

The Effects of Higher Order Thinking Skills and Lower
Order Thinking Skills on Academic Achievement
of Students in World History Class

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Abstract

The purpose of this study was to examine the effects of lower order and higher order teaching methods on academic achievement of students in a world history class. The sample for this study consisted of eleven females and eleven males. Data were collected by using teacher made quizzes. The students were taught first from half of a unit on the Renaissance for the first five days using lower order instruction based on Bloom's Taxonomy levels 1-3. After instruction, students were tested. The second half of the unit was taught using higher order instruction based on Bloom's Taxonomy levels 4-6. After instruction, students were tested. Data were analyzed by using a paired t-test. The results indicated that there was a significance difference on average performance of students when taught with higher order methods and when taught with lower order methods of instruction. However, there was no significant difference between genders on performance. The results suggested that using higher order instruction is beneficial to the students. The results of this study warrant to be duplicated to determine if different results would be realized.



Institutional Review Board Decision Tree

Based on your responses, you do not need approval from the IRB.

It looks like your study is exempt because it does not meet the definition of a research activity. Therefore, it does not require approval by the IRB. However, you should follow ethical practices even when just practicing or demonstrating research.



Refer to 45 CFR 46.102(d)

Student researchers may benefit from going through the IRB process even if they are only collecting data to learn techniques.

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Chapter 1

Introduction

Critical thinking is quite possibly the most important skill a person can develop. Critical thinking and decision making go hand-in-hand, therefore, it is vital that Students develop this skill throughout their lives because in their futures they will have to make more and more decisions. Adults process a lot of information daily and have to form opinions and develop thoughts on that information, then have to make decisions quickly. Children are subject-centered, as to where, adults are life-centered in their thinking, therefore, critical thinking or the ability to think on a higher level is an important skill to start to develop while in school (Moore, 2010). In asking students to think on information, relate it to themselves, develop an opinion, and effectively relate their ideas back to the teacher they are learning to think critically. It is through this process that one is able to best answer a question whether it be in class or in life when they become adults.

Critical thinking is a process that does not develop fully during one class period, however, it takes a long time of repeating this process to truly have a developed critical thinking skill. If teachers want their students to be great thinkers then they need to start somewhere. Allowing students the chance to form ideas and analyze information should be done on a daily basis. The biggest issue a teacher may face in asking higher order thinking questions however may be that teacher that thinks they are asking a higher order question. This meaning, if the teacher does not know how to properly ask a higher order question then the student may not be able

to think on a higher order because they are not being asked a higher order question. Students will not be able to learn this skill properly if not taught properly.

If there is no critical thinking in education and applying content to real life situations then memorization becomes the main way in which students learn material. If a student learns material through memorization they will not think deeply about situations and just form their own bias on certain situations throughout life as where the information should be analyzed. Elder and Paul say in their journal "By internalizing the full range of critical thinking competencies, students will become more self-directed, self-disciplined, self-monitored thinkers" (Elder & Paul, 2010, p. 38). This method of thinking will allow for a better understanding of questions that will be asked of the student.

Many teachers in the school system today do not fully understand critical thinking itself. Critical thinking is more than asking the content in different ways to try to invoke a logical answer. Teachers get students to regurgitate information on tests, otherwise known as memorization, which is a method of lower order thinking. This means that teachers must first fully understand the methodology of asking higher order thinking questions so that students may understand how to think on this level (Choy & Cheah, 2009).

Critical thinking skills allow for better test scores, which is vital in this shift towards more testing. Some teachers say memorization allows for good test scores, meaning either the student knows it or he/she does not. Smith and Syzmanski state that higher order thinking skills correlate with higher test results (Levine, 1994; Uretsi, Goetz, & Bernal, 2002), therefore, principals and teachers can feel confident

that research based evidence supports their efforts. Questioning helps students to move from the lower level recall ability to higher level evaluation and synthesis. This provides structure in helping students beyond basic knowledge that is typically asked on a standardized tests to a deeper conceptual understanding which allows for an easy transfer of knowledge from their understanding to the standardized test (Smith & Szymanski, 2013). The answer to scoring higher on tests is to allow for the opportunity for the development of higher order thinking skills by the students.

This study discusses the differences between higher order thinking and lower order thinking skills, and focuses on academic achievement of students using both higher and lower order thinking skills within a world history class.

Problem Statement

Critical thinking and the method of asking higher order thinking questions is a topic of much discussion and debate in the realm of education. Teachers are expected to ask these types of questions of their students and are evaluated on their questioning during observations. Students have always learned a number of ways and the shift towards more testing has put pressure on teachers and students to pass the examinations. The teachers and schools attain more money if more of the school's students are passing and doing well on these examinations. Therefore, teachers have been teaching students using memorization techniques so that students may pass exams with a higher score improving the overall testing average of the school. Is this the best method of teaching students; and how much will students actually remember from these units if taught through memorization? How is memorization going to help the students become critical thinkers who have developed opinions on topics? These are the questions that education professionals have been asking themselves throughout this shift towards more testing. Higher order thinking questions as displayed in Bloom's taxonomy or Webb's depth of knowledge may be the answers in helping students achieve higher test scores and taking the knowledge relayed to them and reflecting on that information. Higher order thinking may lead to higher test scores and may better prepare students to effectively think on their own forming their own opinions and thoughts in the future. Therefore, the problem of this study was to determine the difference in testing of students using lower order thinking and higher order thinking skills, using a world history class as the focus group.

Purpose of Study

The purpose of this study was to examine and show the effects of lower order and higher order teaching methods on academic achievement of students within world history. This study determines the differences and impact of higher order thinking skills within levels of achievement of this world history class that is the focus group.

Significance of Study

Higher order thinking skills are prevalent in student lives through their abilities to answer questions and think critically. The ability to move beyond the lower level of thinking and think on a higher level, internalizing information, and developing one's own opinions and ideas on a certain subject is important to understanding information and applying it to multiple parts of one's life. This way of thinking can effect academic achievement within student's academic careers. Therefore, this study will add to the knowledge of the impact that lower order thinking and higher order thinking skills may have on testing.

Limitations

I am only completing this study within Robinson Middle School and that is one limitation. Another limitation is that this study will be completed only using one class, while that class has been randomly chosen this is yet still a limitation.

Definitions

- Critical thinking- objective analysis and evaluation of an issue in order to form a judgment.
- Memorization- the act of remembering material in order to use recall on future works.
- Evaluation- the assessment of the teacher's ability to teach and progress students forward in their learning careers.
- Bloom's taxonomy- a classification system used to define and distinguish different levels of human cognition such as thinking and understanding.
- Webb's depth of knowledge- it is the degree of understanding a student needs to respond to an assessment item using four progressive levels including recall, skill or concept, strategic thinking, and extended thinking.

Overview of the Study

Chapter one includes the introduction, problem statement, and the significance of the study, limitations, and definitions. Chapter two consists of literature review. Literature review is the examination of works on this subject area discussed with the study. Chapter three consists of the methods and procedures of the conduction of research in this study including research questions and hypotheses. Chapter four discusses the findings of the research on higher order thinking and the evidence found for the research questions and hypotheses. Chapter five covers the findings, recommendations, and implications on the data that was discovered.

Chapter 2: Review of Related Literature

Teaching is complex in its methodology of enabling a student to retain information; higher order thinking techniques have come to the forefront of education because these questions force students to think on their own using open-ended questioning, or thinking (Moodley, 2013). Critical thinking is believed to be one of the main factors in getting students to make decisions, think logically, and solve problems (Liu, Frankel, & Roohr, 2014). There is much debate among educators not only within critical thinking's impact on academic achievement, but also within the effect on personal life choices and even in the very definition of what it means to think critically.

Researchers have made claims that critical thinking skills help students in 2-year and 4-year colleges, as well as, graduates within their careers. Casner-Lotto and Barrington surveyed 400 employers in 2006 and 92.1% of the surveyed concluded that critical thinking plays an integral part in the life of a college student and within that student's career in their future (Casner-Lotto & Barrington, 2006). Good questioning within the classroom and within student's lives can lead to well developed and thought-out answers. If one is to answer a critical thinking question the student needs to develop his/her own thoughts and ideas on the topic first before that student is to answer. This plays a vital role within college and in a career as students, employers, and employees are forced to develop their own ideas and thoughts to better answer the tough questions and choices they may face. Higher order thinking questioning is also found to have increased student test scores which

is the major question addressed in this paper. Can a classroom that focuses on critical thinking improve student learning and achievement?

Higher order questioning goes all the way back to philosophers such as Socrates and some of the best ideas and thoughts has come from thinking critically. Therefore, it must have some impact on the way students are able to retain their information and achieve higher grades on tests. This is because a student has to think in a deeper manner than what is called for in lower order thinking questions. That student has to think of multiple pieces of a question in order to form opinions to answer their questions, with deeper thinking comes a deeper understanding which leads to better test scores (Kazemi, 2012). Educators and administration often think that higher order thinking questioning is what needs to be taught in classrooms so that students are able to not only improve test scores, but also grow in their understanding of certain subjects. However, what keeps some educators from incorporating higher order thinking in their classrooms all too often is their own understanding of what it means to think critically (Choy & Cheah, 2009). They become roadblocks to their own success in their classrooms because they do not know how to ask questions that force students to think on a higher level.

So what then constitutes a higher order thinking question? According to McCollister and Sayler, higher order questions are questions that force a student to think deeper; meaning that the question provokes interest allowing the student to want to think about a question more deeply (McCollister & Sayler, 2010). Higher order questions will also bring up other questions that need to be answered by the student in their thought process. All too often educators fall into asking students

how something makes them feel, or just throwing the word why at the end of the question. This is not an example of what a higher order thinking question looks like. While adding the word why to the end of the question allows for a student to give their reasoning, it does not allow for other questions to rise or allow for students to think deeper. Asking a student how an event would make them feel can be considered a lower order thinking question because while it allows for the student to think and focus on a topic, it does not require a deep amount of thought and one will often get an answer such as “bad”, or “good”. A higher order thinking question instead requires not only deeper thought, but a greater understanding of a topic. A higher order question will often bring up multiple views and ideas, which will lead to deeper discussion during class time. This in turn will allow for a deeper classroom understanding of a subject. A question may start off asking how a situation has affected life today, and then may lead into a question that discusses the contrasting question to that scenario (Kerkman & Johnson, 2014). This meaning how would life be now if that scenario did not happen. An example of this type of question may look like, “How did George Washington’s Presidency change America”? The next part of this question may be “How do you think life would look if he had become the king of England rather than the President”? These questions allow for deeper thought and the student may arrive at multiple conclusions.

Allowing the student to form his/her own thoughts on a subject will lead to a deeper understanding of the topic you are discussing. While these types of questions often help a student develop a deeper understanding of a topic the student must first have a basic understanding of the topic you wish to discuss. A teacher must first

use lower order questioning to help students gain information and obtain background knowledge on a topic, then one may ask higher order questions. This is called scaffolding and is the technique used to connect lower order questioning to higher order questioning.

Scaffolding allows for a student to learn information and develop basic understanding while preparing those students for a higher order question. INTASC standards have allowed for more room to move from a lower level of understanding to a higher level of questioning and knowledge. In 2001 89% of INTASC standards required the educator to ask lower level thinking questions obtaining basic knowledge of topics. Then the standard shifted in the INTASC standards and now 23% of the standards focus on a basic understanding of a topic and 77% of those standards required a higher level of thinking by the student. This allowed for a deeper understanding of topics within the classroom (Leaman & Flanagan, 2013). INTASC standards have been changed so that students may be able to move from a lower level of understanding to deeper thought on certain subjects allowing for the students to answer a question with their own opinions. In turn this allows for a better atmosphere in the classroom because it allows for a better discussion. Better discussion leads to the understanding of different sides/answers to a question.

However, as the definition of scaffolding states, a student must start out at a lower level of understanding. This means that a teacher must ask lower order questions to the students. There are multiple types of lower order thinking questions. Some of these learning styles are better to incorporate to allow for transition from a lower level of understanding to a higher level of understanding.

One of these transitions includes the use of mnemonics. Mnemonics help the students to answer the who, what, when, and where parts of a question (Hall , Kent, McCulley, Davis, & Wanzek, 2013). This is used to help students remember information to allow for the teacher to move to the next part of questioning which is a higher level of questioning such as critical thinking questions, or having the student create something to demonstrate his or her complete knowledge of a topic. Other forms of lower order thinking include yes or no questions and multiple choice questioning. These types of thinking involve fact recall instead of deeper understanding. Once a student can develop basic knowledge of a topic it is time to incorporate higher order thinking questions and activities. Some activities may include questioning to find if a student has applied the knowledge given them and formed their own opinions or ideas, which in turn leads to a full understanding of a topic. They may also include creative projects that force the student to apply the content learned in the creation of the project. Such projects may include the use of a primary source document within history classes, as we will discuss further in chapter two. When using a primary source document it is often effective to incorporate an activity for the student to do with the primary document to help them dissect it and come out on the other side with a better understanding of the points the document discussed.

The movements from lower level thinking to higher level thinking, or scaffolding as it is known, is described in Bloom's Taxonomy and Webb's Depth of Knowledge. These charts describe how a student should move from that lower level to higher level comprehension in a step by step process. In the Bloom's Taxonomy

model the student must start at the lower level of understanding as we have discussed above (McNeil, 2011). This is the remembrance phase of learning, or recall phase in which the student must remember the topic that is to be better understood. The next phase is the understanding phase where the student must develop basic knowledge and begin to look at the meaning of the text, image, or speech. These students are to begin to grasp the deeper meaning to whatever instructional message you the teacher have given them. The next stage is the application phase where the student begins to carry out a procedure of a certain situation. This is where the higher level thought process should start. Once the student starts thinking on a higher level it is time for the next process, which is to analyze the material. When taking part in this phase it is important for the student to compare different sections or ideas of the material given them, and to determine the correlation between the sections. This will lead to a better understanding of what the students are looking at and will help lead into the next phase, which is the evaluation phase. In this section of the Bloom's Taxonomy pyramid the student is to make their own judgments based on the criteria the educator is to assign. In fully understanding the topic displayed to them those students should be able to make critical judgments and display their own opinions on the matter at hand.

This process then leads into the next phase, which is the creation phase. In this phase, which is the most important phase to the instructor as it lets the educator know if a student fully understands the topic or not. The students are to put elements together from the material they have delved into (McNeil, 2011). In the assignment they will show coherent knowledge and make their own original

work. A deeper understanding of a topic leads to higher achievement because the students by now have developed their own opinions on a topic and know the different aspects of that topic, making it easier to retain the knowledge and display it in a way which shows their understanding of different aspects. Webb's depth of knowledge is set up in a similar way enabling a student to fully understand content through a process such as Bloom's Taxonomy moving from a basic understanding to a complete understanding of a topic. These processes can be used in any subject in education, especially within the realm of world history. The question is, how is critical thinking used in within a Social Studies classroom?

Within every classroom teachers try to move students from basic knowledge of a topic towards a complete understanding of a subject. For example, taking knowledge of what the Church offered in Medieval Europe, such as education, religion, and forming alliances between countries under the Church; then applying that information to how the Catholic Church controlled most of what happened within Europe, politically, spiritually, and physically. The point of Social Studies is to allow the student to learn about what has happened in the past and getting those students to see a bigger picture of why other events occurred due to decisions or actions of another. This is where critical thinking comes into play. Students must learn to think critically to form whole thoughts and opinions on topics and units. Therefore, the teacher must start with being a human model of what critical thinking is supposed to look like. The teacher within the Social Studies classroom must be the person the students look up to in order to discover how to think like a historian, which includes critical thinking and developing ideas on what happened

within the past, constantly looking at the bigger picture (Walker, Russell III, & Pagnotti, 2014). In the observation of a root cause the students will look at such questions as a detective may ask when looking into a case. Why did this event happen? If you were there would you have handled it the same way? Would you have intervened or tried to find another way of handling the situation rather than getting physically involved? These are the types of questions detectives ask when looking into a case and are the same types of questions that are asked when a historian is looking at the bigger picture. An example of an activity that would allow for this type of thinking could be a mock trial (Russell III, Waters, & Thomas, 2013).

While mock trials are fun and get students debating formally, this trial forces the students to see both sides of a scenario helping these students to develop opinions and ideas on certain topics. It is real world application, but within a Social Studies classroom the students would focus on a historical event or theme. One such example would be the re-enactment of Napoleon Bonaparte's trial that sent him to the island of Elba to be exiled. Students could defend and prosecute Napoleon helping them to fully understand the historical event. The students' opinions on a certain topic or unit would also help these students define what they believe in as the opinions formed play a vital role in helping the student to define what he/she may think is appropriate and inappropriate in life. For example, do the students believe that the exile of Napoleon was appropriate because he was using the military without France's complete cooperation and failed at an attempt to invade Russia? If so, why would the student decide to exile him, and if that student does not agree what are their reasons for not exiling Napoleon? This discussion could lead

into a question about a scenario that the educator may set up in the class for a project. The student then will form an opinion on the Napoleon trial while learning about his actions and developing a complete understanding of who Napoleon was including why Napoleon behaved the way he did. All the while developing his/her own opinions on whether or not someone deserves such a punishment as exile for the types of acts he committed. This will in turn lead to a deeper understanding of the French Revolution and Napoleon which will help the students to retain the knowledge learned because it has now become part of their being through knowledge gained and those opinions formed on what kind of person he was.

Another tool a historian has on his or her belt is the use of primary sources for a topic (Patterson, Lucas, & Kithinji, 2012). There are many projects students can take part in that include the use of primary source documents. The projects created will help students with higher level thinking in defining what the source is discussing. The students will have to break down and analyze the document to find its true meaning. The same model used in Bloom's Taxonomy is used in the analysis and evaluation of a primary source document. The knowledge gained from the analysis of the primary source document can then be used to create something in an activity pulling together the analysis and evaluation of the source, applying the knowledge to what the students are to discuss and then creating the project displaying their newfound knowledge of the primary source document in use. This in turn will help the student to not only realize the importance of viewing a primary source document, but it will help the students to gain a deeper understanding of a topic all the while thinking on a higher level in the analysis and evaluation of the

source. Meaning they will discover the true meaning of what the source intended to discuss. These are just some of the many ways in which higher order thinking and questioning may be used within the classroom setting of a Social Studies classroom; there are a number of different ways in which a Social Studies teacher can bring higher order thinking into their classroom.

Now that the topics of how to move from lower order questioning to higher order questioning, and how to include those types of questions and thoughts in a Social Studies classroom were discussed; the next question would be how well does higher order thinking work within student achievement? Schools everywhere want their educators to ask higher order thinking or open-ended questions within their classrooms. This in turn is supposed to force the students to think critically on topics and units that are taught throughout the year. In this study I will be analyzing the impact of higher order thinking on student achievement within a middle school. My question then was what percentage of schools are using higher order thinking in their Social Studies classrooms daily? According to Patterson, Lucas, and Kithinji, middle schools are considered to have the classrooms that have the least amount of Social Studies teachers using higher order thinking within them (Patterson, Lucas, & Kithinji, 2012). Analyzing lessons taught by the educators over the year Patterson, Lucas, and Kithinji have concluded that high school Social Studies classes use higher order thinking skills 80% of the time, elementary schools use higher order thinking skills 27% of the time, and middle schools only use higher order thinking skills within their classrooms 20% of the time. This study was based off of the Bloom's Taxonomy scale and the most common area that is used on that chart is the

application process. In this process students learn to apply the knowledge learned within the study itself, and in middle schools students often apply this knowledge without these phases of analysis and evaluation. Rather proceed straight to the creation phase 80% of the time completely skipping both the analysis and evaluation phases. These students in turn only display those skills learned within their projects only 20% of the time. This means that in middle schools higher order thinking is not used as much as it is within the high school and elementary school levels. Middle school classrooms are not using as much higher order thinking skills as the different levels of education are using today. So do critical thinking skills play a major role in the achievement of a student within grading?

Undergraduate students in a study conducted by Giacumo, Savenye, and Smith were given a writing assignment without a rubric and their work was evaluated, and then the students were given a rubric listing skills that are to be used in the higher order thinking categories of Bloom's Taxonomy (Giacumo, Savenye, & Smith, 2013). If a student were to gain a 3 on their papers he/she would have to evaluate or create an argument within their writing, assessing the value or importance of specific ideas or solutions of a work they were looking at. Students that were just applying and analyzing one or more of the entries looked at gained a 2. Lastly, a 1 was gained on the paper if they only demonstrated the remembrance and understanding phase of Bloom's Taxonomy chart discussing one or more of the entries looked at. The student scored higher in writing the higher they went up in the Bloom's Taxonomy chart. Also, those students who received a prompt scored higher than the students who did not receive a prompt meaning that those students

improved their writing if he/she knew what was to be completed. The prompt was made so that those who received the prompt were aware that if that student thought on a higher level she/he would score better. This made the students think critically while writing their papers, and the reasoning behind this is that thinking on a higher level allows for a better paper because the student evaluates what the works are about that those students are looking at and are able to piece together and understand different parts of the work better than those who just analyzed and applied, or remembered and understood.

Caulfield-Sloan and Ruzicka conducted another experiment that focused on the impact critical thinking had on performance. In this experiment the researchers took teachers within the third grade and had those teachers teach a science lesson (Caulfield-Sloan & Ruzicka, 2005). There was a control group and experimental group. The control group did not teach using higher order questioning and the experimental group did teach lessons using higher order thinking skills. The students were given a rubric that gave the student a score of anywhere from 0-3. 3 being the highest score the student could achieve relaying complete understanding of the topic to the teacher. The question was "How do the roots of a plant act like a drinking straw? How do the roots of a plant act differently than a drinking straw? Use what you have learned about plants to explain your answer" (Caulfield-Sloan & Ruzicka, 2005, p. 166). The 3 on the rubric had to be a complete and clear answer to this question. In teaching the lesson the control group used lower order questioning. In the experimental group the teacher taught the class using higher order questioning when teaching the students. This included student-lead discussion in

which the students built their understanding off of different opinions and findings. The control group had 90% of students score a 0-1 on the assignment, while the experimental group had 61.7% of students score a 2-3 on the assignment. This experiment concludes that a classroom using higher order questioning techniques will gain a more complete understanding of a lesson the teacher is teaching. While these experiments were in different grade levels and in different subjects the results conclude that a student who is forced to think on a higher level or has been taught using higher order questioning will in turn score higher grades.

In discussing how to move from lower order questioning to higher level thinking, how to use higher order thinking within the Social Studies classroom, and looking at some results on grades with teachers who use higher order questioning; we can conclude that the use of higher order thinking within the classroom setting benefits the student. There are a number of ways that higher order questioning may be used within the classroom setting and the teacher must develop a complete understanding of what it means to use higher order thinking skills. However, students who are learning through higher order thinking are able to retain more knowledge and develop clear thoughts that help develop their beliefs and opinions. They are also able to look at and comprehend both sides of an argument and break down documents more effectively, which in turn will allow for better developed answers and work. This is the same conclusion in which this study hopes to discover in the experiment of comparing quiz results from a classroom where critical thinking is used, but is not the focus to a classroom where critical thinking is the

main focus; meaning, does higher order thinking allow the student to actually internalize the information and perform better on tests?

Chapter 3

Methodology and Procedures

The purpose of this study was to examine lower order thinking skills and higher order thinking skills and their impact on student's academic performance in a social studies classroom. These assessments were looked at and studied after a determined time of five days of using each method of questioning within the classroom. These scores were then compared with one another to determine if there was any difference between the scores of the two methods of teaching.

Population

The population of this study came from a smaller urban middle school in Northeast Tennessee. This school had 851 students enrolled and 38% were on free or reduced lunch programs. The demographics of this school were as follows, 94% were white, 2% black, 1% Hispanic, and 3% were of another ethnic background.

Sample

The sample of this study was drawn from one seventh grade class containing 23 students. In the classroom 12 were female students while the other 11 were male students. The majority of the students, however, were white in this sample. There was one black male, one Hispanic male, one Hispanic female, and one Asian female. The academic abilities of this class were varied, but the majority was developmentally on schedule. There was one IEP student, meaning he was on a program to try to get him on the current grade level he was at. While the students were not randomly selected and were in the same class since the beginning of the

semester, the class itself was randomly selected out the four classes I taught within a day through picking a random class period out of a hat.

Data Collection Instruments

Data were collected using two teacher made quizzes. The quizzes came from a unit that was taught over the course of ten days. The unit taught was divided into two equal halves, in which both halves were similar in content and difficulty. A quiz was then administered at the end of the first half unit. The first half of the units was taught using lower order teaching methods for five days. The students were then assessed at the end of the half unit. The quiz focused on questions in the following areas: the impact Venice had on the Renaissance, the impact Florence had on the Renaissance, the impact of the Silk Road, and humanism. The second half of the unit was taught using higher order teaching methods. They were assessed at the end of the second unit as well. The quiz covered the following areas: the translation of the Bible into the Vernacular, the impact of the printing press, the impact different people of the Renaissance had on the world, and Joan of Arc and the Hundreds Year War. The scores of the quizzes were then compared with one another to determine if higher order teaching methods had significant results on student achievement.

Procedures

Before this study had begun, permission was first sought from the school principal and the Milligan Institutional Review Board. After the principal and the IRB granted permission for this study, consent letters were sent home for the

parents of the students who would be participates in the study. After permission was granted, the current study was implemented within the social studies class throughout the 10-day timespan.

The sample consisted of one seventh grade class made up of 22 students, ages 12-13. There were 11 females and 11 males of which 12 were white. One unit was selected for study. The unit was then split into two halves that were similar in difficulty and comprehension. On days one through five, traditional teaching using lower order teaching methods such as remembrance and understanding were used during instruction. This consisted of questioning, readings, worksheets that went along with the readings, and mini assessments using remembrance skills. The students were grouped with one shoulder partner; however, most of the work was independent. There was no use of technology except for the smart board in use while the students took notes. After five days of using this method of instruction, the students were assessed their knowledge using a teacher made quiz that contained 12 multiple choice questions and two short answer questions.

On the days five through ten, students were given instruction using higher order teaching methods. This method of instruction includes higher order questioning from the teacher using open-ended questions, creation assignments, thought provoking videos, and student-based discussion within the classroom, different from just lecturing and remembrance. This test consisted of 12 multiple choice questions and two short answer questions as well.

After the ten days of instruction had been completed the two forms of assessment were then compared with each other to determine if higher order

instruction improved student grades. The researcher was looking for a difference between quiz scores within the method of instruction.

Research Questions

Research Question 1: Is there a difference between students' grades when they are taught using traditional or lower order thinking techniques and when they are taught using higher order techniques?

Research Hypothesis 1: There is a difference between teaching methods and student grades in seventh grade social studies.

Null Hypothesis 1: There is no difference between teaching methods and student grades in seventh grade social studies.

Research Question 2: Is there a difference between genders when taught in a classroom that focuses on levels 1-3 of Bloom's Taxonomy?

Research Hypothesis 2: There is a difference between genders when they are taught in a classroom that focuses on lower order methods within levels 1-3 of Bloom's Taxonomy.

Null Hypothesis 2: There is no difference between genders when they are taught in a classroom that focuses on lower order methods within levels 1-3 of Bloom's Taxonomy.

Research Question 3: Is there a difference between genders when taught in a classroom that focuses on critical thinking and levels 4-6 of Bloom's Taxonomy?

Research Hypothesis 3: There is a difference between genders when they are taught in a classroom that focuses on higher order methods within levels 4-6 of Bloom's Taxonomy.

Null Hypothesis 3: There is no difference between genders when they are taught in a classroom that focuses on higher order methods within levels 4-6 of Bloom's Taxonomy.

Chapter 4

Data Analysis

Introduction

The purpose of this study was to examine and show the effects of lower order and higher order teaching methods on academic achievement of students within world history. Higher order teaching methods included the use of critical thinking questions and activities from Bloom's Taxonomy such as, analysis, evaluation, and creation skills. Lower order teaching methods included remembering, understanding, and applying. Both methods of teaching were used for two weeks when the study was conducted.

Collection of Data

The population for this study came from a middle school in Kingsport, Tennessee. The enrollment for the school was 851 students for the 2014-2015 school year. The sample for this study consisted of one seventh grade history class. There were a total of 22 students for this study, 11 were female and 11 were male. Data were collected during the two weeks this study was conducted. The sample was taught one unit for a week using higher order teaching strategies, focusing on Bloom's Taxonomy. After the end of the first week, students were administered a quiz. The second week students were taught the other half of the unit using lower order teaching methods. After the end of the second week, students were administered a quiz. Both quizzes were compared for depth of knowledge. The demographics of this study are displayed in table 1. These participants were both

the control and experimental groups. The data collection instruments used were teacher made quizzes, consisting of multiple choice and short answer questions.

Table 1
Demographic Profile of Participants

Gender	Frequency (f)	Percent (%)
Male	11	50
Female	11	50
Total:	22	100
Race		
Caucasian	12	54
Black	2	9
Hispanic	3	14
Asian/other	5	23
Total:	22	100

Research Questions and Related Hypotheses

To guide the analysis of the data for this study, three research questions were considered. Each question was followed by a research hypothesis. Data were analyzed using a .05 level of significance.

Research Question 1: Is there a difference between students' grades when they are taught using lower order thinking techniques and when they are taught using higher order techniques?

In order to answer research question one the student scores were recorded after five days of using teaching methods that focused on levels 1-3 of Bloom's

Taxonomy and again after five days using teaching methods that focused on critical thinking questioning and levels 4-6 of Bloom's Taxonomy. The mean score after using teaching methods that focused on levels 1-3 of Bloom's Taxonomy was 77.82, and the mean score after using teaching methods that focused on critical thinking and levels 4-6 of Bloom's Taxonomy was 91.55. The mean difference was 13.73.

Research Hypothesis 1: There is a difference between teaching methods and student grades in seventh grade social studies.

Null Hypothesis 1: There is no difference between teaching methods and student grades in seventh grade social studies.

In order to test whether the mean difference was significant a paired t-test was conducted: the results indicate $t(21)=-4.944$, $P=.001$, and therefore the null hypothesis was rejected. The results are displayed in table 2.

Table 2
Paired t-test for teaching methods and test score

Condition (Teaching Methods)	M	SD	df	t-value	Sig (2-tailed)
Lower Order Teaching	77.82	11.84	21	-4.944	.001
Higher Order Teaching	91.55	8.42	—	—	—

Research Question 2: Is there a difference between genders when taught in a classroom that focuses on levels 1-3 of Bloom's Taxonomy?

In order to answer research question two, the scores for males and females were recorded after teaching methods focusing on levels 1-3 of Bloom's Taxonomy took place. The mean score for lower ordered teaching for males was 74.91 and the mean for females was 80.73. The mean difference was 5.82.

Research Hypothesis 2: There is a difference between genders when they are taught in a classroom that focuses on lower order methods within levels 1-3 of Bloom's Taxonomy.

Null Hypothesis 2: There is no difference between genders when they are taught in a classroom that focuses on lower order methods within levels 1-3 of Bloom's Taxonomy.

Therefore, in order to test whether the mean difference was significant, an independent t-test was conducted. The Levene's test indicated $P=.784$, which is greater than $.05$, therefore, variances were assumed equal. The results for equality of means indicated there was no significant difference at $t(20)=-1.162$, $p=.259$, therefore, the null was retained. The results are displayed on table 3.

Table 3
Independent Samples t-test for gender and performance on lower order teaching methods

Lower order Teaching	SD	M	t	df	Sig (2-tailed)
Males	10.33	74.91	-1.162	20	.259
Females	13.00	80.73	—	—	—

Research Question 3: Is there a difference between genders when taught in a classroom that focuses on critical thinking and levels 4-6 of Bloom's Taxonomy?

In response to research question three, data were collected from a quiz distributed after instruction using critical thinking questions and teaching methods using levels 4-6 of Bloom's Taxonomy was given. The mean score for males was 90.73 and the mean score for females was 92.36. The mean difference was 1.63.

Research Hypothesis 3: There is a difference between genders when they are taught in a classroom that focuses on higher order methods within levels 4-6 of Bloom's Taxonomy.

Null Hypothesis 3: There is no difference between genders when they are taught in a classroom that focuses on higher order methods within levels 4-6 of Bloom's Taxonomy.

In order to test if the mean difference was significant an independent t-test was conducted. The Levene's test indicated $P=.093$, which was greater than $.05$, therefore, variances were assumed equal. The results for equality of means indicated there was no significant difference at $t(20)=-.447$, $p=.660$, therefore, the null was retained. The results are displayed in table 4.

Table 4
Independent Samples t-test for gender and performance on higher order teaching methods

Higher Order Teaching	SD	M	t	df	Sig (2-tailed)
Males	9.81	90.73	-.447	20	.660
Females	7.15	92.36	—	—	—

Chapter 5

Summary

This chapter contains a summary of findings, conclusions, recommendations, and implications for the research conducted to examine the effects of using higher order teaching methods and lower order teaching methods on academic performance of students in a world history class. It also examines the secondary purpose, which was to examine if there was a difference between genders within these methods of teaching.

Summary of Findings

The purpose of this study was to examine the effects of lower order and higher order teaching methods on academic achievement of students within world history. The first research question focused on the difference between student scores, students were taught using lower order and higher order teaching techniques within the classroom. The results indicated there was a significant difference after data analysis was performed. These results are consistent with the literature review. This Research indicates that when students are taught, “the best learning comes from the increased usage in these higher order methods, such as, the analysis, evaluation, and creation phases” (McCollister and Saylor).

During the time of higher order instruction the students were excited and enthusiastic about each lesson, wondering what activity we were going to do to make them think and relate history to their lives. There was a lot of activity and students volunteered to participate in the games, accountable talk sessions and the debates. However, with games and increased discussion came unwarranted side

discussions and students were competing over who got to speak their minds next in the accountable talk sessions and debates. The pace during the week involving higher ordered teaching techniques and critical thinking was quick and included a multitude of activities within the allotted time to teach each lesson. When instruction was given in the week of lower order teaching techniques the students were quieter and focused on their work. While there were also a lot of activities within the lessons, there were less volunteers who wanted to participate in the lesson as in the week involving higher order teaching techniques and critical thinking. During this time, students were less distracted by noise within the classroom and were not competing to answer questions. The pace in the classroom during this week was quick as well, however, the students had a little more time during this week to complete their work, but it looked very much like the week involving higher ordered instruction. However, the mean score for the quizzes used during higher order thinking strategies were higher than those of lower order thinking strategies.

Research questions two and three focused on gender differences. The results indicated that there was no difference between males and females and teaching methods. The results suggest that both females and males were both equally involved in the lessons, therefore there was no difference shown. I expected a difference in learning between males and females within classrooms that either used higher order or lower order techniques because of previous research. Studies have shown that there are significant learning differences within gender in brain-based, autonomic, and sensory-based functions (Bonomo, 2010). Due to the differences between the female and male brains, each comprehends material and

thinks critically on subjects in different ways. However, in this study male and female students tended to respond in the same way during the two methods of instruction.

Conclusions

The purpose of this study was to examine and show the effects of lower order and higher order teaching methods on academic achievement of students within world history. A secondary purpose was to determine if there was a difference in gender and teaching methods. The results indicated that there was a difference on student performance when they were taught using higher order teaching techniques and critical thinking methods as compared to lower order teaching methods. However, there was no significant difference between genders on performance within those two weeks.

Recommendations

1. Further Research needs to be conducted in an environment where there is an equal amount of males and females. The even distribution of males and females in this study helped in determining if gender plays a role in the ability to learn using one teaching method over another.
2. Further Research should introduce methods of instruction before you start your data collection. In this study methods such as, accountable talk and debates, used during the week of higher ordered instruction, were not introduced before the study began. This caused side conversations and distractions throughout the activities.

3. Further research should be conducted using a true experimental design. There should be both an experimental and control group used within the research.
4. Further research should use a larger sample from entire school districts to determine whether different results would be realized. This study may have shown significance in teaching methods for these students, but may not for another group.

Implications

1. Teachers should use a variety of teaching methods within their classrooms, and not disregard lower ordered methods, such as, remembrance, understanding, and application. The results showed that some students learned better using these techniques. This could mean that a solid combination of lower order and higher order teaching methods would be beneficial to students.
2. To determine how students learn teachers should administer a learning style quiz. This knowledge may prove useful to the teacher when teaching students using different techniques. This way the teacher may be able to differentiate his/her teaching so that every student is catered to.
3. Teachers should continue to teach both genders using higher order and lower order thinking skills because both genders will enjoy them equally.

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