EXPLORING THE EFFECTS OF ACTIVE LEARNING ON RETAINING ESSENTIAL CONCEPTS IN SECONDARY AND JUNIOR HIGH CLASSROOMS

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An Action Research Project Submitted to the Graduate Faculty of the School of Education in Partial Fulfillment of the Requirements
for the Degree of Master of Arts in Teaching and Leadership

Saint Xavier University

Chicago, Illinois

May 2012

ABSTRACT

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This report describes a program for improving retention of essential concepts exhibited by junior high and high school students. The purpose of the study was to increase cognitive retention in order to increase student success. The target sample consisted of junior high students in the seventh grade and high school students in grades nine through twelve. One site was a metropolitan area while the second site was in a suburb of a metropolitan area. The problem of retention was documented through teacher observation journals, teacher surveys, and student surveys.

Analysis of probable cause data revealed that students reported issues with retaining information. Teachers also reported that students had issues with retaining essential concepts. Individual teachers noted in their journals that some students could not recall information and remember essential concepts after the initial teaching phase. A review of curriculum revealed a need for interventions to improve cognitive retention.

A review of solution strategies suggested by educational practitioners, combined with an analysis of the problem context, resulted in the selection of an umbrella intervention strategy: active learning methodology. The researchers developed lessons incorporating a variety of active learning techniques which were student centered. These interventions were implemented several times each week during 44 minute class periods for the junior high students and 52 minute class periods for the high school students. The interventions occurred during the fall semester, so that students could respond to the active learning techniques implemented by the teachers.

After the implementation of active learning strategies, the teacher researchers concluded that a moderately positive change occurred concerning retention of essential concepts after teachers converted from traditional lecture methods. The teacher researchers reported that incorporating active learning techniques in their classrooms encouraged cooperation, improved student engagement, and decreased unwanted behaviors. This led the team to proclaim this intervention as successful for their given classroom settings.

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CHAPTER 1

PROBLEM STATEMENT AND CONTEXT

General Statement of the Problem

The students in the targeted secondary and junior high classes exhibited a deficiency in cognitive retention of essential concepts; this deficiency interfered with their academic growth and success. Evidence for the existence of the problem included teacher journal observations that described a significant discrepancy between knowledge during initial acquisition versus long term retention of knowledge as well as data from student and teacher surveys.

Local Context of the Problem

School A

School A contained about 650 students that attend grades third through eighth. School A's cultural make up, or lack thereof, was almost 99% White students. They had less than .5% of Hispanic and less than .5% of Black students. The school had around 9% of students who qualified as low income. There was about a 4% mobility rate in the school with an attendance rate around 96%. School A had a 100% parental contact rate which included parent-teacher conferences, parental visits to school, telephone conversations, and written correspondence. The majority of parents at School A was college educated and approached learning as very important to the success of young people. The majority of parents from School A attended parent-teacher

conferences and were involved in the school in some way. In recent years, School A had been ranked in the top 20 out of over 1350 middle schools on the state standardized tests.

This school contained 62 full-time certified teachers, and they were all white (Caucasian). School A's faculty was comprised mostly of women, accounting for about 82% of the schools employees; whereas, men comprised the other 18% of the faculty. The average teaching experience for certified faculty members at School A was close to 14 years. Just about 33% of the teachers from School A held some type of Master's degree or higher. The average salary for a teacher at School A was just $49,000 per year. School A had one full-time building principal for the junior high (grades sixth through eighth) and one principal who divided time between the intermediate part (grades third through fifth) of the school and the elementary building (grades kindergarten through second). The school also had a superintendent whose office was located in the elementary building of the school district. School A also employed two full-time librarians and a full-time school nurse. School A employed a school guidance counselor who met with students who needed help about three days per week. The guidance counselor also oversaw Character Education at the school. School A had roughly 5 teacher aides employed to help struggling students or students with disabilities. School A did provide professional development opportunities throughout the year, and they allowed teachers to sign up for two workshops per year. School A also paid for their teachers to take one college level class per year if they choose to do so. School A also encouraged continued education with a program that reimbursed teachers who decided to get their master's degree.

School A had experienced a lot of growth in the last seven years and had just recently added on to their school building. Currently, School A had two gyms and a multi-purpose room. They had a school library that was staffed full-time as well as two computer labs and two teacher

lounges. The school also had a music room and a separate chorus room. School A also contained an outside courtyard area that included lush landscaping and plants used for educational purposes as well as a place for people to eat or read outside. The entire building in School A was air-conditioned as well. A typical class room would contain marker (white) boards on two of the four walls. Most classes contained student desks, but some contained tables where multiple students sat. A decent amount of technology was represented as the majority of rooms in School A contained an overhead LCD projector with a pull down screen for students to take notes, look at pictures, or watch educational films. Some classrooms even had Elmo machines, which are similar to a transparency projector, but it has a camera so it projects anything placed under it. The school was built primarily with cider block walls with very few windows. Class size fluctuated between 20 to 26 students where students in grades third through fifth were self-contained and grades sixth through eighth travelled from teacher to teacher, much like a high school setting.

Students at School A received an education in the core academic subjects of Math, English/Literature, Science, and Social Studies. Students also received some training on the use of computers and had the ability to participate in band, chorus, or art class. School A also provided an RTI (Response to Intervention) class where struggling students received extra help in the subjects of Math and Reading. All students had a twenty minute RTI class everyday where they received additional time to learn math or better their reading skills. School A provided multiple extracurricular activities besides band, chorus, and art. Other extracurricular activities that School A provided included scholastic bowl, chess club, service club, softball, baseball, boys and girls track, boys and girls basketball, cross country, pom-poms (dance), cheerleading, and volleyball.

A junior high student's typical day at School A began when they arrived in their homerooms around 7:45 am. Homeroom lasted until eight o'clock am where students ordered lunch, teachers took attendance, and students heard the daily announcements. Students would then proceed to their next four classes in the morning. Students travelled from class to class with an assigned schedule that differed from one another. Each class lasted a total of forty-four minutes. At 11:05 am students went to a forty minute lunch. After lunch, students then went to either band or chorus depending on the day. If they did not participate in band or chorus, students would go to a study hall. After study hall, students attended their RTI (Response to Intervention) class which included an extra twenty minutes of reading or math enhancement. After RTI, students had two of their core classes left in the afternoon. Students were then dismissed at 2:25 pm. Some students would stay after school if they participated in an extracurricular activity.

School A also contained an elementary building in its district that housed students in grades kindergarten through second. School A's elementary building had an enrollment of 314 students. The cultural makeup of the elementary building was almost identical to School A's Middle School.

School B

School B was a unit district with approximately 2,100 students, covering grades 9 through 12. The school spent over $9,500 per pupil with a budget of almost $21,000,000. Over 96% of the students were White; a little over 1% was Hispanic; approximately .5% each was Black, Asian/Pacific Islander, Native American, and Multiracial. The percentage of low-income students was over 35%. More than 15% of the student body had an Individual Education Plan (IEP). School B's mobility rate was about 11% with an attendance rate of about 92%. The graduation rate was just over 87%. The parental contact percentage (parents who attend

conferences, visit the school, have been visited in the home, or have telephone or written correspondence) was 75%.

Teachers in School B had an average class size of 16 students with an average teaching experience of 12 years. Almost 40% of the teachers had earned master's degrees or above, with an average teaching salary of $49,048. The teaching staff was 100% White and almost 67% female, for a total of 125 certified personnel. The Special Education Department supported 21 full-time teachers to address the needs of students with IEP's. The district had a superintendent, an assistant superintendent, a principal, two assistant principals, three disciplinary deans, and seven counselors.

This secondary facility was the only high school in the community. It was a large campus divided into seven sections, many which have landscaped courtyards. The facility contained a large spectator gymnasium, a medium sized gymnasium, a natatorium, and a large theater. The school included incredible outdoor facilities including a huge stadium surrounded by a new track. The baseball and softball fields were also on site, as well as the tennis courts. In the adjoining park, the school used the soccer fields and paths to run cross country. The Career Technological Education building housed an automotive repair shop, a day care, a new art studio, and a manufacturing and welding program, just some of 57 career paths students had to choose from; also included were graphic design, landscaping design, building construction, and one of the area's only high school Certified Nursing Assistant programs. For more opportunities, the students had access to a mathematics laboratory for extra assistance, a community college supported tutoring lab, a library with over 35 computers overseen by a librarian, a clerk, and student workers, and four other computer labs with 30 computers each. The foreign language

also supported its own language lab with special head phones and programming to assist in the acquisition of a second language.

A typical classroom had 25 to 30 desks, a white board or chalk board, an overhead projector, a teacher computer, and a Smart board. Teachers had access to televisions with DVD and VCR players, projection systems, and the use of Blackboard. The school web page allowed access for parents and teachers. Parents viewed their students' grades through Skyward Access. Students could also peruse the library section of the web page which included access to numerous data bases. Supplies were also easy to acquire by requisition forms, signed by department heads. The school day was a six period schedule (52 minutes each) with a built in study hall and a lunch period; the school day was from 8:00 to 2:42, Monday through Friday. Teachers belonged to small professional learning communities (PLC's) to support one another, to collaborate, and to complete book studies. Teachers also received weekly reports on students they choose to supervise (System of Support). The teachers monitored the academic progress, attendance, and behavior of each student. They gave encouragement and suggestions for success and also proceeded with interventions when necessary. However, academically only 47% of last year's juniors met or exceeded standards for all state tests. School B was currently in restructuring implementation and was in the fourth year of academic watch status.

Surrounding Community

Community A

Community A was located on a bluff overlooking a major water way that lent itself to recreational boating, fishing, and commerce. Community A had a major highway which ran directly through the middle of the community. This highway sometimes caused problems as many of School A's students crossed this busy four lane highway on their way to and from

school. School A provided a crossing guard before and directly after school to ensure the safety of the students while crossing the street. However, when students left after an extracurricular activity, they had to cross the highway without supervision. This issue with the highway had prompted some community members to ask for a pedestrian walking bridge to be built over the highway to ensure that students could arrive and leave school safely.

Community A was a commuter community which sat just outside of a metropolitan area which was home to many of the entertainment and employment opportunities for community members. A large percentage of people in the area worked for a major manufacturing company that created heavy industrial machinery. Even though most people worked outside the community in a larger metropolitan area, they preferred to live and raise their families in a smaller community setting. Community A had a current population of 3,232 people; however, according to recent census information, Community A had experienced a 24% increase in population growth over the last six years. They were the fastest growing community located outside the metropolitan area.

Community A was an area on the rise with new homes being constructed constantly. The majority of homes in Community A were single-family homes with a median home value of $249,134. That was an increase of nearly $100,000 over the last eight years. The average household income of Community A was $88,946. The average age of community members was 34 years old, and families represented about 85% of the population. Whites (Caucasians) comprised 97% of the ethnic make-up in Community A, while Blacks, Hispanics, and Asians made up the other 3%. Community A had a trailer park located in the district which could possibly add to the 2.5% of the population that was below the poverty line.

Community A had access to many different entertainment opportunities in the metropolitan area, such as collegiate basketball, minor league baseball, minor league hockey, semi-pro football, theater productions, a museum, a planetarium, multiple movie theaters and eateries, two malls, and multiple golf courses. Community A also enjoyed a nice lake situated within one of the neighborhoods where many of the students enjoyed fishing and swimming.

Community A had other employment opportunities besides just major manufacturing. There were three area hospitals which provided healthcare and employment opportunities for many of the residents located within ten to fifteen minutes of the community. Besides healthcare and industry, people in the area could be employed in one of the many construction companies or car dealerships in the surrounding areas. Community A was also only 14 miles from an international airport. The typical commute for most residents in Community A fell between 10 to 20 minutes. Community A was also located within 40 miles of 2 major colleges and 2 community colleges. This could possibly have helped contribute to the 42% of the population that held a bachelor's degree or higher. Over 94% of Community A's residents had obtained or were in the process of obtaining a high school diploma. Education seemed to be very important to members of Community A, and this was reflected in the standards they set for their children.

Convenience to many entertainment and employment opportunities were just a couple of reasons people chose to live in Community A. Low crime rate (currently zero registered sex offenders), a peaceful setting, well maintained homes increasing in value, and a top notch school system were some other reason that Community A was experiencing such a boom in their population.

Community B

School B's location was metropolitan, lying on a major river, and was approximately 165 miles from two megacities. Several connecting small towns, along with this major city, composed the school district. The area included a large library, a community hospital, the largest park district in the state, four championship golf courses (one was PGA rated), an indoor sports and multi-function dome, a small airport, an indoor mall and strip mall, all major automobile dealerships, and five hotels, along with numerous eating establishments and small businesses. Community B also offered several governmental facilities, such as a Driver's License Facility, a Social Security office, a Health Department, and the court house as the county seat. A senior center was a vital part of the community as well as an extremely active Boys and Girls' Club. Public transportation was offered through a municipal bus service.

Community B was an area of almost 45,000 people with the median age being 37. More than 67% of the families in the area did not have children. The median household income was approximately $48,000 per year. The major area employers included the hospital, a major insurance company, a foundry, a renewable energy plant, a federal prison, and Wal-mart. Within a short distance, a leading manufacturer of construction and mining equipment employed many more citizens. The unemployment rate, however, was over 10%. Thirteen percent of the residents possessed a bachelor's degree or higher. The population of this community mainly lived in owner-occupied houses (almost 70%). The median homeowner cost was just under $800 per month with the median rent approximately $350.

Many people moved to Community B because of the low cost of living, peaceful setting that was still near many more active ones, convenience to many significant corporations for employment, or to retire. The low cost of living helped new residents purchase homes with the

estimated median house or condo value being just over $100,000 while the state average was almost double that purchase price. The low crime rate added to the advantages of this community: under three violent crimes were perpetrated on every thousand citizens annually, in comparison to the almost six per thousand average in the state. This community had convenient, close access to an international airport, a planetarium, a minor league baseball stadium, a Division I university, and a community college. The average worker's commute was low: most drove only five to twenty minutes to a job, and nearly no one drove more than thirty-five minutes. The extensive park district completed both the peaceful and active sides for the community. Sixteen parks were maintained by the city, along with an athletic health club. Boating, swimming, hiking, golfing, and playing sports were popular activities for the residents. Overall, the positive aspects of Community B outweighed the negatives, and this metropolitan area was seeing slight growth.

National Context of the Problem

A deficiency in cognitive retention of essential concepts was apparent not only in this local area but also on a national scale. Decreased retention resulted from a lack of active learning, instructional methods which required students to do meaningful learning activities and think about what they were doing in contrast to traditional lecture methods where students passively received information (Prince, 2004; Van De Bogart, 2009). Studies had shown that active learning in order to retain information was crucial for developing higher order thinking skills. Rote memorization and recall of knowledge were not alone sufficient for marked retention, and students engaged in analysis, synthesis, and evaluation through the use of Bloom's taxonomy were more successful in their academic careers (Bonwell & Eison, 1991). Concurrently, according to Dale's Cone of Learning, retention would not occur without

education that involved speaking, listening, reading, writing, and/or reflecting (Rahn & Moraga, 2007). Therefore, the need to address retention issues was apparent.

Another importance for developing new retention strategies came from understanding the unique needs of Generation Y students. Due to the barrage of technological advancements and different attitudes about learning than in previous generations, educators had found traditional pedagogy ineffective for student retention (Hicks, 2007). The students from this generation struggled to learn in the same ways that previous students had learned, so the importance of additional teaching methods became vital. Williams and McClure (2010) found that traditional lecture methods had failed with this generation, forcing the exploration of determining better practices for the classroom in order to increase retention rates.

Studies showed that retention issues resulted in poor student attitudes and low levels of motivation. Addressing retention issues encouraged student motivation and promoted success according to Frederick, 1993. Felder and Brent (1996) also found that not addressing retention issues crippled student motivation and created negative classroom environments. Whittington (2006) concurred in his study of business students; lack of retention went hand in hand with lower student satisfaction. When retention issues were positively addressed, classroom attitudes became more positive.

If retention issues were not addressed, students were also more likely to drop out of school and were prone to become a financial burden on society (Kumar et al., n.d.). A study completed at California-Berkeley showed that, after three years of education, students whose retention issues were actively addressed completed their education with a higher retention rate and better overall grade point average. Whereas, most of the students in the control group who received traditional instruction had a higher drop out rate (Felder & Brent, 1996). Students also

dropped out more frequently from Rochester Institute of Technology computer programming department. Instructors found that a large portion of their students were not retaining enough programming sequence information to succeed and continue in the class. Lack of retention significantly contributed to this program's poor completion rate (Whittington, 2006).

If students did in fact graduate without great cognitive retention, they still may not have been adequately prepared for college or the work world. Those who could not retain key concepts were unable to transfer learning to the real world or truly be effective when performing tasks outside of the classroom. This also held true for students moving on to college. Students who could not retain essential information were overwhelmed in college courses and required significantly more study time and assistance or resources (Meitner, Gonzales, Gandy & Maedel, 2005). Similarly, Hill, Sutanto, and Tandon (2009) found that students going into the business world were not retaining enough information from their major and were not any more prepared or competitive than non-business majors.

Poor cognitive retention also revealed itself through underdeveloped student skills in the areas of writing, thinking, and logic. Business graduate students failed to retain essential concepts to the point of lacking critical thinking skills. They could not manage employment in the current diverse, global environment (Hill et al, 2009). Van de Bogart (2009), in his study of second language acquisition, discovered that the inability to retain key vocabulary and concepts caused the students' inability to reason or express ideas accurately. Clearly, educators must transition from traditional methods to address retention issues.

CHAPTER 2

PROBLEM DOCUMENTATION

Evidence of the Problem

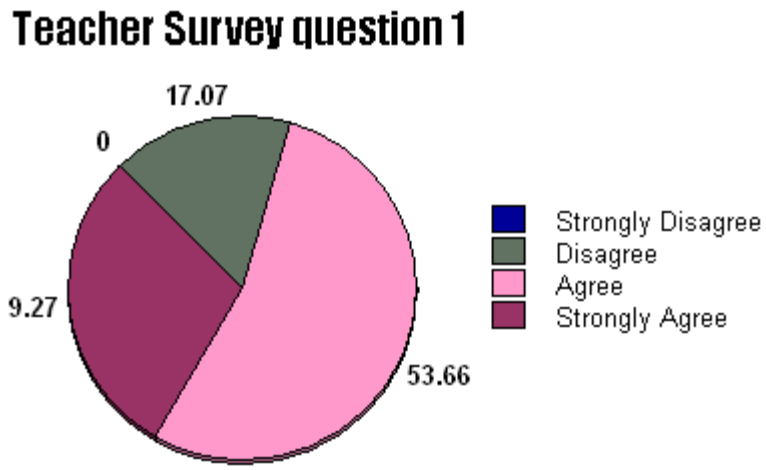
The teachers from both Schools A and B found that lack of cognitive retention among students was a serious problem. Students either did not really learn essential material well or they learned materials in a temporary manner, simply to pass assessments. As the year progressed, teachers expected students to build on materials that had been taught and remember essential concepts necessary for mastering subsequent concepts. When students did not retain core information and ideas, they were not capable of mastering many of the concepts in units that followed. The students who consistently failed to retain information found themselves struggling and even failing as the year progressed. Evidence for the problem of failure to retain essential concepts was obvious to most educators and had been identified in schools A and B through the following methods: teacher journal observations, teacher surveys, and student surveys.

The researching teachers, through journal entries, noted evidence of students who did not retain essential concepts day to day and long term. Many students were stellar actors in pretending to have learned information; therefore, there was nothing to retain. They mimicked responses of others, looked at others' answers to get similar responses, or quietly tried to go

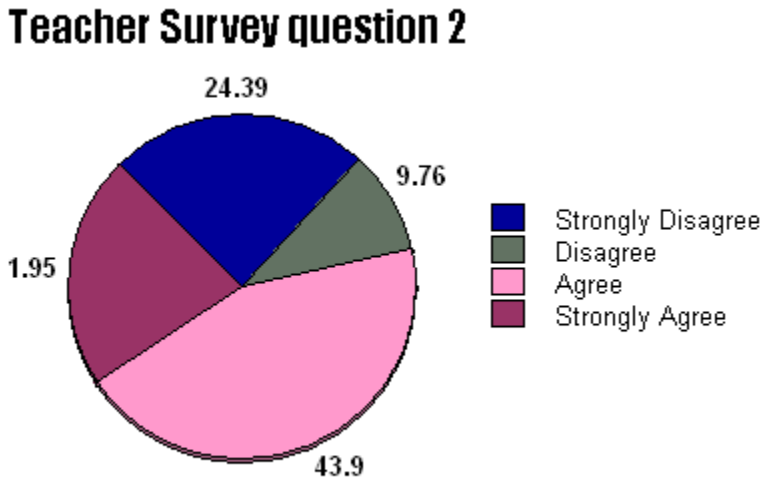
through class without the teacher discovering the lack of initial learning. If the initial learning did not take place, of course, no retention was possible. Another problem was with students who could give quick, accurate responses in class but seemed to throw away the information as quickly as they received it. One group of students, in learning vowel sounds, mimicked the letter "A" over and over while using it in various words; however, the next day, many students mispronounced the letter as if no training had taken place at all. The main problem noted by the researchers was that the way in which the students acted during the learning process directly affected the way in which they remembered at a later time. Those students who yawned and seemed tired, tried to put their heads down, appeared bored, doodled, studied wall decorations, or dreamily gazed around could usually give appropriate responses on the initial learning day, but long term, these students did not seem to have any understanding of the concepts taught. While the researching teachers noted that concept retention was a problem, other building teachers concurred.

Forty-one teachers from School A and School B completed a survey during August of 2011. Teachers determined agreement levels for 10 statements related to concept retention. The choices included strongly agree, agree, disagree, and strongly disagree for each (See Figure 1.). The most overwhelming consistency in responses occurred with the statement, "Students' attitudes toward their education make a difference in retention of concepts." Thirty-eight of the forty-one respondents marked agree or strongly agree, mostly strongly agree. Equally as compelling was the response to the following: "Concept retention is best measured through a multiple choice test." Thirty-eight answered disagree or strongly disagree, mainly strongly disagree, revealing that multiple choice testing did not necessarily best measure retention of information. Teachers also agreed that out-of-school distractions adversely affected student

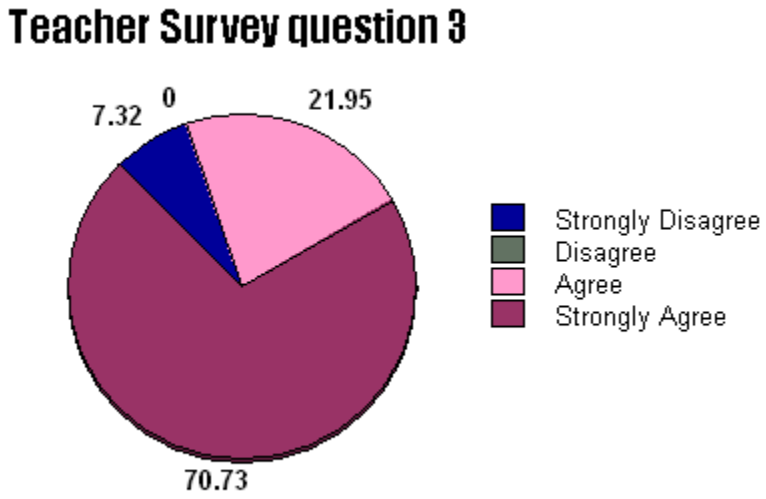
retention, while they soundly disagreed that lecture methods resulted in long term retention of concepts. Overall, the teacher surveys revealed there was a problem with retention of concepts, and numerous causes were likely contributors. Each survey question has been expressed through the pie charts.



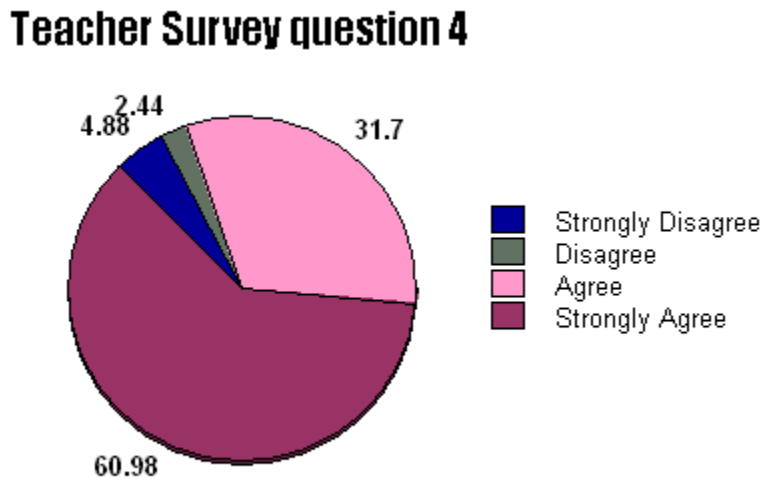
1. "Lack of parental involvement plays a significant role with my students' retention of concepts."



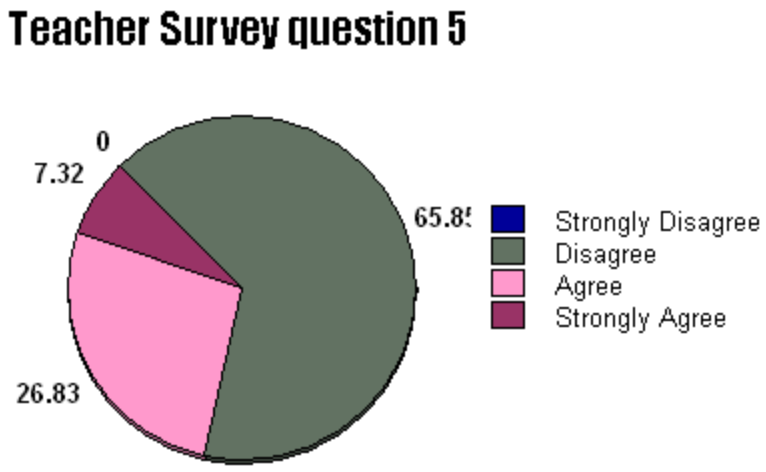
2. "My students cannot tell if this is the 100th time teaching a concept or the 1st time because my level of enthusiasm is the same."



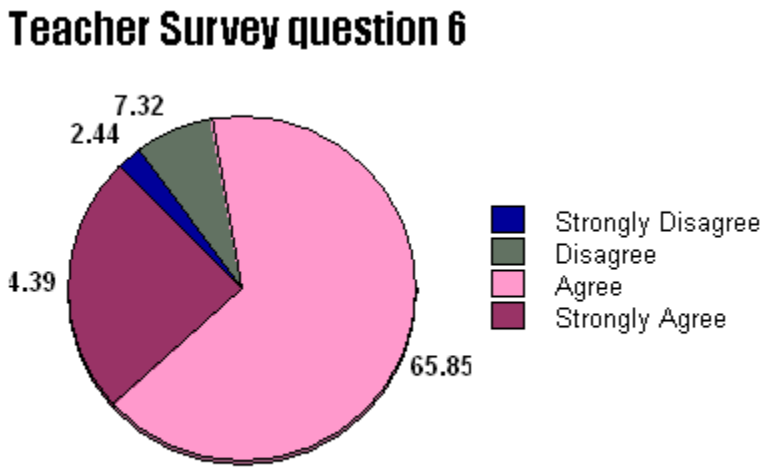
3. “Students’ attitudes toward their education make a difference in retention of concepts.”



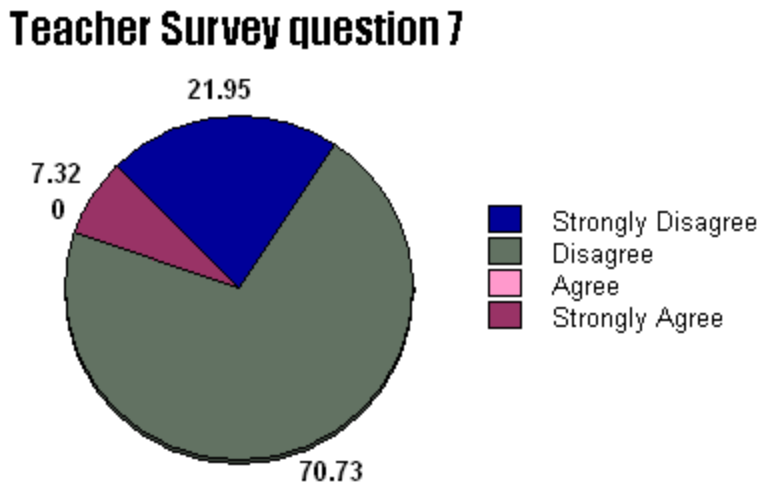
4. “There is a direct correlation between student attendance and retention.”



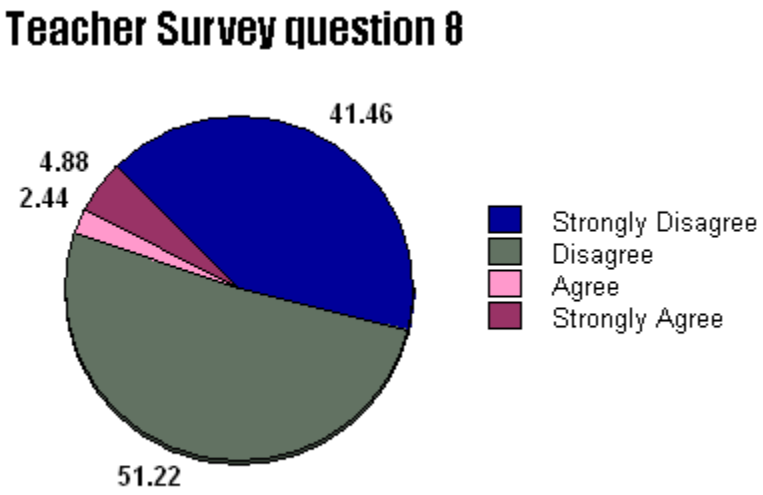
5. "Students who are labeled with a disability have a lower retention rate."



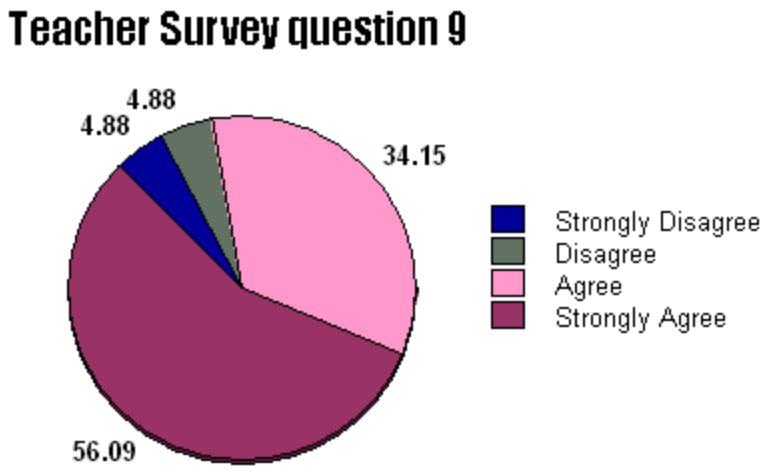
6. "A students' retention is hampered due to distractions outside of school. (Examples are extra-curricular activities, social networking, TV etc.)"



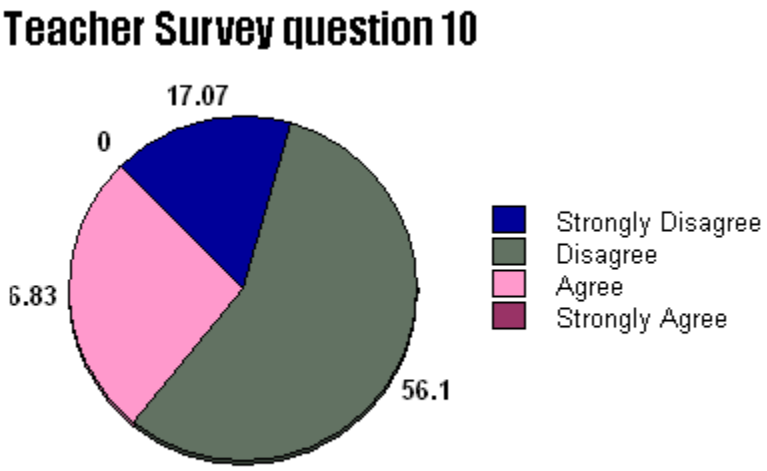
7. “Concept retention is best measured through a multiple choice test.”



8. “My students are most likely to retain information over a long period of time when my primary teaching method is lecture.”



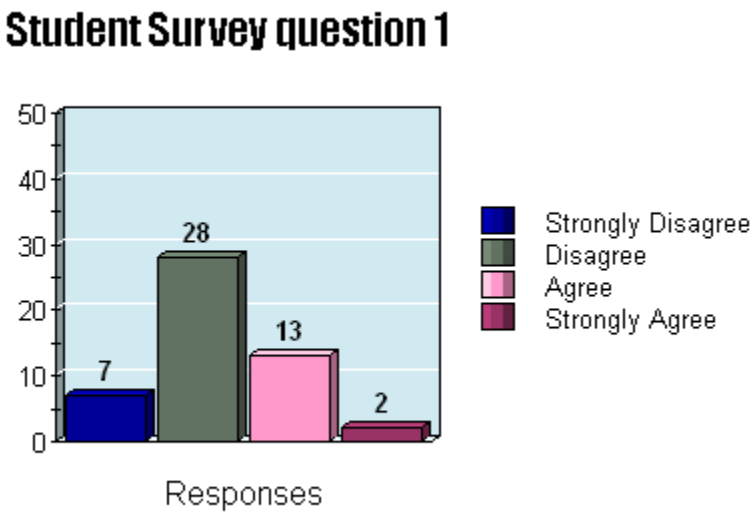
9. "Students retain information longer if they enjoy the subject being taught."



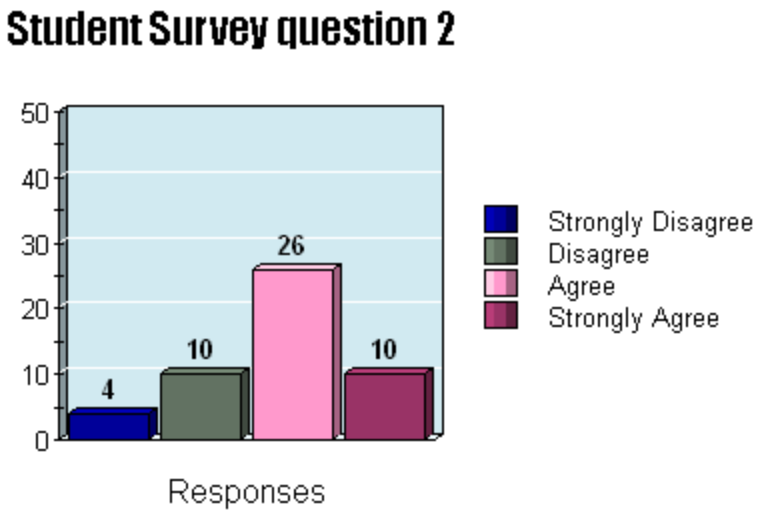
10. "If a student did not fully comprehend the concept taught, it is up to the student to get additional support to gain the knowledge because I, the teacher, must move along with the curriculum due to teaching within a specific time frame."

Figure 1. Teacher survey determining lack of cognitive retention with possible reasons

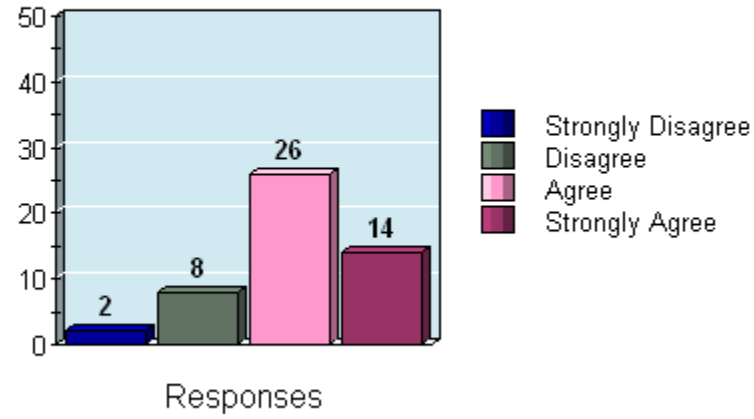
Data from student surveys were compiled to demonstrate the students' perspectives concerning cognitive retention. Fifty students from School A and School B reacted to statements by choosing strongly agree, agree, disagree, and strongly disagree for each (See *Figure 2.).* It was interesting to note the division among students when asked if a test was the best way to measure learning. While thirty students disagreed that testing showcased their learning, twenty believed that tests did reflect what they had learned. Forty-six of the fifty students agreed or strongly agreed that enjoying a class encouraged learning and retention. Also, it was noted that forty-seven students agreed or strongly agreed that their teacher's enthusiasm definitely affected their retention. Most students did agree or strongly agree that relating learning to life or something realistic also increased their ability to remember. Overall, the student survey data indicated problems with retaining information, especially when lecture was a primary teaching method, the assessment was by testing, or when the student and/or teacher lacked interest or enthusiasm for the subject matter. The following statements were used to reveal retention issues:



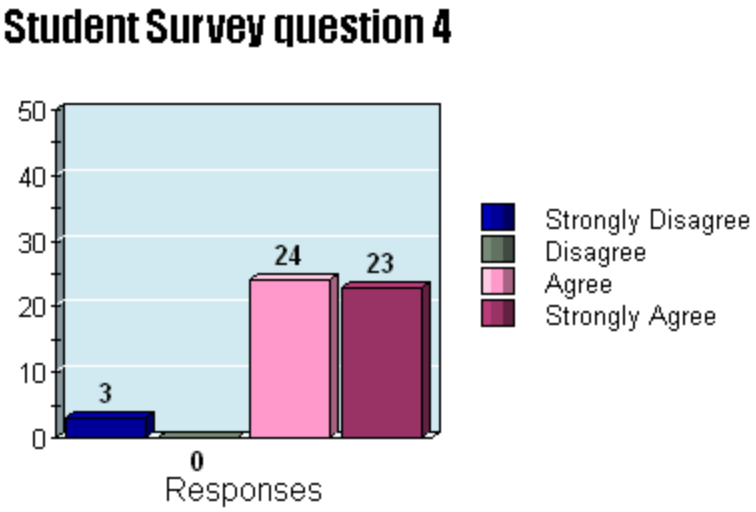
1. "I remember information best through lecture."



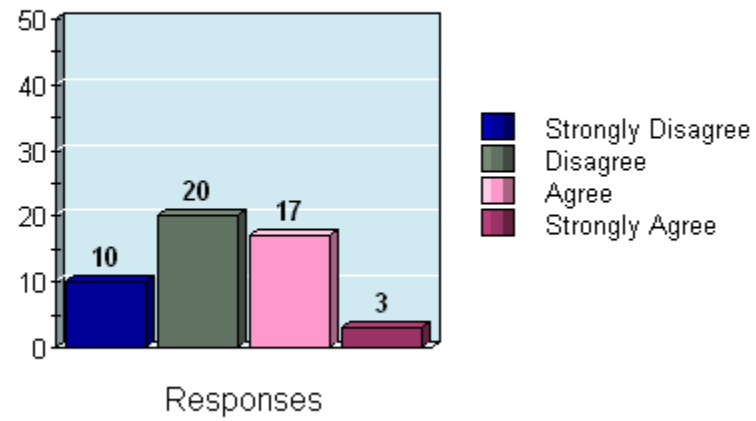
2. "I learn new information best when the teacher lectures with the use of a Power Point, map, or other visual aids."



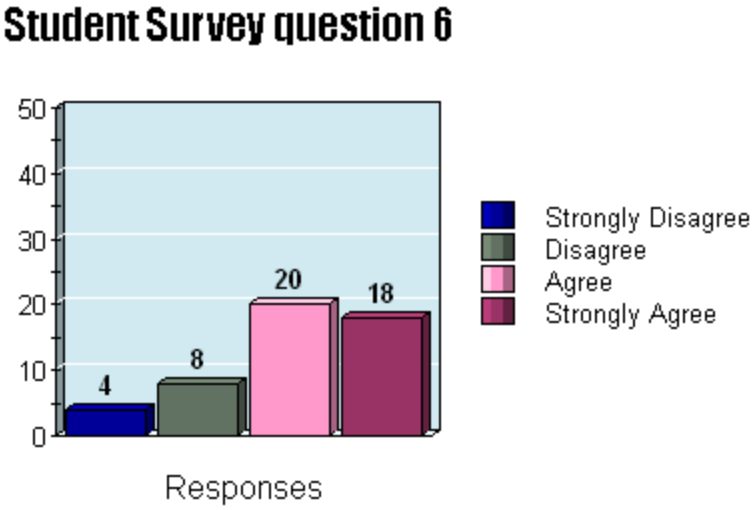
3. "I learn new information best when the teacher reviews information with the whole class."



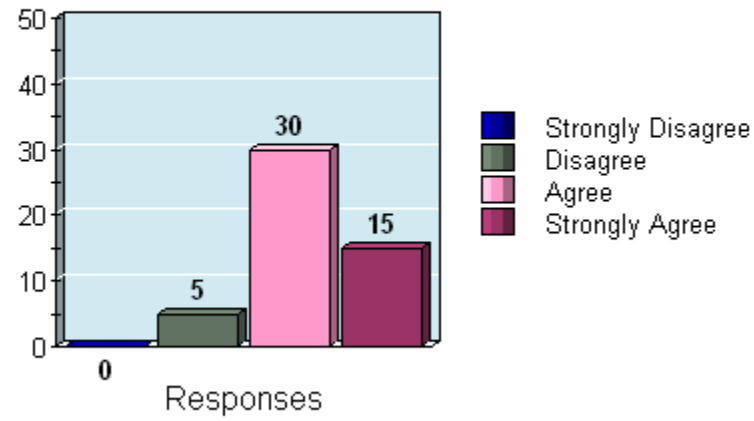
4. "I learn new information best when I get an opportunity to do a 'hands-on' project."



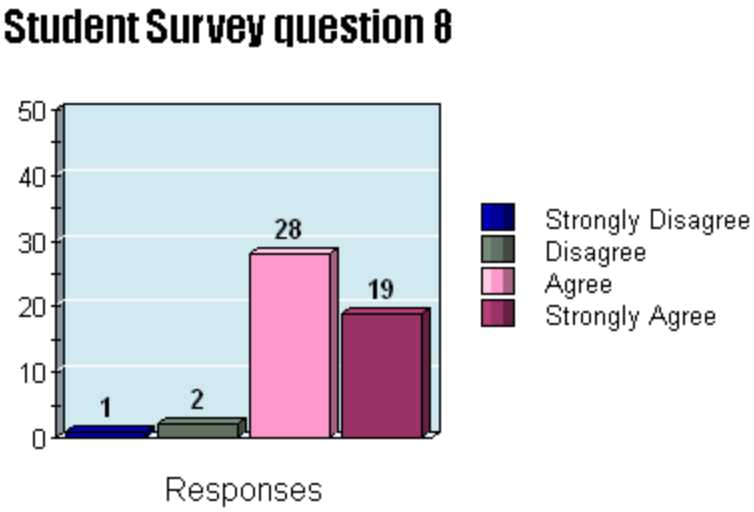
5. "A test is the best way to showcase what I have learned."



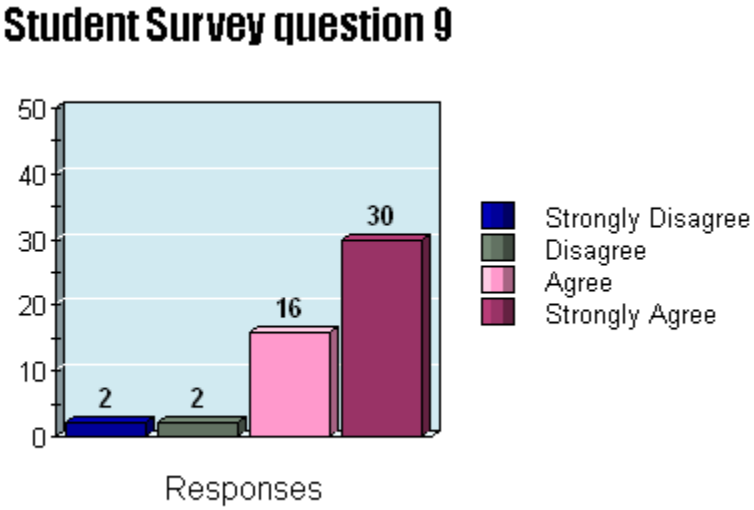
6. "A project or a presentation is the best way to showcase what I have learned."



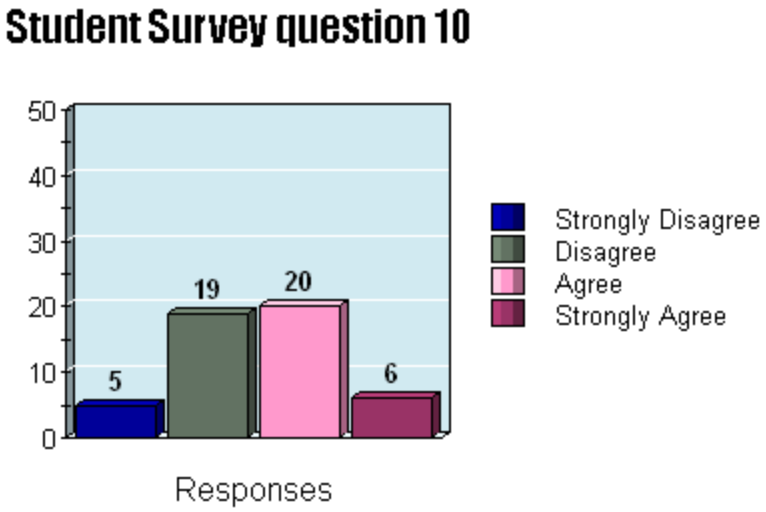
7. "I remember information best when I see a connection between the material being taught and real life."



8. "The enthusiasm of my teacher greatly affects how much I remember of the new material that is being taught."



9. "I remember new material best when I enjoy the subject being taught."



10. "My enjoyment level of a class is based more on the subject being taught rather than the instructor teaching it."

Figure 2. Student survey determining lack of cognitive retention with possible reasons

Probable Causes of the Problem

Many possible reasons existed for the issue of cognitive retention in schools today. Causes noted in the following portion of this chapter include documented reasons as well as classroom observations noted from this research team.

By analyzing the two student bodies, one prevalent issue was that of attendance. When students did not consistently attend school, they missed many pieces of information essential to understanding the unit. They were disorganized upon their return and were simply trying to catch up instead of to master materials. Students who frequently missed school frequently did not retain essential concepts. When students missed instruction, they were forced to self-teach and did not have the benefit of the classroom examples or extra practice that reinforced learning.

Another problem affecting retention was a lack of family involvement and a poor or indifferent attitude about learning and school. Students without a solid support system at a home

that valued education and monitored student progress usually failed to master and retain materials. When no one at home was questioning the student and was concerned for what occurred at school, the student did not value education and saw no need in mastering concepts.

One serious issue facing retention involved attention span, focus, and other disabilities. Students with Attention Deficit Disorder and other processing or focus issues could not retain information without significant interventions. Students may not have processed everything to begin with or may not have been capable of maintaining focus long enough to cognate the material and file it for future use. Teachers who did not insure that all students were initially learning materials well could not expect recall and application later (Lieb, 1991). Teachers who did not practice concepts long enough or have sufficient activities to insure learning also produced students who only learned for the short term (Strategies to Improve Memory, n.d.).

A constant complaint among students was that class seemed boring. A non-stimulating environment or one in which material did not seem worth remembering could be a legitimate cause for lack of cognitive retention (Myers, 2004; Beran, 1999). Lack of teacher enthusiasm over course content and the use of too much lecture as a teaching method added to retention issues. Being a passive spectator for class seriously impaired cognition (Williams & McClure, 2010).

Another problem with today's learners was the inability to apply learning to self, life, or past experiences. According to Felder and Brent (1997) and Rahn and Moraga (2007), students who did not view what was being taught as relevant to themselves or the world around them only learned material for temporary use, thus impairing long term use.

The way in which students would be tested also affected the way in which students learned or mastered the materials. Teachers who exclusively used multiple choice and true/false

assessments found that their students did not need to master the materials. They simply needed recall; therefore, long term retention could not take place (Bruno, Ongaro, and Fraser, 2007).

Another possible cause for lacking retention was having too many distracters. Over stimulation with technology and all of the technology options kept students from completely focusing on the work at hand. Without focus, students did not completely comprehend all concepts. Also, students tended to rush through their work just to get to whatever technology awaited afterword. Students were so consumed with gaming, television, texting, etc. that they did not want to work on school, or they became so involved that they lost track of time and did not have time to complete assignments. The use of technology at home affected what students expected at school as well. Students who were used to stimulation through technology did not retain as much information when faced with more traditional teaching methods.

Teachers agreed that they desired for their students to retain knowledge to become lifelong learners and as building blocks for future coursework. Causes that possibly contributed to students' failure to retain essential concepts included attendance issues, lack of positive parental involvement, and medical issues. Other evidence could be seen by way of a non-stimulating class environment, lack of relevance to the students, assessment methods, and technology.

CHAPTER 3

SOLUTION STRATEGY

Review of the Literature

A significant problem with student retention existed, and teachers were challenged to find viable solutions to combat the issue. Many experts had researched the issue of cognitive retention and proposed a variety of solutions.

One such probable solution was using technology and E-learning as a primary teaching tool. In a study by Ibrahim and Al-Shara (2007), evidence showed that the use of virtual environments and interactive tools from the computer and the Internet significantly increased retention of information. They also noted that attention span increased with the use of technology which increased basic acquisition. In a separate study, researchers found that technology-rich teaching met the needs of today's learners better by addressing the different ways in which today's students think. Integrating technology not only met the needs of the students but also increased retention of information while increasing logical thinking (Moore, Fowler, & Watson, 2007). Another way of meeting students' needs was through computer self-paced modules and web quests (Starke, n.d.). Van de Bogart (2007) even suggested that every student be equipped with a laptop computer as essential to the learning process. While technology as a primary teaching tool had proven effective and the use of technology should be encouraged, the lack of

practicality for most teachers and schools who have limited resources makes this solution not as feasible as some of the others.

Changing the way in which students are assessed is a different approach to building retention among the student population. According to a study by G.M. Slavich (2005), student behaviors, particularly the ways in which students study and pay attention, are affected by the way in which the students' grades are figured. Using traditional post-test exams that are primarily objective encouraged temporary learning, so this study proposed spending more time assessing skills, improvement, attitudes and values through more variety such as activities, projects, and writing. Slavich (2005) believed that teachers needed to completely transform their ways of thinking to be affective and to increase student knowledge retention. Moore, Fowler, and Watson (2007) agreed with this in their own study where they encouraged authentic assessments in which students performed tasks and could gauge their own strengths, weaknesses, and progress. Students worked from their own individual baselines and sought to improve. As students were more vested in showing improvement, their retention of information increased. Another way of viewing assessment was through the use of Bloom's Taxonomy of Educational Objectives and Dale Edgar's Cone of Learning. Shifting from traditional assessments to alternative assessments that test synthesis, analysis, and evaluation helped focus students on mastery and deeper thinking, thus increasing retention of the information (Rahn & Moraga, 2007). McKinney (2008), a professor at Illinois State University, concurred that changing assessment was a key factor in positively affecting retention. Developing assessments that evaluated skills and ones in which students' values were probed were more effective for student learning. McKinney encouraged student-made assessments to help with engagement and retention as well. In a unique study done at the University of Houston, students used a method

called ticket to retention. The process involved responding to and debating target questions, and later being allowed one minute to write a paper explaining the concepts and giving examples and support. This way of assessing caused students to be highly involved in class since they knew the one-minute paper would conclude the session. Most students did have increased retention through this alternative writing assessment (Divoll & Browning, 2010). It was understood that varying assessments could positively affect student retention, yet there were other solutions that researchers had proposed.

A method to increase student interest and retention that was increasingly more popular is that of connecting learning to the real world. According to Starke (n.d.), the use of real life situations in the learning environment increased student participation and retention of information. Williams and McClure (2010) found similar results as they promoted the use of popular culture through social interaction and the mass media as a way to interest and teach students. They realized that daily occurrences impacted everyone, so it would only be natural to incorporate these daily occurrences into teaching. Popular culture then acted as the tool as students used newspapers, television, movies, the Internet, and music to connect to educational topics, thereby creating more meaning to the learning process. Lieb (1991) promoted his concept that students had to see meaning or some purpose to any information given in order for that information to be retained. In a different study where teachers related life to educational concepts, business students were kept current on business and marketing news so that they could relate the classroom concepts to what was occurring in the business world. Students who participated were better able to transfer their knowledge from situation to situation, problem-solve, and recall information for future use than those traditionally taught (Hill et al., 2009). One additional study found that teachers were much more effective and students remembered material

long term when situations were not only project oriented but simulated real life projects that may need to be accomplished on the job. Teachers created convincingly real tasks for students to complete, incorporating personal, interpersonal, and community in the process (Meitner et al., 2005). There were many additional case studies proving the merits of providing relevant, real life models so that students learned more and remembered information better.

The most popular methodology for increasing student retention to date was by the use of active learning. Williams and McClure (2010) used Kolb's Model of Experiential Learning as a basis for their study. Learners experienced full involvement in the learning process thorough first experiencing something concrete, then observing and reflecting, next generalizing, and finally testing out ideas and concepts in new situations. They found that traditional lectures, even ones with slides of key information, were ineffective for long term learning. Beran (1999) tested the lowest form of active learning, active lecturing methods, where there was more interaction among students and with the teacher during the presentation of information and found this teaching choice more effective than traditional lecture methods. Another study concluded that passive learning (lecture, lecture with Power Point, and reading) lead to limited retention and interest in the subject. By focusing on the Edgar Dale's Cone of Learning, researchers saw that students who simply read, saw, or heard information retained less than half of the information presented. Seeing and hearing simultaneously in the learning process only merited approximately half of all the information. These were all deemed passive learning and were ineffective as primary means of teaching. In order to get 70% or more of all information to be retained, teachers had to move students into the active realm. Active learning included participating in discussions or leading talks, performing in a dramatic way, simulating a life experience, or actually completing a real life activity. Students had to receive information, participate during

the process, and then actually do something meaningful with the information for retention to occur. Active learning had side benefits other than just retention; learners were also more capable of higher order thinking in other situations, were better team players, were better communicators, and were more motivated with better attitudes (Felder & Brent, 1997). Another team, Nixon and Fishback (2009), chose a specific active learning technique to teach vocabulary. They used a small group approach in which students were forced to find relationships among a list of words and categorize them. Students in the study noted that they loved the activity and knew the meanings of the vocabulary long term without sitting down to memorize them. A study performed with college faculty also found active learning techniques to be quite effective in improving retention of concepts. The researchers provided the professors activities to try in their courses, such as student summaries of other students' answers, fish bowl questioning, puzzles, share and pair ideas, concept mapping, role playing, and panel discussions, among many others. Professors as well as students were pleased with the results (Paulson & Faust, n.d.). Asaro (n.d.) provided a list of strategies she had found to be effective and to promote retention. The list included guessing games, card games, a gallery walk, and choral reading. Van de Bogart's study (2009) attempted to instill a sense of self discovery in students while still maintaining rigor. He emphasized that active learning was not a teacher based system, rather student based. Many other research teams have led studies proving the merits of active learning in terms of student interest and long term cognitive retention (Rahn & Moraga, 2007; Meitner, et al., 2005; Felder & Brent, 1997; Frederick, 1993). Active learning techniques are definitely the wave in education for today.

The possible solution that best fit this research group's goal for higher cognitive retention was the last: using active learning techniques. Active learning may be defined as a method of

learning where learners are discovering, processing, and applying information in the learning process instead of passively absorbing information (McKinney, 2010). Active learning not only increased retention but it also created an environment of fun. Students would feel as though they were the center of education instead of a bystander in the process. Active learning would also help with student motivation and help to decrease disruptions in the classroom. We viewed these as important side benefits in our quest to improve retention of key concepts. Through our intervention, we varied our active learning techniques as we saw fit with our individual courses and unique student populations. We administered surveys to teachers and students to gauge the necessity and interest in using different techniques for learning. Our team journaled at least weekly, noting if we perceived that students were retaining information better through our observations and interactions with the students. Our journal also included retentive successes through quizzing the essential concepts. Our team implemented our active learning research as our primary teaching technique.

Project Objective and Process Statements

> As a result of implementing the methodologies of active learning during the period of 22 August 2011 to 31 March 2012, the targeted junior high and high school students will increase their retention of essential concepts as measured by student surveys, test and quiz results, and teacher observation journal responses.

In order to accomplish the project objectives, the following processes are necessary:

- Draft the student survey to measure student attitudes toward learning and retention.
- Draft the teacher survey to reflect their students' learning and retention.
- Develop active learning activities and strategies to meet unit objectives.
- Write journals that reflect how different active learning techniques worked, specifically in regard to retention of information or concepts.

- Develop tests and quizzes that measure student retention of important, specific concepts.

Project Action Plan

Prior to intervention (Weeks 1 and 2)

- Administer the teacher survey and survey to the targeted students.
- Collect the baseline data and assimilate it.
- Use traditional lecture methods for instruction.
- Journal the level of student engagement.
- Assess immediate retention of concepts from traditional lecture methods

Interventions (Weeks 3-16)

- Teach using active learning techniques and strategies instead of traditional lecture methods.
- Assess essential concepts at the completion of each unit.
- Re-assess essential concepts 2 weeks after original assessment to determine retention.
- Continue assessment/re-assessment format for the duration of the intervention process.
- Teachers will continue to journal weekly, noting the levels of student engagement, retention, and effectiveness of each strategy/intervention.

Post intervention (Weeks 17-18)

- Administer the initial student survey again.
- Compare the data and analyze to determine changes in student attitudes.

- Compile information from journals and reflect on the effectiveness of active learning methodologies in relation to retention.

Project Assessment Plan

One method we will use to measure the outcomes of our intervention is student surveys. The survey will gauge the attitudes of students in relation to preferred methods of learning, specifically in reference to remembering the information. Students will have only four choices on the survey: strongly agree, agree, disagree, and strongly disagree. The survey will be administered to the target group during week 1 by each teacher on the research team. The teachers will also administer the same survey during week 15. We hope that our students will value active learning strategies and benefit from the interventions implemented during weeks 3 through 16, as indicated by their survey choices. The surveys should also reveal students' attitudes concerning better retention of information.

The second method we will use to measure our outcomes is test and quiz results. Assessments will be given following the learning of essential concepts. We will re-assess key concepts approximately two weeks following and continue to re-assess throughout the entire intervention process. We will use begin assessing at the end of week 2 and continue through week 16. Results should indicate that the initial concepts during the lecture period (weeks 1 and 2) were not retained as well as the concepts during the active learning period (weeks 3-16).

We will also measure student retention through our own personal observations and log them in our journals. At least weekly, each teacher will narrate the effectiveness of the strategies and interventions in relation to student engagement and retention. Teachers' journals will be kept in weeks 1 through 16. During weeks 17 and 18, teachers will evaluate their entries for trends,

patterns, and discrepancies in order to determine the effectiveness of active learning methodologies in relation to retention.

Before beginning interventions, we will survey a sample of teachers in Schools A and B. We will individually take care of our own surveys. This will take place during week 1. After receiving the data, we will assimilate it as a research team. We hope to see a need for using different, active learning strategies for increased student cognitive retention.

CHAPTER 4

PROJECT RESULTS

Historical Description of the Intervention

Our theory asserted that active learning techniques would increase student retention of essential concepts longer than with traditional lecturing methods. We began by surveying students (See Appendix A) and teachers (See Appendix B) to identify that there was in fact a problem with students remembering important information. The teacher researchers also kept journals to document this problem. After the problem identification, the teacher researchers investigated possible solutions and chose to implement active learning techniques (in sharp contrast to traditional teaching methods) to possibly address the issue. In order to test whether or not students retained information, we chose to use four assessment questions that reflected acquisition of new material. Two weeks later, we retested with the same questions to check retention. This process continued throughout the semester. All three teacher researchers began the semester with traditional lecture methods in the classroom. After two to three weeks of this method, active learning strategies, in which students were more engaged and the teacher was not the center of instruction, were employed as our intervention. The following are the individual accounts of each teacher researcher.

Teacher Researcher A performed interventions in a junior high setting, consisting of 14 pupils from the seventh grade. Similar to Teachers B and C, Teacher A began his research using the traditional lecture method. Teacher A was somewhat surprised by how well his students retained the information two weeks after the lecture. A number of variables could contribute to these findings, for example, the skill of the orator, previous knowledge about the subject, and or the interest of the subject being taught. Teacher A did observe that during lecture, many students were not well engaged for the entire time. Teacher A reported that during lecture, students were found doodling, drawing, reading, daydreaming, and even working on homework for other classes. Teacher A also reported calling on multiple students to answer questions, and the students had no idea what question was even asked, thus indicating that they were not paying attention and were not engaged in the lesson. Teacher A also noticed that some students had heads on desk and would yawn quite often during lecture; some even mentioned how boring lecture was and how they were not learning much.

The first active learning strategy employed by Teacher A was a Jig Saw. The premise of jig sawing is for students to split up the work load and then teach the material to each other. In this activity, the students were split into five groups. Each group was assigned to read about one of the five themes of geography. Next, they had to decide as a group the most important elements in the reading. Students were then responsible to write that information on the board in note taking form. Once all groups had a chance to complete this part of the activity, students then presented the information to their classmates, one group at a time. Some pluses of this activity were that students were responsible for their own learning; students got up and were moving; they were forced to use public speaking skills; they worked as a group; and the activity was student led. Some negatives to this activity were the group dynamics led to some people not

working well with others or do as much work as others. Students were split as to whether they liked the activity or not. The activity resulted in some interesting comments from the students as a few mentioned they were not sure if they were getting the correct information from their peers. They continued by saying that when the teacher gives the information, they know it is accurate.

The second active learning strategy employed by Teacher A was interviews and presentations. Students were given directions and ten questions that they were to use to interview someone who vividly remembered the September 11 attacks. While students had a choice to tape or video record the interviews, most just wrote down the responses on paper. Once students interviewed a person of their choice, they had to put the information they obtained into a Power Point and present their information to the classroom. Teacher A reported that students enjoyed creating the Power Points and interviewing their parents, grandparents, or neighbors. Teacher A also reported that significant dialog (that might not have happened had it not been for this project) transpired between parents and students about a sensitive subject. Some other pluses to this project were that students had to work on communication, technology, and presentation skills. A negative to this project was that some students received inaccurate, biased, or racially insensitive information from their interviewee. A few students also stated they would have preferred to learn about this subject from their teacher and that they did not like doing projects. However, many students reported that they enjoyed hearing a number of different perspectives on such a sensitive but important incident.

The next active learning strategy used by Teacher A was “Stand and Share.” In this active learning strategy, students read a passage on their own and then worked with a partner to answer questions pertaining to the text they just read. After Teacher A gave students time to finish recording their answers, all students stood up. Teacher A then called on a group to give their

answer; any other student who had the same answer then sat down. Teacher A continued to call on each group until all groups were seated. The stand up and sit down sequence repeated for the remainder of the questions. Teacher A reported that the students seemed to enjoy this activity because it kept students' blood flowing and kept them engaged. The only negative to this activity was the fact that many similar answers were given.

Teacher A reported that the students really enjoyed the next active learning strategy called "True-False Sort." In this active learning strategy, the teacher put students into groups of four and then distributed 10 slips of paper in envelopes. Five of the slips of paper contained true statements and five of them contained false statements. Each group worked together to figure out which statements were true and which statements were false by sorting them into two categories on the board. The statements were numbered so students could save time by just writing the number on the board instead of the entire statement. During the same class period, the teacher went over the information. The teacher concluded by orally revealing which of the ten statements were accurate and which were not and by writing the answers on the board so students could see how their groups did. This was a great way to gauge what students knew before the lesson and also review important information at the end of a lesson. This activity also allowed the teacher to "hook" the students because they had to wait until the end of class to see if they were correct or not. Students really enjoyed this activity, commenting that it was a good way to learn, much better than from the book, and that they learned from people in their group.

Another active learning strategy was called "Question and Answer Match," a great way to end a boring, traditional lecture lesson. After the teacher lectured, each student received a slip of paper with either an answer or a question. Next, the students found the corresponding match and sat by that person. The teacher then called on a student to read the question and the other

student read the answer. Teacher A also randomly called on a third student to summarize the answer. This activity forced students to be active and take part in the class instead of just sitting at their desk the entire time.

The last active learning strategy that Teacher A incorporated was called "Written Dialect." Students read from a text and had a class discussion about the Salem Witch Trials; then the teacher assigned pairs. The pairs had to create a ten sentence dialogue that could have taken place during the Salem Witch Trials. After that, students had to act out their skit in front of the class. The students seemed to enjoy this activity; many students commented on how fun it was to create a dialogue.

Teacher Researcher B performed interventions in a High School setting. This researcher began just as Teacher Researchers A and C, using traditional lecture methods for the first unit of the school year. Lecture with Power Point while students took notes and completed worksheets to reinforce materials were typical methods. During this time, it may be noted that students, especially ones who had completed Junior High courses in the subject, were fidgety, bored, or attempting to complete other work during the class.

Teacher Researcher B began the active learning segment by changing the seating in the room from traditional rows to quads of four. Each student was assigned a partner, the student across from him/her and a group, the other three students in the quad of four desks. Frequently, students completed short tasks and were asked to pair-share or group-share. Students seemed very enthusiastic about this, and frequently the teacher heard students explaining inaccuracies to their partners/groups. Teacher B could not have individually addressed as many concerns as were addressed by allowing more advanced students to assist those who were struggling. Another way this teacher checked comprehension was by informal assessment throughout the class period.

After important concepts had been practiced, students were asked for a thumbs up (concept is understood), flat hand (concept is fairly understood but could use more practice), or thumb down (concept needs more explanation or practice). This helped direct the class toward more practice or moving on to the next concept. It also allowed the teacher to note students who would need extra help for mastery. By using alternative seating and informal assessments, students were more engaged and acted more accountable to their group and to the teacher.

A variety of teacher strategies were implemented by Teacher Researcher B during the semester to engage students actively and to promote retention of essential concepts. One of the first lessons required students to write a Pen Pal letter in Spanish. This letter was "sent" to a student in another first year class to answer. The letters used the vocabulary and grammatical structures in a concrete, fun, and realistic way. Answering the letters also created the same effect. Students were engaged, motivated, and on task as they used their Spanish to communicate.

Another method used frequently during the semester was to teach concepts normally learned through repetition by a song with motions. Students learned subject pronouns, verb conjugations, days of the week, etc. by changing the words to common songs such as "Row, row, row your boat." Most students enjoyed singing and learning. Some came in humming or singing the tune weeks later. One student even asked if he could sing to help him on the test. Teacher Researcher B considered this strategy to be not only fun but also motivating.

One common active learning strategy involved the use of note cards. Frequently, each student was given part of a sentence on a note card. Students then had to get up and find other students to complete their sentence so that the sentence made sense (vocabulary) and was grammatical. The teacher checked sentences, and those who were incorrect went back out to find new matches. Students did not seem to mind being corrected by their peers and liked moving

around the room to find their matches. Students were forced to remember vocabulary and correctly implement grammar in order to complete this activity. These sentence note cards were incorporated to teach being verbs, sentences with “have” as well as adjective descriptions.

One popular intervention involved the Smart Board. While the majority of students were working in their groups on an assignment which reinforced colors and adjective agreement, each group was called up to play a game on the Smart Board. A website was used that had a color wheel and said a random color in Spanish. Whichever student touched the color first won. Students were highly competitive and quickly learned the colors. Teacher Researcher B used this game to individually encourage every student. For weeks afterwards, students begged to play this game.

Another very successful activity involved a song about a cow with a cow picture. This activity was designed to teach clothing along with adjective/noun agreement. As students heard what the cow was wearing through the verses of the song, they drew clothing on their cows. Later, they colored in their clothing items using whatever colors appealed to them, wrote sentences with the clothing and color, and discussed these sentences in their groups. Students helped each other correct inaccuracies in agreement. The teacher rotated to facilitate group work and assist with questions. Afterwards, random students were called upon to reveal their sentences to the class while the teacher used the Smart Board to demonstrate appropriate responses. In previous years, this teacher has always had difficulty getting students to understand adjective/noun word order and adjective/noun agreement in Spanish. After this activity, almost every student used correct word order and agreement from then on.

While the above mentioned strategies were effective, many others were attempted to encourage student engagement and retention. Learning stations were used for the Mexican

Independence Day lesson. Students changed stations throughout the class period in order to read about the holiday and make an organizer of information, color a picture representing the holiday, read an actual newspaper article about the holiday and answer questions about it, have a traditional snack, and complete a word search of common holiday words and expressions. Moving to different stations helped with boredom, and students heard festive, traditional music all hour to encourage learning.

Another technique used to involve all students was the use of picture cards. Students received a picture of a scene with people in it. They had to quickly look at their vocabulary list and create sentences about the scene to state to their group or to the class. Another technique to stimulate interest in vocabulary and cause students to associate vocabulary with an action or visual was playing charades. Board race games were played for the same effects. One other project was used for alternative assessment. Students created a family poster with pictures to present to the class. They were given rubrics requiring use of almost all grammar covered for the year. All of these activities, and so many more, helped the students of Teacher Researcher B actively and enthusiastically gain and retain information.

Teacher Researcher C implemented active learning strategies in a High School special education, self-contained setting. Lecture with use of the classroom textbook supplemented with an occasional Power Point with guided cloze notes were the chosen pedagogy for the first two weeks of school. By the end of the two week unit, the students in this classroom were starting to show negative classroom learning behaviors, such as inappropriate comments and daydreaming. When called upon, students showed a lack of participation by yawning or complaining they were tired of the traditional lecture method of teaching and were ready for a change within the classroom. Strategies for active teaching paralleled with the use of a Smart Board were

implemented in the following weeks. Teacher Researcher C used a variety of learning activities with a specific focus on vocabulary strategies.

On the first vocabulary activity, students were given 14 syllables of specific vocabulary words, and they were distributed to all 12 students. Students were told that the letters were syllables and they were to make words out of the syllables. They were given one minute increments to work with the syllables, and after each additional minute another hint was given. The first hint was that the words pertained to American Government. The second hint was that each syllable that was circled was the first syllable in each word. The third hint was each syllable that had a number written on it meant that it was the last syllable of each word. The fourth hint was that the number written on the last syllable was how many syllables were in each word. The last hint given was a sheet of paper that had each word's definition and the page number where they could locate the word in their textbook. The students stayed involved and paid special attention to the one minute timer. They enjoyed being competitive amongst their peers and showed excitement while they were building the vocabulary words.

Activities involving the Smart Board were implemented as well. One of the activities that utilized the Smart Board was called "Pairs", an editable interactive matching exercise. Twelve tiles were chosen in two rows of six. A chosen student approached the Smart Board and chose one tile. When the tile was chosen, it turned around and unveiled a vocabulary word. The student tried to match the definition to the word by touching a second tile in the second row. If they matched, the tiles disappeared; if they were incorrectly paired, the tiles would turn back around. Activities that involved the Smart Board motivated the students to be more engaged. The behaviors they displayed were on-task, and they had excitement for learning in their voices.

Another active learning strategy that was used to reinforce material was called “Silent Find”. A different vocabulary word was written on twenty separate index cards. Each student drew an index card and held the card in front of them. Silently, the students were to look around at all the words and stand next to a student who was holding a card with whom they could connect their word concept. The students were then to write a sentence connecting the meaning of each pair’s words and then share their sentences with the whole class.

“Hot Seat” was another interactive vocabulary teaching strategy. A chosen student sat in the hot seat at the front of the class. A vocabulary word was written on the white board behind him/her. Each student in the audience took turns giving a one word clue that would help the person in the hot seat name the word on the white board. After the hint was given, the student in the hot seat was given an opportunity to guess the word written on the white board.

Partner Share was another strategy used for active learning. Students were organized into pairs, and they faced each other. They orally listed everything they remembered about the topic on amendments. They were instructed to take turns and that each partner may share only one idea at a time. This back-and-forth sharing continued until time was called. Unfortunately, the classroom was too noisy and it was hard for the teacher to troubleshoot; students would repeat a concept they heard from another student rather than stating their own knowledge on the topic.

During the semester, students created a game board using their knowledge gained from a jigsaw activity: how a bill becomes a law. The students were given the necessary supplies, and they had to create steps starting from an idea for a law to the idea becoming a law. They were given twenty-five squares and they had to write down sequential steps. Students could add additional creative squares, such as “go back two spaces” or “return to start”. They had to add color to their game board and at least one photo that pertained to American Government. The

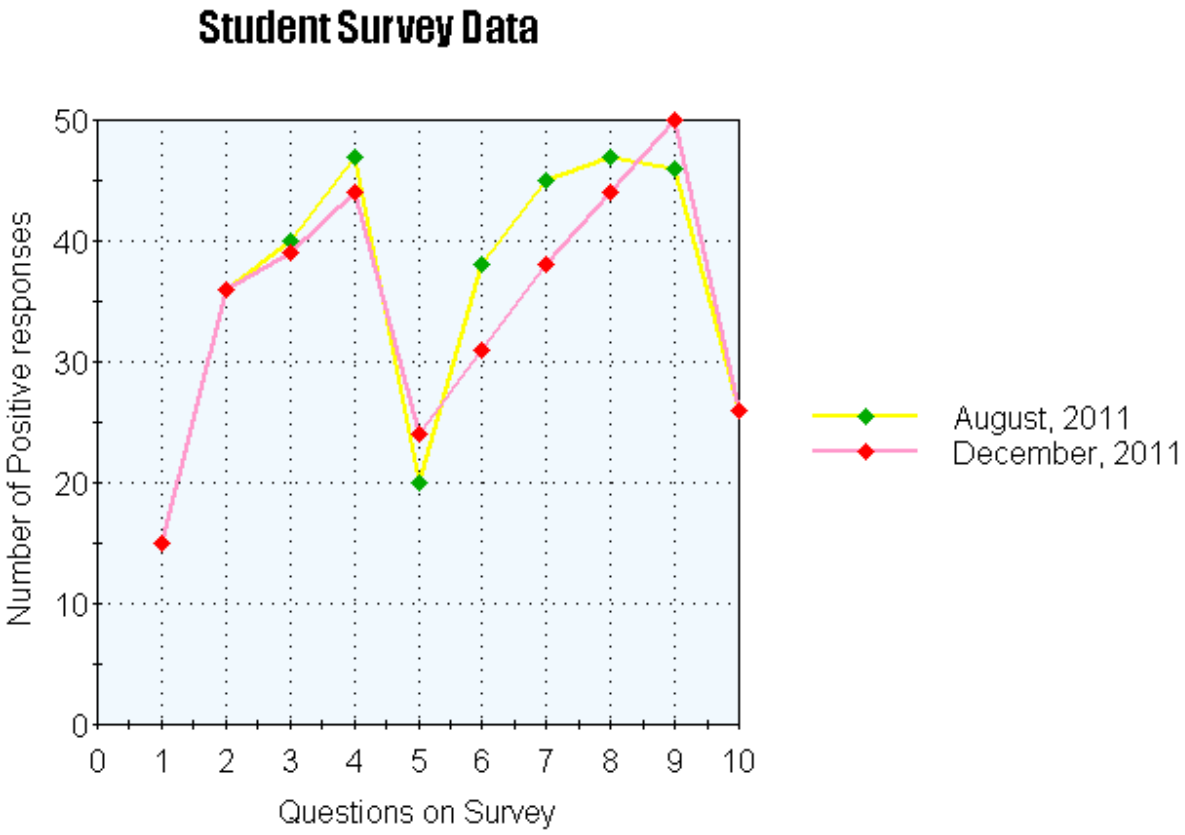
students also made their own die. The students put considerable thought and creativity into their game boards. Afterwards, students were allowed to play their own games, an activity they enjoyed very much.

Choice Boards was another active learning strategy that was implemented and assessed. Nine activities were created and labeled in a square with its corresponding learning style. For example, square one represented verbal/linguistic learning style and the activity involved the student interviewing a family member and writing about how life might play out if the Bill of Rights did not exist. Square two represented bodily/kinesthetic learning, and the student role played the signing of the Constitutional Convention in a pre-determined amount of time. Square three represented musical/rhythmic learning styles, and the student wrote a song using a familiar tune to describe the Bill of Rights. Square four represented a naturalist learning style, and the student created several scenarios of rights taken away. Square five was marked wild. Square six was visual/spatial, and the students were to create a 3D poster of a scene during the Constitutional Convention or a right that is depicted in the Bill of Rights. Square seven was interpersonal, and the students were to create a Bill of Rights for their high school. Square eight was logical, and the students were to create a timeline of events that led up to the Constitution. Square nine was labeled intrapersonal, and the student wrote about an experience they may have had when a right was taken away. The students were instructed to choose three activities in a tic-tac-toe design in a row either horizontally, vertically, or diagonally. After they identified their squares, they had the choice of which activity they would work on first, and they could choose activities that paralleled with their strengths. This activity took a lot of planning and preparedness from the instructor, but the students responded well. This activity gave the students the opportunity to participate in multiple tasks while focusing on multiple skills.

Presentation and Analysis of the Data

Three tools were used to judge the effectiveness of this research group's intervention plan: student surveys, teacher-made assessment questions, and teacher journal notes. The following provide details as to the results of each one.

Students were re-administered the identical survey that they had taken at the beginning of the semester, before any interventions had begun. Figure 3 reveals the comparative results between the initial and post responses. Question 9 showed that, while 92% of students surveyed in August believed that enjoying learning helped them remember, 98% were convinced of this fact by December. We also found that students did not change their opinions on lecture methods after being taught for a semester primarily using active learning techniques. Question 2 results maintained that the nearly the same percentage of students thought lecture with Power Point was effective (72% and 71%, respectively). One larger difference between the pre and post surveys was question 7. Students who believed that they remembered more when information related to real life declined from 90% to 75%. Students also did not favor learning through hands-on projects (Question 4); 94% of students responded positively to hands-on learning initially, while 86% thought so in the end. Question 6 revealed that fewer students also believed presentations and projects best showcased their work: 76% initially liked this method, and 61% positively responded post-intervention. Overall, most of the student survey data revealed that students had not changed their opinions on how they learned best after the active learning intervention.



1. I remember information best through lecture.
2. I learn new information best when the teacher lectures with the use of a Power Point, map, or other visual aids.
3. I learn new information best when the teacher reviews information with the whole class.
4. I learn new information best when I get an opportunity to do a "hands-on" project.
5. A test is the best way to showcase what I have learned.
6. A project or a presentation is the best way to showcase what I have learned.
7. I remember information best when I see a connection between the material being taught and real life.
8. The enthusiasm of my teacher greatly affects how much I remember of the new material that is being taught.
9. I remember new material best when I enjoy the subject being taught.
10. My enjoyment level of a class is based more on the subject being taught rather than the instructor teaching it.

Figure 3. Comparative data of initial student surveys with post-intervention student surveys

Each teacher researcher asked subject-relevant questions on a bi-weekly basis and then retested those same questions two weeks later. (See Table 1 for combined results from all three teacher researchers.) Students initially tested after being taught with traditional lecture methods, and nearly 83% of the questions were correctly answered. During retesting, this number declined to over 76%. Testing after active learning techniques garnered mixed results. Students answered between nearly 82% and 91% of the questions correctly; however, retesting results were higher than with the lecture method a range of almost 83% to 91% of the questions answered correctly. Based on these numbers, more questions were consistently answered correctly (initially) during the active learning intervention than with the traditional teaching methods. Interestingly enough, all three teachers reported increases in comprehension (based on the retention test questions) for some of the weeks.

Teacher researcher A's results were very positive from the 14 students who were researched (See Table 2). Despite all the negatives associated with the lecture technique, Teacher A only reported 84% accuracy initially with 80% retention. For the interviewing intervention, the student retention rate dropped from 80% to 68%, even though students reportedly enjoyed the project. For the Stand and Share activity, students had a retention loss from 90% to 83%. The True/False Sort activity lesson showed and actual improvement in retention, 80% up to 88%. All initial assessment questions were 80% or higher. Except for one re-assessment, the retention results were identical. In three instances, scores for retention were identical to the initial assessment scores; every student who originally learned the material also retained it. During assessment 5, this teacher's students scored significantly higher during the retention test: 80% up to 88%.

Teacher researcher B reported the following results from testing (See Table 3). Out of 25 students tested, 81% of the questions were answered correctly during the lecture unit. At the two week check, student retention for the lecture material dropped to 71% accuracy. At this point, active learning techniques replaced traditional techniques in the classroom. The first active learning assessment garnered the identical results as with the lecture: 81% accuracy; however, the retention results showed that not only had the original students retained the essential information, but that other students had also picked up this information after the initial testing: 91% was answered correctly on the retest. Results for the duration of the semester remained consistent with approximately 90% of all questions being answered correctly at initial testing with nearly the exact same rate retaining the information for the retest two weeks later. Only one unit showed a significant decrease in retention; this was the most difficult unit of the semester. Student accuracy dropped to 81%.

Teacher researcher C reported dissimilar trends for her 13 students (See Table 4). One notable exception was that the students in this class, overall, seemed to perform better with lecture methods than with the intervention, 85% correct on the initial assessment with 83% for the retention. However, one initial testing and re-assessment were scored at 100% each. Three different retention assessments showed increases from the original assessments. The overall data for the active learning interventions was remarkably similar. The initial assessment average was approximately 83% with the retention average at 81.5%.

Table 1

Initial and Retesting Assessment Comparison to Determine Retention of Information- Combined

ALL	Assessment **1**-lecture	Assessment **2** - active	Assessment **3**- active	Assessment **4**- active	Assessment **5**- active	Assessment **6**- active	Assessment **7**- active
Initial results	82.81%	81.96%	84.81%	90.58%	89.77%	88.35%	88.63%
Retest results	76.42%	87.52%	83.96%	88.69%	82.88%	91.04%	88.40%

Table 2

Initial and Retesting Assessment Comparison to Determine Retention of Information- Teacher A

A	Assessment **1**-lecture	Assessment **2** - active	Assessment **3**- active	Assessment **4**- active	Assessment **5**- active	Assessment **6**- active	Assessment **7**- active
Initial results	84%	92%	80%	90%	80%	97%	89%
Retest results	80%	92%	68%	83%	88%	97%	89%

Table 3

Initial and Retesting Assessment Comparison to Determine Retention of Information- Teacher B

B	Assessment **1**-lecture	Assessment **2** - active	Assessment **3**- active	Assessment **4**- active	Assessment **5**- active	Assessment **6**- active	Assessment **7**- active
Initial results	81%	81%	90%	86%	92%	92%	95%
Retest results	71%	91%	96%	86%	81%	95%	94%

Table 4

Initial and Retesting Assessment Comparison to Determine Retention of Information- Teacher C

C	Assessment **1**-lecture	Assessment **2** - active	Assessment **3**- active	Assessment **4**- active	Assessment **5**- active	Assessment **6**- active	Assessment **7**- active
Initial results	85%	73%	80%	100%	96%	72%	76%
Retest results	83%	76%	78%	100%	81%	77%	77%

All three teacher researchers wrote weekly journal entries describing the types of interventions tried as well as the levels of success for each one. The traditional lecture method period evoked behaviors signifying boredom: the tendency to place heads down, gazing distractedly around, doodling on paper, etc. Students were also more likely to complain, state they did not like the subject, or act in inappropriate ways during this time. Students could answer questions on days of initial instruction but many seemed clueless on subsequent days. Students' attitudes and behaviors were noticeably different once active learning strategies began. Students' levels of engagement seemed increased as noted by attentive faces, cooperative spirits, and laughter with smiles. Student discipline problems decreased to a minimum. The teacher researchers noted in their journals that most students were able to respond positively during informal assessment checks and that students seemed able to use the newly acquired material at later dates. Students also frequently assisted other students during the intervention period, and students habitually asked questions of their classmates.

Conclusions and Recommendations

After completing a semester of interventions using active learning techniques, our first conclusion is that student engagement and motivation for learning significantly increased. The teacher researchers reported fewer behavioral issues with more focus on the activities and less on the grumbling about the actual material. Although more preparation was necessary for the instructor for some of the strategies, lessons flowed more smoothly and learning followed suit. With students actively involved in the process, teachers were allowed the privilege of "seeing" learning take place. A higher percentage of students were required to participate in each lesson and seemed, for the most part, to do so willingly. Students definitely exhibited more on-task behaviors and displayed more positive attitudes than with traditional lecture methods.

The teacher researchers also concluded increases in student retention of essential concepts through active learning strategies, though only moderate gains were made in comparison to the traditional lecture methods. While in some weeks, we reported significant gains, others showed losses. We consider these gains as successful, however, because any gains made across the board move students to higher achievement.

Another conclusion drawn by the teacher researchers was that active learning strategies were very cost effective. Teachers created materials through the use of the already installed Smart boards, white boards, index cards, envelopes, markers, and the use of the copy machine. Most materials were readily available in the classroom. Neither the students, the teachers, nor the school district was required to purchase costly programs or supplies. The "cost" was in teacher preparation time. Time, though, was not exorbitant, especially considering that the materials could be reused the following year.

A final conclusion was that student views did not significantly change from before to after the intervention, concerning their opinions about retention of information. Most students already recognized their preferred methods of learning according to the survey. Overall, lecture methods were not as successful as active learning methods in retaining information, according to the students. Students reported to us that the active learning techniques we employed were favorable and that they desired continuation of similar methods.

In continuing with active learning technique research, the teacher researchers definitely recommend using active learning strategies in their classrooms. The modest gains in retention were beneficial toward increased student achievement; this alone would be enough reason to continue. Increased motivation and decreased behavioral issues were significant side benefits to active learning.

A second recommendation would be to allow ample time for preparation of each strategy and to make use of the summer to create materials ahead of time. Being adequately prepared would allow for more enjoyment of the lesson by the teacher and, more importantly, more time for reflection and adaptation of lessons throughout the year. Teacher researchers should immediately modify or at least make notes for future modification so that lessons may be used in the future with little to no preparation.

Based on the results of this intervention, we recommend that others attempting to reproduce this research should continue to use the two week testing method and keep careful track of which strategies garnered more positive results. We found using four questions to retest was manageable; however, more caution in ensuring that all four questions actually revealed learning of core concepts may be necessary.

Finally, we recommend compiling a teacher portfolio of each learning strategy. This would be a permanent reference for the teacher who created it and for other teachers in the building. The portfolio would include a description of each activity with a template for creating materials. Also suggested would be ideas for improvement, modifications, and teacher or student reflections.

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Appendix A

Student SURVEY

Choose the answer that best reflects your attitude about each statement. Write the letter of your choice on each line.

_____ 1. I remember information best through lecture.
a. strongly disagree b. disagree c. agree d. strongly agree

_____ 2. I learn new information best when the teacher lectures with the use of a Power Point, map, or other visual aids.
a. strongly disagree b. disagree c. agree d. strongly agree

_____ 3. I learn new information best when the teacher reviews information with the whole class.
a. strongly disagree b. disagree c. agree d. strongly agree

_____ 4. I learn new information best when I get an opportunity to do a "hands-on" project.
a. strongly disagree b. disagree c. agree d. strongly agree

_____ 5. A test is the best way to showcase what I have learned.
a. strongly disagree b. disagree c. agree d. strongly agree

_____ 6. A project or a presentation is the best way to showcase what I have learned.
a. strongly disagree b. disagree c. agree d. strongly agree

_____ 7. I remember information best when I see a connection between the material being taught and real life.
a. strongly disagree b. disagree c. agree d. strongly agree

_____ 8. The enthusiasm of my teacher greatly affects how much I remember of the new material that is being taught.
a. strongly disagree b. disagree c. agree d. strongly agree

_____ 9. I remember new material best when I enjoy the subject being taught.
a. strongly disagree b. disagree c. agree d. strongly agree

_____ 10. My enjoyment level of a class is based more on the subject being taught rather than the instructor teaching it.
a. strongly disagree b. disagree c. agree d. strongly agree

Appendix B

Teacher SURVEY

Choose the answer that best reflects your attitude about each statement. Write the letter of your choice on each line.

_____ 1. Lack of parental involvement plays a significant role with my students' retention of concepts.
a. strongly disagree b. disagree c. agree d. strongly agree

_____ 2. My students cannot tell if this is the 100th time teaching a concept or the 1st time because my level of enthusiasm is the same.
a. strongly disagree b. disagree c. agree d. strongly agree

_____ 3. Students' attitudes toward their education make a difference in retention of concepts.
b. strongly disagree b. disagree c. agree d. strongly agree

_____ 4. There is a direct correlation between student attendance and retention.
a. strongly disagree b. disagree c. agree d. strongly agree

_____ 5. Students who are labeled with a disability have a lower retention rate.
a. strongly disagree b. disagree c. agree d. strongly agree

_____ 6. A student's retention is hampered due to distractions outside of school. (Examples are extra-curricular activities, social networking, TV etc.)
a. strongly disagree b. disagree c. agree d. strongly agree

_____ 7. Concept retention is best measured through a multiple choice test.
a. strongly disagree b. disagree c. agree d. strongly agree

_____ 8. My students are most likely to retain information over a long period of time when my primary teaching method is lecture.
a. strongly disagree b. disagree c. agree d. strongly agree

_____ 9. Students retain information longer if they enjoy the subject being taught.
a. strongly disagree b. disagree c. agree d. strongly agree

_____ 10. If a student did not fully comprehend the concept taught, it is up to the student to get additional support to gain the knowledge because I, the teacher, must move along with the curriculum due to teaching within a specific time frame.
a. strongly disagree b. disagree c. agree d. strongly agree