new equipment or how to learn new procedures. In addition, simulations are useful tools to teach students how to diagnose and treat various illnesses (Abdulla, Watkins, & Henke, 1984; Alessi & Johnson, 1992). The dental profession has experimented with using computer simulations in the licensing of new dentists (Alessi & Johnson, 1992).

Simulations in Schools

According to Alessi and Trollip (2001), simulations provide teachers a powerful teaching tool. Certain activities cannot be taught safely in a school environment, such as experiments with dangerous chemicals. Other topics or subjects cannot be replicated, such as the United States Revolutionary War (Alessi & Trollip, 2001). Simulations make possible students’ experience of these situations. Also, simulations make possible acceleration or decrease in the time and control of the number of variables, which are examined.

Drosophila Genetics and Catlab are two simulation examples which accelerate time. Both of these computer simulations enable students to see in seconds how genes pass from one generation to the next in contrast to months in natural settings. There are at least two versions of Drosophila Genetics. One is a web based simulation developed at the University of Wisconsin – Madison (2009). The other simulation was developed by Newbyte Educational Software (2008). In both simulations students can manipulate the genetic attributes of fruit flies, and in Catlab developed by Kinner (1998) the genetic attributes of cats are manipulated. In both program students can recognize what happens to succeeding generations when a male with certain characteristics mates with a female with different characteristics.

Another advantage of simulations is the simplification of reality. Teachers control the number of variables that will be manipulated and examined by the student. This attribute reduces the risk that students will be overwhelmed by too much information. In Catlab, (Kinner, 1998) for example, students can focus on one trait such as hair color. In a flight simulator, a beginning pilot learns only a few controls (Andrews, Bernell, Mattoon & Thurman, 1996). After the pilot has mastered basic controls, features that are more advanced can be added to the simulation. After a period of time, the beginning pilot will be able to work with all of the controls necessary to successfully fly an airplane.

In addition, simulations can allow students to control variables which normally cannot be controlled. For example, an early Minnesota Educational Computing Consortium program allowed students to control the amount the amount of sunlight a plant receives to measure the affect of light on plant growth.

Simulations are used not only by teachers to teach but also in teacher preparation. Simulations enable prospective teachers to experience teaching in a nonthreatening environment. Future teachers can learn about classroom management, as well as teaching techniques. Prospective teachers also can experiment with different teaching techniques and different discipline styles before they enter a classroom (Burson, 1996; Cruickshank, 1996).

Simulations in History and Social Studies Classes

In the mid-1960s, simulations began to appear in social studies classrooms as an important instructional tool (VanSickle, 1986). The number of research articles seems to have paralleled the popularity of simulations in the classroom. As the popularity of simulations waned, "The Frequency of published experimental studies comparing simulation gaming with other instructional techniques crested in 1975 and has tapered off dramatically since that time" (VanSickle, 1986, p. 245). In his meta-analysis of simulation research in social studies settings, VanSickle (1986) found that simulations had little or no effect on short-term recall of knowledge facts when compared with other instructional methods. VanSickle (1986) did find that simulations were more effective in helping students retain knowledge when compared to the lecture method of instruction. His findings were consistent with earlier meta-analyses he examined. However, VanSickle's research uncovered some results which differed from previous studies. Concerning attitudes toward the subject, VanSickle reported only a small effect favoring simulations, compared to earlier studies which showed a greater effect in favor of simulations. Even more striking were VanSickle's findings of attitudes towards the phenomenon studied. Previous research (Livingston, 1973) concluded that students who used simulations had a more positive attitude towards the phenomenon studied, but VanSickle's research revealed the opposite finding.

According to Clegg (1991), little research has been completed on computer simulations in history and/or social studies. Clegg concluded in his (1991) review of the literature while simulations appear to possess tremendous potential as a learning tool in the history classroom, the research base is so weak that it is of little use to teachers as they make instructional decisions.

On the other hand, studies of other types of simulations used in social studies classes have been conducted. For example, Cherryholmes (1966) reported in his analysis of simulation in social studies classes that students found simulations to be more interesting than they found the usual instruction to be. However, students in classes in which simulations were used did not achieve any higher test scores than did students in control groups. Also, students using simulations did not retain more information, nor did they show significantly greater gains in critical thinking or problem solving skills, nor were their attitudes changed significantly when compared to control groups.

According to Clegg (1991), the number of studies involving microcomputer simulations remains small, but their results are similar to those from studies of non-computer-based simulations. That is, students find simulations to be interesting and prefer to use simulations as opposed to conventional methods of instruction. However, as in prior research, students showed no significant gains in learning facts, attitudes, or problem solving skills when compared to the control group. Roberts (1976), for example, reported that simulations seemed effective in giving students personal control over world events. Students in the simulation group scored significantly higher than the students in the control group.

Boocock and Schild (1968) postulated that much research underestimates the amount students learn from simulations. In fact, most of the reported research involved students using a simulation only one time. Currently, no research exists that investigates possible benefits from multiple uses of a simulation.

Methodology

Qualitative methods were used to collect and analyze data obtained in this study. Student informants were asked to think-aloud as they proceeded through the class activities which were recorded on audiotape. Afterward, the students and teachers were interviewed about various aspects of the class. Also, students and teachers were observed during social studies class to verify the validity of what the informants reported.

School Setting

The study was conducted at a rural elementary school located in the southwestern United States. The school has a Mexican American student population of 56%. Many of the students come from a low socioeconomic background; 65% of the students receive free or reduced lunch. There are over 750 students enrolled at the K-6 elementary school. Many of the students in Dinsmore Elementary, as well as other students who attend other schools in the school district in which Dinsmore Elementary is located, move during the school year. Many of these students who move from place to place and school to school fit the state definition of an at risk student. At the time of this study, 75% of Dinsmore's students were considered at-risk. Faced with the task of educating many students considered at-risk by Texas state standards, the administrators and faculty of Dinsmore Elementary have been willing to try a variety of programs as a means to increase

students' grades, attendance, self-esteem and motivation. While not all of the programs the school has tried have been successful, the principal and teachers are open to new ideas.

Participants

The two teachers, Jane Hoff and Joann Moore, who participated in the study, were recommended by their principal. The teachers in the study have taught for more than fifteen years, both are certified teachers and have the same level of education, a bachelors degree in elementary education. Neither teacher has a degree in history. In addition, the principal of the school considers both above average teachers.

Jane Hoff has more than twenty years of teaching experience and has taught in a variety of settings. She enjoys teaching and studying history. Ms. Hoff and her husband frequently travel during the summer months and they visit historic sites that they encounter during their travels. During the summer of 1996, the Hoff's traveled through parts of the Midwest United States and had the opportunity to see parts of what was once the Oregon Trail. Because of her travels, Ms. Hoff was able to bring in various maps and artifacts from the Trail. In addition, she brought to the class a wealth of background information about the Trail which she shared with her students.

The other teacher, Joann Moore, has more than fifteen years of teaching experience. Ms. Moore's specialization is reading, but she is certified to teach all academic subjects in grades one through six. Ms. Moore said her interest in teaching social studies had increased since she first began teaching social studies. She admits that she lacks some of the necessary background knowledge that would enable her to teach history at a deeper level. Although she would like to spend more time outside of the classroom preparing for social studies lessons, her time is limited. Thus, she often relies on the social studies textbook. Because she does care about her students and she would like to offer them an enriched curriculum, Ms. Moore was excited to participate in the project.

The demographics of the students from both classes are similar. According to Ms. Hoff, not many of her students come from an environment that encourages learning. In the case of one student, Roger, Ms. Hoff speculated that, if it was not for one of Roger's aunts who worked at the school, she did not know if Roger would come to school or if he would have any school supplies.

Prior to beginning the unit, preliminary conversations with the students from both classes revealed they had little or no knowledge of the Oregon Trail. This is not unexpected since United States History is not taught until the fifth grade in Texas schools.

Teaching style varied greatly between the two teachers. Because of her interest in history Hoff was able to add detail to while teaching the unit on the Westward Expansion of the United States. She also had resources from her travels that Moore did not have such as children's literature about the Oregon Trail and the Westward Expansion of the United States that she allowed her students to borrow. Hoff was able to answer student questions with more detail. For example, Hoff was able to discuss what types of food the

settlers may have taken with them. She was able to discuss the terrain the settlers would have to cross. Ms. Moore relied on the textbook and the movie “West to Oregon”, which Ms. Hoff’s class watched as well.

Oregon Trail Simulations

The Oregon Trail simulation is an older simulation but was used because it was the best choice available that would allow students to apply some of their knowledge of what settlers in United States would encounter during the mid 1800s. The object of the simulation is for the players to successfully cross the United States starting from Independence Missouri to the Willamette Valley Oregon or Salt Lake City, Utah.

Before leaving on their journey, the simulation requires students to pick the members who will accompany them on their journey. Students pick members by using skill points. The more useful skills a person has the more skill points a student will use. Skills or professions that are highly valued in an urban setting are not always the most useful skills on the open range. Students are also required to buy supplies and pick the date of their departure. If students leave too early in the year then their traveling party will be exposed to harsh winter weather. If the students leave too late in the year then traveling party will have to endure extreme summer heat.

Once the students begin their expedition they can use the trail guide which tells them their geographic location, the weather conditions, amount of food supplies and the health of the members of the party. While traveling, students need to make a number of decisions such as how fast to travel, the number of hours the party will travel each day, the method they will use to cross a river or a mountain, when to stop and rest and when to trade or hunt for food.

Results

Question One

The first research question asked; what thinking process did the fifth grade students use when they made decisions as they proceeded through The Oregon Trail II? For the most part, the five students from Ms. Hoff’s class seemed to have had direction and purpose when they made decisions. When asked why they made certain decisions each of the students relied on information they had learned from class discussion, class assignments, or the most common answer, from the movie, “West to Oregon”. For example, Judith and Roger mentioned that when they hunted it was because food supplies were low. They tried not to depend on hunting as a source of food as hunting was not a reliable source of food. Joseph also mentioned he tried to hunt near rivers because rivers were a location that animals gathered to drink water. Joseph believed hunting here increased his chances of securing some food. Roger, Joseph, and Jason reported that they hunted only animals that could supply large amounts of meat such as deer, moose, bear or buffalo.

In their encounter with the simulation, all the students in Ms Hoff's class relied on the trail guide when they were asked which road they wanted to take. All of Hoff's students were concerned about what time of the year to start their trip they were aware of the dangers of leaving too early or too late in the year. Most choose to leave in March. The students in Ms Moore's class with the exception of Cedrick and Roman were unaware of the importance of leaving too early or too late in the year. Players were required to choose a month for their departure before the trip could begin.

Cedrick, one of Ms. Moore's students, said information he had learned in an enrichment class and from the movie "West to Oregon" helped him. While Roman reported the information he learned from books helped him the most in making decisions. The remaining students from Ms Moore's class reported they used their best judgment or guessed. The four fifth graders, who relied on guessing and personal judgment, seemed to lack the background knowledge necessary to make thoughtful decisions on the trail. This finding is not surprising considering that these four students had spent little time studying the Oregon Trail.

When Martha, Becky, Bryan, and Juan were asked why they made certain decisions, they replied, "It seemed like the right choice", or "I just guessed", or "I didn't know what to do so I just guessed". Martha, Becky, and Juan, in particular, seemed to hunt whenever they felt like hunting, with little regard for food that was on hand and the conditions or the surroundings. Martha's experience provides an example of this type of behavior. In her first encounter with the game Martha hunted five times before traveling 100 miles. None of these three students considered the size of the animal when hunting and were just as likely to shoot at a squirrel as at a deer. The students admitted that they liked to hunt. Possibly, their interest was because the hunting segments of the Oregon Trail II resemble an arcade type game.

Juan offers another example of a student who failed to advance more than 200 miles. Juan failed to buy enough draft animals to enable him to cross muddy paths. The result was Juan's wagon became stuck and was unable to free the wagon. This fact, along with Juan's failure to purchase any cold weather clothing, resulted in the members of Juan's wagon dying from exposure to extreme cold. Juan, who is one of the brightest students in fifth grade according to Ms. Moore, had failed to consider that during early March and April his wagon members would encounter four to six weeks of harsh winter weather. Consequently, he failed to buy any warm weather clothing for his wagon members. Concerning the draft animals Juan had learned that oxen were a good choice for draft animals, but he did not realize the number of oxen that were need to pull the wagon.

Roman and Cedrick, the other two students in Ms Moore's class were able to give reasons based on information they had learned for their actions and decisions. Both managed their supplies well. Cedrick knew that bacon was one of the main food staples of the westward travelers because it was inexpensive and was easy to preserve. For that reason, he bought a large amount of bacon. He also knew that fresh fruits and vegetables were necessary to avoid his getting scurvy. Roman and Cedrick kept a close eye on supplies. They tried not to rely on hunting as a food source; rather they preferred to buy their food at forts or trading post along the trail. Both students realized hunting was an unreliable food source. Cedrick and Roman were the only two students from either class

who rested on a regular basis. Neither Cedrick nor Roman traveled more than two weeks without resting one or two days. Both students understood the different methods of crossing rivers, going up a mountain and going down a mountain. In addition, Cedrick and Roman knew that hunting was an unreliable food source.

As mentioned earlier Cedrick was enrolled in an enrichment class that had studied the Westward movement and the Oregon Trail the previous summer. Roman reported that he had read books outside of class time on the Oregon Trail. Thus, both of these students had more background knowledge than the other students in Ms Moore's class involved in the study.

Becky offers an interesting contrast to Cedrick and Roman. While Becky lacked the background knowledge of Cedrick and Roman, she traveled 73 miles farther than Roman. Although Becky's wagon did not make it to the original destination of Oregon City, OR the wagon members did arrive safely in Salt Lake City, UT. Becky elected to settle in Salt Lake City rather than risk the welfare of the wagon members. Becky offers an example of a student who guided her wagon safely to a final destination by chance rather than knowledge and skill. Becky and Roman also serve as cautions to teachers who would grade students based on the number of miles the students traveled in the Oregon Trail II simulation.

Another area, which also revealed a difference in decision making, was in the purchase of supplies. On one occasion, Becky attempted to buy four shotguns for no other reason than she wanted to have them. Juan, Becky, Bryan, and Martha tended to overstock on some items such as bullets and gunpowder and under stock items such as fruits, vegetables and warm weather clothing.

The observation and the interview data reveal that the Ms Hoff's students had more knowledge with which to work than the Ms Moore's students. This observation is not surprising considering the type and quality of instruction each class received. The data also revealed that while background knowledge can help students make informed choices there is an element of chance involved with the simulation. Some students with a wealth of background knowledge may not succeed due to events which were beyond their control. Other students because of chance will succeed despite their lack of knowledge. Still other student will succeed not because they have knowledge of the Oregon Trail, but because they have learned to play the simulation.

Question Two

The second research question related to changes in student thinking. "Did students change their thinking as they gained more experience with the Oregon Trail II CD-ROM simulation?" If students improved in their performance, what factors appeared to relate to this improvement? Did only the skills at engaging the Oregon Trail II improve, or did the student's knowledge of the content improve as well?

Part 1

Did the student increase the number of miles traveled?

Due to a lack of time only five of the eleven students engaged the Oregon Trail II a second time. In all cases at both classes, students increased the number of miles traveled in the second encounter with the simulation. The range of the increase was a low of 65 miles to a high of 1006 miles. Each of the students reported that their engagement of the simulation for a second time was beneficial to them.

The increase in miles does not seem to be related to increased knowledge of the Oregon Trail. For example, Joseph made informed choices in his first trip relying on the information he learned in class. His simulation ended at 896 miles due to the death of the trail guide by accidental gunshot. During the second trial Joseph, a student in Ms Hoff's class, used the same strategies as the first time through the difference the second time was there were no unfortunate events. Jason and Roger, also in Ms. Hoff's class, also used the information they used in class for both the first and second trials. However, only Jason was successful in reaching Oregon City.

Only two students in Ms. Moore's class engaged the simulation for a second trial. Bryan traveled 65 miles farther and used the same method of guessing as the first trial. Martha had the largest percent increase in the number of miles. This increase in miles was not accompanied by increase knowledge of the subject matter. After the second trial Martha did not know which were the preferred methods for crossing rivers, she did not keep track of the supplies she had on hand, and again appeared to hunt when she felt like hunting as opposed to hunting when she needed food. Martha stated in the interview that she preferred to use the Oregon Trail II simulation rather than reading the textbook or listening to a lecture. She stated she believed she learned more from the simulation than from the textbook, lecture, or the Oregon Trail on-line. If this is true then Martha learned little if any information from the other three teaching methods. Martha also stated that she wished there were more simulations for use in schools.

Part 2

Was the health and well being of the wagon train members as good or better than on previous encounters with the Oregon Trail II simulation?

Using miles traveled as measure of health, all students were able to keep wagon members healthy for longer periods of time. While not every member of every train made the trip safely to Oregon, all students showed improvement. If making a complete trip to Oregon City is used as a measure of health only Joseph and Jason were successful in this regard. On the second trial, only the three of Ms. Hoff's students used their skill points to select medical skills. Only the students in Ms Hoff's class used skill points to select botany. These students realized that by selecting botany they increased their chances of finding wild fruit and vegetables along the trail. During the simulation several of Ms. Hoff's students mentioned that having fresh fruits and vegetables to eat helped maintain the health of the wagon members.

The most of the students in Ms. Moore's class demonstrated little knowledge in maintaining the health of the wagon members. Her students believed meat was the most important food item and focused on having a large supply of meat.

Part 3

Did the students manage supplies more efficiently than on previous trips?

All of the students reported that they took advantage of trading posts and forts to purchase supplies, something that they did not do in their first encounter with the simulation. Again the students in Ms. Hoff's class used their prior knowledge to help them purchase supplies. The Ms. Hoff's students were more likely to be aware of the need for cold weather clothing, tools to help repair the wagon or clear paths and a variety of food. The students in Ms. Moore's class were more likely to focus on a few items such as meat, guns and ammunition.

In summary, a second encounter did see an increase in the number of miles traveled. However, a second encounter with the simulation did not seem to result in their changed knowledge. Students who did not understand the different methods of going up or down mountains or crossing a river did not understand the different methods after a second encounter. What did change was that students with less background knowledge, through a process of trial and error, discovered methods that may have proved more efficient for overcoming mountains and rivers.

Student thinking changed very little. Students with more background information continued to rely on the information they had learned, whereas students with less background information continued to rely on guessing to make their choices. Although all of the students traveled more miles, no evidence was gathered that indicated that students' performances improved because their knowledge of the Oregon Trail increased. Rather, they apparently became more familiar with the simulation. Even the Ms. Hoff's students and the two students in Ms Moore's class who had more background information needed time to learn how the simulation operated. All of the students agreed that students need more than one time to use the simulation. Even though the students were instructed on how to operate the simulation, they reported that they needed time to learn how to operate the simulation. The first time that they engaged the simulation they learned as much if not more about how the simulation worked.

Question Three

What were the students' opinions, of the simulation? Did students find the simulation motivating after having engaged (played) the simulation a second time? Did students believe the simulation was a good use of instructional time? Did the simulation help the students understand the material?

Part 1

What were the students' opinions, of the simulation?

All of the Ms. Hoff's students believed that the simulation was a useful learning tool because it gave them a chance to use the information they had learned in the Vista

class. However, they all mentioned that they learned more from the movie than from any other source. Ms. Hoff offered the following explanation. She believed that many of the students were visual learners. Thus, the movie may have made a stronger impression on them than did the simulation. Moreover, the Ms. Hoff's student saw the movie on the second day of the unit. Thus, the movie was the students' first encounter with most of the information. Ms. Hoff speculated that the other activities reinforced what the students learned from the film and helped them to remember the information. However, the students may not have made the connection between the movie and the other class activities.

The students in Ms Moore's class also viewed the movie "West to Oregon" but, as a group, they could recall fewer details than did the students in the other class. The response of the Ms. Moore's students supports Ms. Hoff's interpretation of the value of the movie.

Ms. Moore's students gave the following responses to the researcher. Cedrick and Roman both believed that the simulation was a good use of class time and that they learned something from the simulation. When Cedrick was asked from what he learned most, he replied that he believed that it was a combination of all the activities he had engaged. Roman believed that he learned more information from books. Juan reported that he did not see any value in the simulation and he believed that he would learn more from the history textbook or other books. Bryan, Becky, and Martha liked the simulation and believed that the simulation was a good use of class time. However, when each was asked why they believed that it was a good use of class time, each admitted that they liked the simulation because it was fun, not because they learned much information from the simulation. Martha responded that the Oregon Trail II was "better than the boring textbook".

Part 2

Did students believe the simulation was a good use of instructional time?

All of the students in Ms. Hoff's class believed that the simulation was a good use of class time in part because they believed the simulation helped them learn the material, but also in part because they enjoyed the game aspect of the simulation.

All of the fifth graders enjoyed the simulation. However, four of the six students admitted they enjoyed the simulation more for the entertainment value than for the educational value. The students in both the fourth and fifth grades stated they would like to more simulations developed for classroom use.

Part 3

Did the simulation help the students understand the material?

As stated above none of the data collected in this study indicates that the students learned any additional information. Nor does the data indicate that students' ability to think historically was affected by the use of the simulation.

Question Four

What was the role of the teacher while students were engaged in the simulation?

Did teachers believe that the process of debriefing improved students understanding of the content? Did the teachers think that the simulation was a wise use of instructional time?

Part 1

What was the role of the teacher while students were engaged in the simulation?

While Ms. Hoff's class engaged the simulation as a group, she acted more as a coach for her students than an instructor. She sat in the back of the room and watched their behavior. For the most part, she said nothing unless the students asked her for help. When the students did ask for assistance, Ms. Hoff posed questions to the student. She wanted the students to answer their own questions. The exception to this general rule occurred when a word appeared on the screen which Ms. Hoff did not think the students knew the meaning. Then, Ms. Hoff stopped the students and asked them what they thought the word meant. She reminded the students to use context clues. Only as a last resort did she tell the students the definition of the word. During the week, (Monday through Thursday) Ms. Hoff collected a list of a dozen such words. On Thursday she gave the students a vocabulary test over these words. When the students engaged the game individually, she observed the students and prepared materials for the debriefing session.

Ms. Moore, on the other hand, went about other class business. She did not actively observe her students as they engaged the Oregon Trail II. If she observed students it was to redirect misbehavior. There was little student/teacher interaction. The little student/student interaction that was observed did not pertain to the simulation.

Part 2

Did teachers believe that the process of debriefing improved students understanding of the content?

Ms. Hoff had a two-class period debriefing session. Ms. Hoff believed that the debriefing session is a way of bring closure to the unit. It allowed student a last opportunity to ask questions. It also provided Ms. Hoff the chance to clarify any misunderstandings and to add any comments that may have been omitted. Ms Hoff also used the debriefing as an introduction to the next unit which the students would begin on the following Monday.

Ms. Moore did not have a debriefing session for her students. It was not a teaching strategy that she had employed. Without a debriefing session or referencing the simulation to the unit on the Oregon Trail Ms. Moore concluded the fifth grade unit on the Oregon Trail and Ms. Moore made the transition to the next unit.

Part 3

Did the teachers think that the simulation was a wise use of instructional time?

Both teachers believed that the use of the simulation the Oregon Trail II was a good use of instructional time, but for different reasons. Ms. Hoff did not expect her students to learn content from the simulation. Rather, she used the simulations to allow her students to apply the knowledge they had gained about the Oregon Trail from a variety of classroom activities. Also, she believed the simulation gave the students a chance to analysis events and solve problems.

Ms. Moore used the simulation believing her students would learn content from the simulation. Yet, she had no way of knowing if the students learned any information from the simulation.

Discussion

Simulations Used in Isolation and Applying Knowledge

This study indicates that when a simulation is used in isolation, that is, when the simulation is not integrated into the curriculum unit, students gain little if any benefit from the simulation. Four of the six students in Ms Moore's class in this study understood the Oregon Trail II as little more than a game. Although they enjoyed the experience of engaging the Oregon Trail II, they thought of the simulation as a fun experience, not a learning experience.

The Oregon Trail II did not appear to have a positive impact on children's historical thought. This is not surprising. The students were never challenged to interpret historical data. Nor were students asked to analyze historical documents. When students were asked to analyze a situation they were restricted to a few choices. This type of environment did not foster the development of historical thinking in children. These findings are consistent with the finds of Cherryholmes (1966) and VanSickle (1986).

Yeager and Davis (1994; 1995a; 1995b) documented that teachers, with more historical background knowledge and that have a vision of history, make better history teachers. This study confirms those findings.

Many teachers use simulations as a means of creating empathy in their students. Yet, the observations of this study showed that the students developed little empathy for the emigrants. Students from both classes continuously subjected wagon members to extreme weather conditions and days of traveling with little rest. Many students had their wagon members walking twelve hour days for weeks at a time with no rest.

The Oregon Trail II, and simulations similar to it, do not convey information directly to students. As discussed in earlier the situations where simulations were used successfully were situations where a skill was taught and there was a direct relationship between what the student was learning from the simulation and a future task (Andrews et. al., 1996; Shlechter & Burnside, 1996; Treiber, 1994).

The Oregon Trail II simulation presented the students with an opportunity to experience a part of history that cannot be recreated. Simulations such as the Oregon Trail II likely can supplement and can be used as a tool to review material. However, in order for the simulation to be considered educational as opposed to recreational, the teacher must invest time before the simulation is engaged. None of the literature reviewed mentioned the need for teacher self-preparation before using a simulation. Developers and teacher educators may assume that teachers will know how to use a simulation and not need to be taught that skill. This gives the teachers the opportunity to learn the information which is necessary to understand the events of the simulation.

A teacher should also invest time after the simulation as been engaged, in order to debrief the students. The debriefing session affords the teacher the opportunity to clarify any misunderstandings that may have arisen during the simulation. While the debriefing seems educational sound there is little research that reveals just how much if any debriefing helps students learn content knowledge.

Based on this study, students likely will learn little information about the Oregon Trail simply by engaging the simulation. Books, lectures and other learning activities can offer students more information about the events surrounding the westward expansion of the United States.

Why Simulations Fail In Educational Settings

Several possibilities may explain why simulations have not been used more successfully in classroom settings. First, teachers may have relied on the simulation to carry the lesson and have not provided the students with the necessary background information to make the simulation meaningful and relevant. Some teachers believe that the simulation will do the teaching. Certainly, this explanation reflects the behavior of one teacher in the present study. Second, teachers may not have been prepared to use simulations in the classroom. Teachers need help in integrating simulations into their lessons. The simulation should be relevant to the topic being studied. In addition, teachers need instruction on how to conduct a debriefing class. The debriefing segment seems to be a critical part of the simulation experience, and one that many teachers ignore. Third, the emphasis in school policy on accountability testing takes away time and resources from the curriculum areas, such as science and social studies that are not tested. In addition, for the subjects that are tested, teachers often will stress those skills that they believe will help their students to perform well (or pass) the standardized test. Consequently, students have a narrowed education that focuses on test taking skills and miss an enriched educational experience.

Recommendations

Guidelines for Integrating Simulations into the Social Studies Classroom

Based on the observations of the two classrooms in this study, the following guidelines are offered to help teachers successfully integrate simulations similar to the Oregon Trail II into the social studies curriculum.

1. Teachers need to have a strategy of how to incorporate the simulation into the lesson. The students need to understand the educational reason for engaging the simulation. Students require background information not only to help them make decisions as they proceed through the simulation, but the background information also makes the simulation more relevant. The students know what is expected of them. The fourth grade student viewed the Oregon Trail II simulation as part of their learning experience. They had a chance to apply what they had studied for the past six weeks. The fifth grade students did not understand the relationship of the simulation the Oregon Trail II to their unit on the Oregon Trail.
2. Although background information is important, the debriefing session at the end of the simulation is critical. A teacher who fails to debrief her students after a simulation can be compared to a basketball coach who pulls his team off the court after the third quarter. If a basketball coach expects to win the game, his team must play the whole game. If a teacher expects her class to get the full benefit of a simulation, then she must dedicate some class time to debriefing.
3. Teachers likely need workshops about how to integrate computer simulations and other materials into classroom lessons. The two teachers in this study had not received any instruction about how to teach social studies. Both Ms. Moore and Ms. Hoff believed that teachers would welcome the opportunity to learn how to become better social studies teachers. While some may consider Ms. Hoff an above average social studies teacher, it is her love of history, and not special training that drives her teaching. She has developed her own style for teaching history and has had to acquire a resource library. Schools would do well to create a social studies laboratory. The facility could be stocked with artifacts, films, simulations and activity ideas that could help teachers construct interesting and informative units.
4. Teachers need time to prepare lessons that examine topics in depth. Many teachers rely on the textbook not because they believe it is the best source of information but, rather, because it is a quick source of information and lessons.
5. Teachers need support from their principal and from district-level curriculum consultants. At Dinsmore Elementary, much emphasis is placed on high TAAS scores. In order to obtain high scores, increased amounts of time is devoted to TAAS than is devoted to social studies. This lack of importance placed on social studies has led to some teachers to drop the subject from their daily schedule.

Future Research

The results of this study indicate that the use of computer simulations in isolation is not an effective method of conveying information to students. Research which explores the use of simulations as an integral part of an instructional unit may find an effect of conveying information.

Another type of study that could prove useful would employ quantitative analysis of the information students retain a month or two after a simulation enriched unit has been completed. Possibly, simulations will help students retain the information they have learned for a longer period than that learned from other formats. Other research could attend to issues related to debriefing following the simulation exercise(s).

Concluding Remarks

Computer simulations seem most successful when there is a direct connection between what the simulation teaches and the desired outcome. For example, there is a direct connection between a student pilot learning the controls of an airplane and the lessons a flight simulator teaches. However, there is not a direct connection between the Oregon Trail II and the desired outcomes of many teachers. Oregon Trail II simulates travel on the Oregon Trail; it does not teach facts associated with the Trail. Yet, the Oregon Trail and other educational simulations are judged based on how well students perform on an objective test.

Most educational programs are judged based on how well the program helps students remember facts or how well the program helps students perform on a standardized test. Under this criteria, simulations have not performed well. However, many students find simulations fun and motivational.

The nature of simulations (e.g., colorful graphics, rapid feedback, varied task) may increase the interest some students have in the subject of the simulation. However, teachers will have to build on initial interest and cannot rely on the simulation to transmit all the knowledge. While simulations may not increase students standardized test scores, they may help students in areas such as problem solving and critical thinking.

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