2020

Teaching for Long-Term Retention: Best Practices

Kai E. Thietje
Bethel University

TEACHING FOR LONG-TERM RETENTION:

BEST PRACTICES

A MASTER'S THESIS

SUBMITTED TO THE FACULTY

OF BETHEL UNIVERSITY

BY

KAI THIETJE

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS

FOR THE DEGREE OF

MASTER OF ARTS

MAY 2020

BETHEL UNIVERSITY

TEACHING FOR LONG TERM RETENTION:

BEST PRACTICE

Kai Thietje

March 2020

APPROVED

Advisor: Louise Wilson, PhD

Second Reader: JoEllen Ambrose JD

Program Director: Molly Wickam PhD

Abstract

The author of this thesis has often walked away from conversations with adults with the feeling that those adults do not remember some of the content learned in school in Social Studies subjects such as History and Geography. For this reason, the author has concluded that the study of teaching methods that have a likelihood of resulting in long-term retention has particular relevance to the content area of Social Studies. The literature review seeks to answer the following question: What are the proven strategies of teaching content that are most likely to result in long-term retention of learned material? Additionally, the application emphasis will be based on the findings of the literature review and serve as a series of best practices for teaching with long-term retention in mind.

Table of Contents

CHAPTER I: INTRODUCTION

Rationale for Thesis

There has been an ongoing trend in the American education system, that many adults struggle to remember concepts that were learned in Social Studies courses such as Geography, History and Civics. This phenomenon is so prevalent in U.S. society that late night talk show hosts such as Jay Leno and Jimmy Kimmel have included segments in their shows in which Americans are selected at random to answer Social Studies questions. Most adults struggle to answer any questions correctly, while children seem to perform considerably better. While this phenomenon may be considered entertaining, it compels one to pose the question as to why many social studies concepts are not retained into adulthood.

Socialstudies.org explains that Social Studies courses such as Civics, Geography and History are taught in our schools in an effort to enable students to understand, participate in, and make informed decisions about their world. Considering this objective of teaching Social Studies courses, it is important that students retain these learned concepts to be utilized in life as adults. "Students cannot apply what they understand if they don't remember it" (Klemm, 2007, p. 61). For this reason pointed out by Klemm, an important goal of Social Studies teachers, as well as teachers of any subject, should be for their students to retain learned concepts in the long-term. The position of this thesis is that there is not enough emphasis in secondary education on student long-term retention, and furthermore

that there are certain teaching methods that are better suited to long-term retention than others.

As a teacher of Social Studies at the high school level, the author is always seeking ways to ensure that students not only learn but also retain the concepts being taught. Taking into consideration factors such as teaching methods, assessment methods, connection to previously learned material, as well as the frequency of reviewing previously learned material is important. While teachers can assess the short-term retention of learned concepts by their students, the challenge all teachers face is assessing how effective instructional methods are at creating long-term retention. A 9th grade World History teacher can only assess the retention of content taught to students during the school year that they are in that course. Additionally, the State of Minnesota does not require students to complete a Social Studies standardized test such as Fastbridge, or MCA. For these reasons, it is necessary to rely on academic research to study and form an understanding of teaching methods that are best for teaching with long-term retention in mind. This thesis sets out to compare the results of studies by academic professionals and create a best practice to follow for teachers who intend to teach with the goal of long-term retention in mind.

It has been suggested that one factor contributing to poor retention of learned concepts in the Social Studies is related to common teaching methods and strategies used. The traditional approach to teaching social studies has been one

that involves memorization of names, dates, and locations etc. The education community has generally moved away from this teaching approach in recent history, in favor of teaching themes or trends that can be observed in the material being taught. The general consensus is that this approach has had positive results. This thesis seeks to explore additional methods, strategies, and approaches to teaching that have been shown to have positive results on long-term retention of learned concepts.

It has also been said by some that Social Studies concepts are not remembered by many adults due to the fact that these concepts are not used regularly as some aspects of mathematics, and language arts, which are. If this is in fact a factor as to why many adults struggle to recall learned Social Studies concepts, it causes one to question if in the absence of frequent use, can learned information be retained long-term?

As a Social Studies teacher, this author has had reason to question if the state of Minnesota has de-emphasized the importance of teaching Social Studies courses in our schools. Standardized exams that are aimed at measuring student progress and achievement are not required of students on a reoccurring basis across several grade levels, as they are in other subjects. This makes it difficult for Social Studies teachers to assess the retention of what they have taught. If the Social Studies are not considered as important as other content areas by the Department of Education, it causes one to wonder what has contributed to this conclusion. One can not help

but wonder if the previously mentioned phenomenon in which many adults do not recall what they learned in these courses has contributed to the Social Studies being de-emphasized in schools.

Is it a worth-while pursuit to examine this phenomenon in which many adults often do not remember Social Studies concepts that they learned in school? Should long-term retention of learned material be a priority for teachers? "Education has become a critical political and social issue in virtually every industrialized country because it is increasingly clear that an educated populace is the backbone of any program of national defense, a key indicator of future economic health, and essential to the future of every country on our planet" (Halpern & Hakel, 2002, p. 3). This quote sheds light on the importance of retention of learned material. It is the belief of the author, as well as the belief of many education experts, that if the concepts we teach are important enough that they should be taught, then it is equally as important that they should be remembered.

This literature review is focused on identifying and exploring teaching methods and strategies that have been deemed successful in improving or achieving long-term retention of learned facts and concepts. The application emphasis will include a series of lesson plans that are based on the findings of the literature review, and serve as a best practice for teachers who are teaching with long-term retention in mind.

Definition of terms

Consolidation effect - "taking a test immediately after learning will lead to better retention of the material at a later date, as evidenced on a delayed retention test, even when no corrective feedback is provided and when no further study of the material has taken place (Nungester & Duchastel, 1982, p. 18).

Desirable difficulties - difficulties in the learning process that create better learning outcomes because they utilize generative or active learning rather than recall or passive learning (Usman, 2016, p. 360).

Generative learning - learning in which the student tries to solve a problem without first being taught how to do so. The term generative learning is applied because in this method, the student generates the answer rather than recalls the answer (Usman, 2016, p. 380).

Inferential question - question that is not explicitly answered by the text, but can be worked out by combining existing knowledge with clues in the text (Butler, 2010, p. 1118).

Long-term retention - as it will be used in this paper refers to learned facts and concepts that are retained into adulthood, rather than being forgotten shortly after being taught.

Over learning – continued study, even after mastery of a practice has been accomplished once (Rohrer, Pashler & Cepeda, 2007, p. 183).

Retrieval practice - the retrieval of the information from memory rather than the

additional exposure to the information (Roediger & Butler, 2011, p. 20-21).

Self-regulated learner – one who has "learned how to learn" from their own experiences (Usman, 2016, p. 389).

Structure building - "the act, as we encounter new material, of extracting the salient ideas, and constructing coherent mental frameworks" (Usman, 2016, p. 355).

Testing effect - occurs when adding tests to one's learning regimen benefits retention more than including a comparable amount of additional studying, particularly when the initial testing involves recall" (Toppino & Cohen, 2009, p 253).

Guiding Questions

As teachers embark on creating curriculum that is intended to not only be learned, but also retained, the following questions need to be addressed:

- Are there methods of teaching that are more likely to result in long-term retention of the concepts being taught?
- If so, what are the proven strategies of teaching content that are most likely to result in long-term retention of learned material?

Answers to these questions can be beneficial to the many teachers who would like to place emphasis on long-term retention of the concepts they teach. It is the hope of the author that this thesis, and the application emphasis contained within will play a role in both the acknowledgement of the need for teaching for long-term

retention in the Social Studies as well as the solution. While some research has been completed on what leads to long-term retention, there is a need for a comprehensive guideline of best practices that teachers can use to increase likelihood of long-term retention of learned material by their students.

CHAPTER II: LITERATURE REVIEW

Best Practices for Long Term Retention

This chapter will focus on research and studies that are designed to compare teaching methods and practices in order to identify which are best suited to producing long-term retention of learned facts and concepts. This chapter will also focus on identifying teaching methods that have been tested and shown to result in long-term retention. The chapter will be broken into three main sections:

1. Instructional Methods
2. Self-Study, Assigned Reading and Homework
3. Testing and Assessment

Each section will identify and explore research aimed at teaching toward long-term retention that is relevant to the topic of that section.

Instructional Methods

When considering how best to teach with long-term retention in mind, the first aspect that most teachers will consider is the instructional methods that they should utilize. In secondary teaching, methods have evolved greatly over the years. Many teachers have moved away from a lecture format in favor of teaching methods that are considered more engaging and require more student participation. Doucet, Vrins & Harvey (2009) set out to test the effectiveness of an audience response system in promoting an active learning environment, motivation, and long-term

retention. The characteristics associated with an active learning environment included interaction, focused feedback and student engagement. In this study, one test group was asked open-ended questions during class, and student participation was voluntary. In the other test group, an audience response system was used to poll students' individual responses with multiple-choice rather than open-ended questions. The results of this study showed that the group in which the audience response system was utilized provided an active learning environment, favored engagement, increased student and teacher motivation, was informative to teachers, and significantly improved final exam results. On the other hand, this study did not demonstrate benefits in terms of long-term retention, as a post-test administered one year after the learning unit showed no significant difference between groups. This is an important piece of research to consider, as active learning methods such as having students create a poster or timeline, complete a graphic organizer, or participate in a Socratic seminar have become more common in the classroom. While this research identifies important benefits of this instructional method, long-term retention is not one of them. (Doucet, Vrins & Harvey, 2009, p. 570).

According to Usman (2016), cognitive science supports four teaching approaches that must be considered when teaching toward long-term retention. The first assertion made by Usman is that making learning difficult is optimal for long-term retention of information and skills (Usman, 2016, p. 357). Usman further explains that asking students to solve problems even before teaching them how to

do so is optimal for long-term retention (Usman, 2016, p. 360). Usman expands upon this by explaining the term generative learning which is described as learning in which the student tries to solve a problem without first being taught how to do so. The term generative learning is applied because in this method, the student generates the answer rather than recalls the answer (Usman, 2016, p. 360). The general idea with generative learning is that effort necessary to generate the answer or solution rather than simply recall it is what creates the long-term learning (Usman, 2016, p. 361).

Problem-based learning (a popular term in modern education) is an instructional approach which can be described as teaching in which students are first presented with a problem and then supported while they learn by solving it. While the term problem-based learning puts more emphasis on connecting new knowledge to old knowledge, it is closely related to the concept of generative learning. The key to making these types of learning manageable for students is that they have supports to rely on through the process. In Social Studies for instance, students would have access to text-books or handouts that they can utilize to discover the answers to questions or solutions to problems that they need to solve. UCLA researchers Elizabeth and Robert Bjork (in Usman, 2016) have even coined the term "desirable difficulties" in reference to difficulties in the learning process that create better learning outcomes because they utilize generative or active learning rather than recall or passive learning (Usman, 2016, p. 362).

Usman's second assertion is that teaching to a student's learning style (preference to learn visually, auditorily, or kinesthetically) may not be important, but that how a student builds mental models is of great importance and may have a significant effect on long-term retention (Usman, 2016, p. 357). This is a surprising assertion, as "learning style" has been a significant buzz word in education in recent years, and many teachers have bought into the concept of teaching to a student's "learning style". Usman further asserts that learning style theories are contradictory and that they have not been scientifically proven to increase learning (Usman, 2016, p. 357). Usman focuses on structure building which is described as "the act, as we encounter new material, of extracting the salient ideas, and constructing coherent mental frameworks" (Usman, 2016, p. 363). Usman introduces terms such as "high structure builders" who are better at learning new material, and "low structure builders" who struggle with learning new information because they struggle to disregard unimportant information and therefore try to hang on to too much information (Usman, 2016, p. 363). A related concept is the idea that students are generally either "rule learners" or "example learners." "Rule learners are able to abstract the "rules" or underlying principles when studying an example, whereas example learners are more apt to memorize the example itself" Usman explains (Usman, 2016, p. 363). Those that are example learners may be more challenged as the example may not have as much relevance to the problem at hand, whereas the underlying rules would. These theories show relevance to the idea that teaching students certain learning techniques may be more beneficial than

teaching to certain learning styles (Usman, 2016, p. 363).

Usman's third assertion is that practice that is repetitive and focused is not ideal, and that practice that is varied and interspersed with other material is ideal for learning (Usman, 2016, p. 357). Usman discusses the phrase "practice makes perfect" that we have all heard as children in reference to how we master a certain skill. This generally accepted principle has merit, as we have all experienced improvement of skills due to practice. It can be argued that skills or activities that are intended to be utilized constantly in life such as tying one's shoes or keyboarding do benefit from repetition, as they become automatic. Most concepts and skills taught in secondary education, however will not benefit from this, as they will not be utilized enough to become automatic. Usman introduces the term "massed practice" which can be described as learning sessions that are long and intense as opposed to distributed practice which uses shorter or less intense sessions. Usman goes on to explain that cognitive science regarding long-term learning suggests that massed practice may result in short-term gains but is not the best practice for long-term retention (Usman, 2016, p. 365). At the heart of this concept is the theory that it takes time for the brain to connect newly learned material to existing knowledge and therefore from short term memory to long-term memory. Research shows that the forgetting that takes place between practice sessions is actually useful in generating long-term memory. Essentially, spaced practice results in retrieving forgotten information which strengthens recall for the

next time the information is recalled (Usman, 2016, p. 365-366).

Usman's fourth assertion is that mindset and character have a greater impact on learning than we may think (Usman, 2016, p. 370). Usman describes being able to learn from both successes and mistakes as being a key to long-term learning. Some educational psychologists have used the term self-regulated learner to describe people who have 'learned how to learn" from their own experiences. Self-regulated learning includes three important steps including forethought, the implementation phase, and reflection. Forethought will include understanding the assignment, setting goals, and creating plans for achieving those goals. The implementation phase will include tasks like focusing attention on the task. The reflection phase will include reflecting on how effective the learning process was (Usman, 2016, p. 371). What is interesting about the idea of self-regulated learners, is that based on the description, we can see how mindset may play a role in how self-regulated one can become. For instance, if we explore the concepts of "fixed or growth mindset," we can recognize that with a fixed mindset one is unlikely to put much stock in the process of reflection as a means for improvement and therefore is unlikely to master self-regulated learning. While a student with a growth mindset may believe that there is a lesson to be learned from reflection on an experience that can be implemented toward future success, a student with a fixed mindset is more likely to believe that reflection on an experience will have no impact on future outcomes.

An additional aspect of mindset is the thought that the fear of failure can stifle ones' willingness to experiment or take risks necessary to achieve success (Usman, 2016, p. 374). This is of course an interesting factor to consider, in that Usman states that "being able to learn from both successes and mistakes is a key to long-term learning" (Usman, 2016, p. 370). If this is accurate, then as teachers, we must consider that not all students have become self-regulated learners. The presence or absence of this skill by a student could be a determining factor in how they learn, and therefore what they will retain. This research could be an indication that students who are self-regulated learners will better learn and retain the content they are taught than those who are not self-regulated learners regardless of the teaching method. Usman discusses three steps involved in self-generated learning: (Usman, 2016, p. 370-371).

- forethought – understanding the assignment, setting goals, creating plans to achieve those goals
- implementation phase – focusing on the task, implementing and monitoring the effectiveness of the strategy
- reflection – looking back on and evaluating the effectiveness of the approach and implications on future tasks.

Teachers with an interest in self-regulated learning should consider writing lesson plans that involve these three steps.

Another fascinating study focused on instructional methods pertaining to teaching vocabulary. An important aspect of teaching in secondary education in particular is content area literacy. This is a significant area of emphasis currently in secondary education, as the belief is that each content area will have extensive vocabulary that may be otherwise unfamiliar to students yet must be learned. Many teachers include a list of vocabulary terms for each learning unit either on their white board or in a unit handout, and students can fill out definitions as they proceed through the unit. Some of these vocabulary terms will appear on the unit exam, and this approach seems to be successful in students recalling the definition or appropriate use of the term on the unit exam.

Vocabulary, however, has the potential to be exactly the type of content taught in class that is not retained in the long-term. Sovreen (2013) identified this issue when she was a student. Her teacher used the familiar method of teaching vocabulary described above, and Sovreen remembered the vocabulary terms long enough to pass a unit exam but did not retain their meanings in the long-term. As a result, Sovreen (2013) set out to develop a better approach to teaching vocabulary that would result in long-term retention. She developed a method that gave the students anywhere from 11-15 exposures to the vocabulary terms over the course of 20 days, while only dedicating 5 -10 minutes of class time to vocabulary daily. The approach included an initial assessment, oral preview, and a cycle of review alternating students' comprehension of both definition and usage. The vocabulary

terms would then appear on a unit vocabulary quiz (Sovreen, 2013, p. 116-119).

This approach to teaching vocabulary was tested across 4 high schools and a total of 369 students. Not only did the study show improvement by participating students on unit exams, but students also completed a quiz three months after the learning unit to assess their retention. Students averaged a 71% on the retention quiz which is a significant improvement over the 21% average taken just 31 days after a learning unit in which this teaching approach was not utilized (Sovreen, 2013, p. 116-119). This study is important in demonstrating that frequent exposure to a certain concept or fact can have a lasting impact in terms of retention even when the exposures have not occurred for several months upon the date of assessing the retention.

In the 1990's the National Science Foundation proposed a movement away from teacher-centered to what they described as student-centered teaching. Many educators in the field of chemistry rose to the challenge of developing a new teaching method. From this came a teaching method called Process-Oriented Guided-Inquiry Learning (POGIL) (Vanags, Pammer & Brinker, 2013, p.230 & 240). The POGIL approach requires students to work in small teams with the instructor acting as a facilitator. POGIL.org explains that the outcomes that the POGIL approach aims for include: effective communication, management skills, teamwork, critical thinking, problem solving, assessment, and effective feedback. A unique aspect of the POGIL approach is that the instructor does not specify exactly how the

project or assignment should be carried out. The effectiveness of the POGIL approach has been tested extensively against traditional methods. The majority of these studies have shown improved learning outcomes when the POGIL approach is utilized (POGIL 2019).

Vanags, Pammer & Brinker (2013) set out to evaluate how the POGIL approach might affect long-term retention. The researchers conducted a study consisting of 354 first-year undergraduate Psychology students. The researchers hypothesized that the POGIL group would demonstrate better long-term retention than in the groups in which traditional teaching methods were used. There were a few surprises, the POGIL group scored lower than other groups at posttest (immediately after the lesson). While all groups scored lower on the follow up test (2 weeks after the lesson) the POGIL group showed the smallest drop in knowledge. What is most compelling about this study is it shows that what appears to be a good teaching method for short-term retention, may not be a good teaching method for long-term retention. Another important conclusion of this study was the assertion that due to the approach taken in the POGIL group, students lacked confirmation from the teacher that the knowledge they had constructed was valid, and that this held back long-term retention (Vanags, Pammer & Brinker, 2013, p.230 & 240). If this is accurate, and the POGIL approach actually stifled student confidence in what they learned due to a lack of teacher-centered instruction and therefore long-term retention, it would appear the POGIL approach is not ideal when teaching toward

long-term retention.

In a related study, Lysne & Miller (2017) intended to measure knowledge retention amongst community college students between two teaching approaches, lecture and active. In the active approach students were expected to acquire information on their own, explore examples, and engage in activities. The active approach utilized in this study bares some similarity to some of the approaches used in the POGIL approach to teaching mentioned above. The results of this study were however inconsistent with the POGIL study. There was no significant difference in the results of the first posttest (given immediately after the lesson), however students in the active learning group scored slightly higher. The second post-test (given 5 months after the lesson) also shows no significant difference in scores between the two teaching methods, however the lecture group actually scored slightly higher. It is interesting that the measure of a similar teaching approach showed opposite results in terms of short and long-term retention, though results of the study by Lysne & Miller (2017) were not significant (Lysne & Miller, 2017, p. 100-104) When the results of the Vanags, Pammer & Brinker (2013) study are considered relative to the results of the Lysne & Miller (2017) study, it is clear that there is no consensus as to the effectiveness of active learning approaches (which POGIL would be considered) and additional research is needed.

Self-Study, Assigned Reading and Homework

When exploring how to best achieve long-term retention of learned facts and

concepts within students, we must also examine methods used outside of the classroom such as self-study, assigned reading and homework. These methods have been considered important components of teaching for many years. This section will explore what role these out of the classroom teaching components may have in achieving long-term retention.

Self-study.

As a teacher, it is important to consider how our students study for quizzes, and exams, and whether there are methods that we can suggest to our students with long-term retention in mind. We have all heard the term practice makes perfect as it applies to mastering a certain practice or concept. Traditional teaching strategy suggests that continued study, even after mastery of a practice has been accomplished once, is the way to continue to improve performance. Rohrer & Pasher refer to this approach as overlearning in their 2007 study (Rohrer & Pashler, 2007, p. 183).

Most students and even teachers have come to believe that overlearning (the continuation of study after the student has achieved one performance that is error-free) is the best way to prepare for an exam, as many people have experienced success on exams with this very method. While this method of overlearning is generally accepted for short-term retention such as a test or exam, the question this author seeks to answer is whether this method is also beneficial for long-term learning and retention. In a 2005 experiment by Rohrer, Taylor, Pashler, Wixted, &

Cepeda, results showed that while overlearning showed good gains in performance on tests taken after 1 week, those gains were almost undetectable at 4 weeks. In the same study, adequate learning (study in which the student can recall each correct response without prompting from text or notes at least once) showed lower gains comparatively at week 1, however with not near as steep a decline by week 4. This research would indicate that while overlearning is beneficial in the short term, it may not be the best policy for long-term retention (Rohrer, Taylor, Pashler, Wixted & Cepeda, 2005, p. 1). The findings in this study are also consistent with the assertions made by Usman that cognitive science regarding long-term learning suggests that massed practice results in short-term gains but is not the best practice for long-term retention (Usman, 2016, p. 365).

Yet another question regarding self-study pertains to the spacing of study sessions, as well as the time between study and test, and the interval that is best for long-term learning and retention. While the results of Rohrer, Pashler & Cepeda's (2007) study are complex, they have said that generally longer gaps between study sessions as well as between study sessions and tests, have produced better retention results than shorter gaps (Rohrer, Pashler & Cepeda, 2007, p. 185).

Assigned reading.

Requiring students to read textbooks has long been considered an important component of a well-rounded education. The school of thought being that the student will go into the classroom in which a topic is taught with a familiarity of the

basics of that topic. An important distinction that teachers must however understand when assigning reading is the difference between memorizing and learning. Of course the goal for all teachers is for their students to learn the material, however if we are not diligent in the approach taken to assigned reading, it may for some students result in memorizing, but not learning (Kintsch, 1994, p. 294). Kintsch describes learning as requiring a deep understanding of the subject matter so that the content acquired can be used productively while memorizing merely requires a shallower understanding, or ability to recount what was read (Kintsch, 1994, p. 294). Learning that produces deep understanding can result from many of the methods discussed in this thesis, however the recall of something read word for word from a text is simply the use of memory, and does not require a deep understanding of what was committed to memory.

When assigning reading, it is also important to consider the order in which the reading assignment should take in place in relation to in-class instruction. It has been widely accepted that background knowledge is important for comprehension and memory of a text. What may play an important role in a student's comprehension and therefore retention of what was read in a textbook depends on relative familiarity with the concepts within (Kintsch, 1994, p. 297). For this reason, a teacher must decide what constitutes background knowledge, and how best to ensure each student has sufficient background knowledge prior to reading the text. At a minimum it would probably be beneficial to provide a brief overview to a

student in the form of an anticipatory set, so that students approach the text reading with a basic knowledge of the key topics.

Homework.

As a secondary teacher, it has been hard to ignore the ongoing debate in recent years as to whether homework is an effective learning tool. While there are clearly teachers, and even schools/districts that have established policies either enforcing or prohibiting homework, it is important to examine whether homework plays a role in long-term retention. This section will seek to answer, first, whether homework has been shown to play a role in the long-term retention of learned facts and concepts, and second, what types of homework or strategies involving when homework is assigned/feedback given may benefit long-term retention.

While there is not a great deal of research that has been done regarding homework and long-term retention, there have been some interesting studies that are worthy of mention. In a 2012 study, students who reported spending 60 minutes or less on homework daily scored 1.8-2.2 points higher on standardized tests than their peers who reported doing no homework daily (Maltese, Tai & Fan, 2012, p. 61). Additionally, students who reported doing 61 to 120 minutes of homework each day scored 2.9-3.0 points higher than their peers who reported doing no homework daily (Maltese, Tai & Fan, 2012, p. 61). While this does not prove that homework leads to long-term retention, it is a compelling indication that homework may be beneficial in standardized testing, which depends on long-term

memory.

In a 2018 study, retention of concepts covered in class, and then again through homework, were measured by a semester-end summative assessment. (Cadaret & Yates, 2018, p. 308-309). The results of this study showed that summative assessment scores were generally higher in instances of homework being assigned five days rather than one day after the topic was taught in class (Cadaret & Yates, 2018, p. 308-309). The theory expressed at the conclusion of this research is that the longer duration of time between class and homework made completion of the assignment more difficult which is a benefit to knowledge retention (desirable difficulties). The idea here being that due to the fact that the homework was completed after some forgetting had taken place, that the completion of the assignment was more challenging, and the more challenging an assignment is, the more impactful, and memorable it becomes. This would be an example of a desirable difficulty (difficulties in the learning process that create better learning outcomes because they utilize generative or active learning rather than recall or passive learning) discussed earlier (Usman, 2016, p. 362).

Many teachers tend to be busy, and it can take some time to grade assignments and assessments and return them to the student with substantive feedback. It has long been thought that feedback given to a student sooner rather than later will have a more positive effect on their learning and perhaps retention. This comes from the thought that a correct or incorrect response to an assigned

question will take root in memory, and the sooner it is confirmed as correct or incorrect, the better the chance of correct recall in the future. A fair amount of research has been done in recent years that has set out to test whether the timing of feedback has any correlation on learning and long-term retention. There is a growing body of research that challenges the previously accepted thought that feedback received by students sooner is more beneficial to their learning and long-term retention. In a 2007 study by Butler, Karpicke, and Roediger, the timing of feedback on multiple choice tests was measured. Results indicated that delayed feedback led to superior final test scores when compared to immediate feedback (Butler, Karpicke & Roediger, 2007, p. 273). In a 2010 study by Smith and Kimball, they concluded that the timing of feedback actually depends on the number of correct responses. In students who are expected to have a large proportion of errors, it would be beneficial to deliver feedback as soon as possible. For students in which the expected number of errors is relatively low, they concluded that delayed feedback would be more beneficial (Smith & Kimball, 2010, p. 38).

Testing and Assessment

One aspect of teaching and learning that must be taken into consideration when teaching with long-term retention in mind is testing and assessment. Just as the way that material is taught plays a role in long-term retention, so does the way we test on that material. While we have traditionally thought of tests as a method of measuring learning, there is a growing body of research that demonstrates that tests

themselves are learning events (Halamish & Bjork, 2011, p. 801). "Tests as learning events, can enhance subsequent recall more than do additional study opportunities, even without feedback" (Halamish & Bjork, 2011, p. 801). Another fascinating area of study regarding testing, is the effectiveness of practice testing versus restudy. In a study by Nungester and Duchastel, (1982) for example, "participants studied a history passage and then restudied the passage, took a test on the passage, or engaged in an unrelated activity. In a final test administered 2 weeks later, participants in the test group outperformed participants in the other two groups" (Nungester & Duchastel, 1982, p.18). This same study acknowledges a phenomenon called the consolidation effect which is describes as follows: "taking a test immediately after learning will lead to better retention of the material at a later date, as evidenced on a delayed retention test, even when no corrective feedback is provided and when no further study of the material has taken place (Nungester & Duchastel, 1982, p. 18).

In a related article, the term testing effect is used. "The testing effect occurs when adding tests to one's learning regimen benefits retention more than including a comparable amount of additional studying, particularly when the initial testing involves recall" (Toppino & Cohen, 2009, p. 253). This phenomenon of the testing effect could have great potential for improving long-term retention in education if teachers can balance the appropriate testing methods, and frequency.

In a 2006 study, Roediger and Karpicke studied the testing effect with

positive results. "Both experiments showed the same pattern: Immediate testing after reading a prose passage promoted better long-term retention than repeatedly studying the passage" (Roediger & Karpicke, 2006, p. 253). This study was important in establishing that the testing effect is not simply a result of students gaining re-exposure to the material during testing because restudying also allowed students to re-experience the material, but produced poor long-term retention. While it is not known why repeated testing produces better retention than repeated study, it appears that the process of responding to a question from memory produces better retention than simply viewing the correct answer in a text or notes. The results of this study reinforce the theory that teaching designed to result in long-term retention would benefit from frequent testing of the same material with perhaps increasing weight on the students' grade with each additional test. To make this process of frequent testing less cumbersome for the student, unit lesson plans could be designed with two to three brief quizzes with revised questions of differing formats and concluding with a unit exam. This way the student does not feel as though they are answering the exact same questions in the exact same format every time. To maximize student buy-in, ideally this should be done in such a way that does not feel overly repetitive for the student.

In a 2010 study by Butler, he explores the concept of test-enhanced learning and whether it produces superior transfer of learning relative to repeated study. While this study did produce results indicating that repeated testing led to better

transfer of learning than repeated study, it did go a few steps further. Not only did testing of the same material produce better results with repeated testing, but superior transfer of learning occurred with new inferential questions (questions that are not explicitly answered by the text, but can be worked out by combining existing knowledge with clues in the text) within the same knowledge domain as well as new inferential questions within different knowledge domains. This study was important in establishing that test-enhanced learning is not limited to retention of repeated testing of the exact same material (Butler, 2010, p. 1118).

In a later study by Roediger & Butler (2011), they discuss the concept of retrieval practice and how it plays a role in explaining the previously observed phenomenon that re-testing produces better retention results than re-studying. In this study they explain that it is the retrieval of the information from memory rather than the additional exposure to the information that actually enhances and reinforces the ability to recall that information in the future. In other words, the act of retrieving content from memory for the purposes of responding to a test question produces better retention than the act of viewing the content in text or notes. This theory was tested with compelling results showing that students who utilized retrieval several times outperformed students who utilized retrieval only once and studied several times by about double on a final test. The indication is that it is the actual retrieval (recall from memory) that causes the enhanced retention, while restudy is less effective because it lacks the retrieval practice. Retrieval practice

can be employed by short answer, fill in the blank, essay, or even filling out a graphic organizer or poster, as they all require retrieval of the information from memory. This study helps us to understand the value of retrieval in comparison to study (Roediger & Butler, 2011, p. 20-21).

A related 2013 study by Larsen, Butler, and Roediger measured learning of forty-seven first year medical students through several differentiated learning sessions including those with self-generated explanations, testing without explanations, and review sheets with and without explanations. This study concluded once again that repeated testing resulted in better long-term retention than repeated study. This study also concluded that in addition to testing, the generation of self-explanations should be used to produce superior long-term retention (Larsen, Butler & Roediger, 2013, p. 674). Of course, medical students engage in real world applications or residencies during which they work in clinics and hospitals, which could have an impact on the results. The presence of this real-world application was however consistent across all students across all testing groups, as to not create an inconsistency in the data.

An important study that took place in Sweden in 2014, compared the results of repeated testing across different testing formats (Stenlund, Sundstrom & Jonsson, 2016, p. 1). This study was beneficial to this area of study because it contrasted short and long-term retention through both multiple choice and short answer testing. The study reinforced previous research in that both test formats showed

the testing effect when compared to rereading alone. The study went on to show that "an initial short answer test produced greater gains over time than an initial multiple choice test, especially when the delayed tests were presented in short answer format" (Stenlund, Sundstrom & Jonsson, 2016, p. 16). The short answer questions that were used required brief responses of a brief sentence or two. This format requires retrieval, as the student must generate the answer from memory rather than choose it from multiple-choice. The confirmation that short answer testing shows greater long-term retention than multiple choice testing tells us that the retrieval process plays a role in retention. This study plays a significant role in establishing not only that repeated testing can have a positive impact on long-term retention, but also that short answer testing has been shown to produce stronger long-term retention than multiple choice testing. Multiple choice testing has been a common testing format for many secondary Social Studies teachers for several decades due to the relative ease of grading and providing feedback with this format. This groundbreaking research may be an identifier of testing format being a contributing factor to poor long-term retention in Social Studies education.

A related 2008 study addressed some ways to minimize the negative effects of multiple-choice testing. This study acknowledges that multiple-choice exams come with the risk of misinformation in the form of students recalling incorrect responses. Butler & Roediger (2008) go on to conclude that a reasonable solution to the possible negative effects of multiple-choice tests is to ensure that students

always receive substantive feedback that identifies the correct answer and briefly explains why the response given was incorrect after testing (Butler & Roediger, 2008, p. 604).

A related study published in 2003 set out to actively measure the rate of forgetting when comparing repeated study to repeated testing (Wheeler, Ewers & Buonanno, 2003, p. 571). The results of this study were fascinating in that a short term interval of 5 minutes (between study and testing) actually produced a greater rate of remembering whereas both long-term intervals of 48 hours and 7 days produced a lower rate of remembering in the repeated study condition, and greater rate of remembering in the repeated testing condition. While forgetting did occur at each of the intervals tested, it occurred at a much greater rate in instances of repeated study than repeated testing (Wheeler, Ewers & Buonanno, 2003, p. 574, 576). Considering the findings of this study, it becomes evident that the way most teachers teach is consistent with the methods used in this study that produced short term rather than long-term retention. These studies have shown us that by making some adjustments to testing frequency, and testing format, teachers can better teach for long-term retention and memory.

Another important aspect of long-term retention and memory of learned material deals with the age of the student, and therefore the capacity of certain age groups to recall events. "For much of the period of history of cognitive and developmental science, it was widely assumed that infants and very young children

were unable to form memories of specific events that would endure and be accessible over time" (Bauer, Wenner, Dropik, & Wewerka, 2003, p. 1). This phenomenon has been referred to as infantile or childhood amnesia. There have been many explanations as to why childhood amnesia occurs. Piaget, for example explained that "cognitive structures change qualitatively over time. After the change, children are thought capable of forming memories of specific events of or episodes that they later are able to recall" (Bauer, Wenner, Dropik, & Wewerka, 2003, p. 2). "Freud suggested that childhood amnesia exists because adults failed to reconstruct or translate these fragments into a coherent narrative (Bauer, Wenner, Dropik, & Wewerka, 2003, p. 2).

While there are many theories as to why childhood amnesia occurs, there is consensus that the phenomenon is real, and that children do gradually develop greater recall ability as they age. This has implications for teachers of young children as it asserts that memory recall is developing as these students are learning. For this reason, elementary teachers who aim to teach for long-term retention would want to be familiar with this phenomenon, as well as how students in this developmental phase learn best. With all of this being considered, teaching at the elementary level that relies heavily on non-verbal memory recall early on, and transitions more heavily to verbal recall oriented teaching would be in line with teaching toward long-term retention. Nonverbal recall refers to a students' ability to demonstrate memory of something in ways other than speaking such as acting

out an event or scene. The key here is to be aware learners at any age learn differently and some may be able to express new learning or memories better through movements, gestures, or visuals rather than language (Bauer, Wenner, Dropik, & Wewerka, 2003, p. 2).

This is relevant to testing and assessment because the teacher who is teaching young children will want to pay close attention to the assessment and testing methods they use. Teachers who aim to accurately assess the recall and comprehension of younger students may want to consider an assessment that relies on acting out or some type of non-verbal presenting of the learned material.

Summary

In summary, there are some compelling consistencies and take-aways from the Literature Review. In response to the first guiding question, the answer is yes, there are several studies reviewed in this thesis that demonstrate teaching techniques that produce superior retention in comparison to others. In response to the second guiding question as to what the strategies are that have been proven to produce superior long-term retention, they are highlighted below.

The first compelling take-away is the similar concepts of generative learning, desirable difficulties, active learning and the avoidance of overlearning. The overwhelming commonality amongst these approaches to teaching is that learning that is active or challenging, or requires generation of the answer rather than simple

recall of something the student read, is more impactful, and memorable, thus creating greater retention (Usman, 2016, p. 362) (Usman, 2016, p. 365-366) (Rohrer & Pashler, 2007, p. 183) (Rohrer, Taylor, Pashler, Wixted & Cepeda, 2005, p.1).

Another compelling take-away is the importance of measuring and assessing learning as opposed to memorizing within our students. This could be a key in understanding why some adults struggle to retain concepts that they learned in Social Studies. There was a time when the Social Studies was taught in a way that required memorization of names and dates. Not enough emphasis was put on identifying themes and understanding of the significance of those names and dates and important events. Assignments and assessments that measure a students ability to understand themes in history as well as 'why' an event was important have the potential to last in a students memory. A name or date that was memorized without understanding its importance will likely not last in the long-term memory of a student (Kintsch, 1994, p. 294).

Another significant take-away of the literature review is the consistency of acknowledgement that assessments and tests are not simply a method of measuring student learning, but also learning events. The consensus among researchers was overwhelming in regard to the belief that the methods and approaches taken to testing and assessment can have an effect on long-term retention (Halamish & Bjork, 2011, p. 801) (Nungester & Duchastel, 1982, p.18) (Toppino & Cohen, 2009, p. 253) (Roediger & Karpicke, 2006, p.253) (Roediger & Butler, 2011, p. 20-21) (Larsen,

Butler & Roediger, 2013, p. 674) (Stenlund, Sundstrom & Jonsson, 2016, p. 16) (Butler & Roediger, 2008, p. 604) (Wheeler, Ewers & Buonanno, 2003, p. 574, 576) (Bauer, Wenner, Dropik, & Wewerka, 2003, p. 2).

This summary section highlights the three important themes that reoccurred throughout the literature review chapter:

- Teaching using active or generative learning
- The promotion of learning rather than memorization
- The acknowledgement of assessments as learning events

Several approaches to executing methods of teaching that embrace these themes will be explored in the lesson plans included in the application section of this thesis.

CHAPTER III: APPLICATION OF THE RESEARCH

Evidence-based Rationale

The lesson plans contained in this Application of the Research and included as examples in the Appendix are intended to be a template for teaching for long-term retention based upon the research discussed in the literature review. Each of the teaching approaches, methods and strategies in the lesson plans are labeled with references to the literature in which it was discussed in the literature review. While there are some teaching methods in the lesson plans that were not based upon research or theories discussed in the literature review, the majority of methods utilized in the lesson plan are based upon content in the literature review. Based upon the content reviewed in the literature review, the author believes that the lesson plan contained within this Application of Research is a good representation of best practices for teaching toward long-term retention.

Explanation of the Project

The lesson plans contained in this Application of the Research were created with the findings of the literature in mind. Many of the approaches, methods, and strategies discussed in the literature review are executed in the lesson plans in this section to serve as an example of how they may be utilized. There are seven lesson plans below that together make up an entire learning unit on the Cold War which is covered in the World History course. Teachers who would like to attempt some of

the best practices for long-term retention discussed in this thesis can use this lesson plan when teaching World History. Those teachers teaching other courses can simply base their own lessons on the approaches, methods, and strategies contained within these lessons.

Details about the Audience

The lesson plans contained within this application of the research are intended to be used by any teacher who would like to practice teaching toward long-term retention. The author envisions this thesis and the lesson plans contained within as being one resource in an ongoing dialogue between teachers, and researchers who seek to address the steps that can be taken to achieve long-term retention of the material taught to students. While this thesis has identified some best practices for teaching for long-term retention, other teachers are invited to utilize, revise, and improve upon what has been written, but most importantly share what they learn about teaching for long-term retention. While the author has expressed the observation of long-term retention seeming to be lacking in the Social Studies, the author does not feel that this should be a conversation exclusively for Social Studies teachers. All teachers who would like to employ strategies for teaching for long-term retention are invited to participate in this dialogue regardless of their content area.

Resources needed

To utilize the lesson plans included in this action emphasis, there is no noticeable cost in doing so. The materials utilized within these lesson plans utilize common teaching resources such as textbooks, computer, projector, PowerPoint, YouTube, Handouts etc. These are all resources that most teachers should have easy access to. The lesson plans contained in this application emphasis are intended to be used (or the methods within them rewritten into other lessons) by teachers who would like to try some methods of teaching for long-term retention. Aside from taking the time to understand the approaches and methods and incorporate them into lessons, there ae no barriers to utilizing these, or similar lesson plans.

Sustainability

The teaching approaches and methods included in the lesson plan, have been utilized by the author, and all have shown some degree of success in terms of improving student retention. However, those methods are intended to be tested and revised as teachers see fit. Teachers are encouraged to gradually include some of the teaching methods from the lesson plans over time, and track student scores on end of term/year summative assessments to assess their effectiveness. For this project to truly have a lasting impact, it will require open dialogue and participation from participants who believe there is a need for teaching toward long-term retention and are willing to play a role in being a part of the solution. The author invites other teachers to use, revise, and improve upon what has been written, but

most importantly share what they learn about teaching for long-term retention. Teachers with a passion for long-term retention are invited to contact the author and have conversation about their observations and experiences. Additionally, the author intends to create a Facebook page relating to teaching for long-term retention. This page is envisioned as a resource in which teachers with passion in this area can share ideas, have conversations and collectively contribute more best-practices for teaching toward long-term retention.

Sample Lesson Plans Designed for Long-Term Retention

Lesson Plan Day 1

Teacher: Kai Thietje

Subject Area: World History

Grade Level: 9th Grade

Unit Title: The Cold War

Lesson Title: Origins of the Cold War

Materials/Resources Needed: Text-book, PowerPoint

Time: 48 minutes

General Instructional Objective:

Students will be able to explain how the end of World War II influenced the Cold War.

Specific Learner Outcomes:

Students will be able to:

1. Describe the differing ideologies of the Soviet Union and the U.S.A.
2. Describe how the superpowers divided Germany and the city of Berlin

3. Describe the United Nations
4. Explain the “Iron Curtain”
5. Identify and describe the Satellite Nations of the Cold War
6. Explain the Truman Doctrine and the Marshall Plan
7. Describe NATO and why it was created

Language Objectives:

Language Objectives:	**Vocabulary:**
(Great verbs for writing language objectives: view, hear, speak, write, listen, read, list, tell, discuss, journal, record, persuade, debate, draft) SWBAT: 1. Debate with a classmate the differing ideologies of the Soviet Union and the U.S.A. and which you feel was better 2. Describe how the superpowers divided Germany and the city of Berlin 3. Describe the purpose of the United Nations 4. Tell a classmate your understanding of the term “Iron Curtain” 5. Identify and describe the Satellite Nations of the Cold War as well as the purpose they served 6. Explain the Truman Doctrine and the Marshall Plan and their importance to the war 7. Describe your understanding of	Yalta Conference United Nations Grand Assembly Security Council Satellite Nations Iron Curtain Containment Truman Doctrine Marshall Plan West Germany East Germany Operation Vittles North Atlantic Treaty Organization (NATO) Warsaw Pact Berlin Wall Nuclear Threat Brinkmanship U2 Spy Plane

NATO and why it was created	ICBM Soviet Sputnik

State or National Standards:

9.4.3.13.1 - 9.4.3.13.4

Post-World War II geopolitical reorganization produced the Cold War balance of power and new alliances that were based on competing economic and political doctrines. (The World After World War II: 1950-1989)

Benchmark:

9.4.3.13.2

Evaluate the degree to which individuals and groups have shaped the development of various post-colonial governments. (The World After World War II: 1950-1989)

9.4.3.13.3

Explain how the Cold War shaped the global geopolitical climate, including proxy wars and the Non-Aligned Movement. (The World After World War II: 1950-1989)

Anticipatory Set:

Introduction to the Cold War Quiz (Desirable Difficulty) 10 minutes (Usman, 2016, p. 362).

This is a brief 10-20 question multiple choice quiz over material not yet taught. Students will hang on to the quiz and correct their own quiz as they progress through the learning unit. There will be no motivation for students to change their answers, as they will receive full credit for completion rather than accuracy. Students will answer questions they have not yet learned the answers to yet which has been shown to improve retention once the concepts are learned.

Input (includes modeling and checking for understanding):

Communism vs. Capitalism poster activity 25 minutes

The class is divided into two large groups. Each group is assigned either Communism or Capitalism. Groups are given a large blank poster, and instructed to create a poster explaining their assigned ideology, how it emerged, highlight it's pros and cons, successes and failures, and explain what countries have utilized that type of economy. Each group will briefly present their poster, with detailed answers to the previous questions in class.

Closure:

Reading Preview (Background Knowledge) 5 minutes (Kintsch, 1994, p. 279).

A brief reading preview is discussed introducing students to the main topics of the assigned reading. This is designed to increase students background knowledge as they approach the reading assignment.

Retention Quiz on industrial Revolution and Scientific Revolution (Interspersed Practice) (spacing of Study) 8 minutes (Usman, 2016, p. 365-366) (Rohrer, Pashler & Cepeda, 2007, p. 185) (Rohrer, Taylor, Pashler, Wixted & Cepeda, 2005, p. 1).

A brief quiz over concepts that had been taught 2 units prior to the current unit is administered. All questions are short answer. Students take these summative assessment quizzes throughout the course to measure retention as well as spacing of study. Students are given a calendar for each term and know when to prepare for these reoccurring quizzes.

Differentiated instruction

Both the introduction to the Cold War Quiz as well as the Industrial Revolution and Scientific Revolution Quizzes will be differentiated for the EL students. The differentiated version of the exam will include image-based questions.

Assessment Plan:

Communism vs. Capitalism poster activity

Student posters are hung on the classroom wall for the duration of the learning unit and will be entered into the grade book as a formative assessment.

Introduction to Cold War formative assessment (feedback) (Desirable Difficulty) (Butler & Roediger, 2008, p. 604) (Usman, 2016, p. 362).

The Introduction to the Cold War Quiz is a formative assessment. Students will receive feedback in real time as they grade their own quiz throughout the learning unit.

End of Unit Summative Exam (short answer exam) (Stenlund, Sundstrom & Jonsson, 2016, p. 16).

Content covered in the Introduction to the Cold War PowerPoint presentation will be assessed on the end of Unit Summative Exam.

Summative Retention Quiz (Spacing of study & assessment) (Usman, 2016, p. 365-366) (Rohrer, Pashler & Cepeda, 2007, p. 185) (Rohrer, Taylor, Pashler, Wixted & Cepeda, 2005, p. 1).

The material will be covered on the summative retention quiz that will take place approximately 3 units after it is taught in an effort to space study and assessment.

Assigned Reading Quiz (Spacing of study & assessment) (measure of learning rather than memorizing) (Usman, 2016, p. 365-366) (Rohrer, Pashler & Cepeda, 2007, p. 185) (Rohrer, Taylor, Pashler, Wixted & Cepeda, 2005, p. 1) (Kintsch, 1994, p. 294).

A quiz will be administered covering material from assigned reading approximately 2 days after the reading was assigned as to present a desirable difficulty. Additionally, all quizzes over reading assignments are intentionally written to measure learning as opposed to memorizing. These quizzes will ask questions that do not merely require recall, but rather require students to analyze and understand the underlying concepts being presented in the reading.

Lesson Plan Day 2

Teacher: Kai Thietje

Subject Area: World History

Grade Level: 9th Grade

Unit Title: The Cold War

Lesson Title: The Cold War in China

Materials/Resources Needed: Internet/YouTube, PowerPoint, Textbook, Differentiated Handouts

Time: 48 minutes

General Instructional Objective:

Students will be able to express how and why Communism spread to China.

Specific Learner Outcomes:

Students will be able to:

Explain the difference between the Communist and Capitalist Parties.

Describe the movement of the Red Guards in China

Language Objectives:

Language Objectives:	**Vocabulary:**
(Great verbs for writing language objectives: view, hear, speak, write, listen, read, list, tell, discuss, journal, record, persuade, debate, draft) SWBOT: 1. Discuss and debate with a classmate the difference between the Communist and Capitalist parties as well as pros and cons of each 2. Write your understanding of the movement of the Red Guards in China as well as the motivation behind it.	Mao Zedong Communist Party Nationalist Party People's Republic of China Republic of China Communes Red Guards

State or National Standards:

9.4.3.13.1 - 9.4.3.13.4

Post-World War II geopolitical reorganization produced the Cold War balance of power and new alliances that were based on competing economic and political doctrines. (The World After World War II: 1950-1989)

Benchmark:

9.4.3.13.1

Trace the political and economic changes in China from the Communist Revolution until recent times. (The World After World War II: 1950-1989)

Anticipatory Set:

China Comparison chart & video (interspersed practice) 20 minutes (Usman, 2016, p. 365-366) (Rohrer, Pashler & Cepeda, 2007, p. 185) (Rohrer, Taylor, Pashler, Wixted & Cepeda, 2005, p. 1).

Teacher asks students to reflect on what they have previously learned about China in class. Teacher goes in depth about previously taught content on China

(interspersed practice). Teacher also asks students what they know about China currently. Teacher talks students through a comparison chart on the white board. Teacher concludes anticipatory set with a brief video explaining China's transition to Communism.

https://www.youtube.com/watch?v=FJdQ1gna10k

Input (includes modeling and checking for understanding):

The Cold War in China PowerPoint Presentation 15 minutes

A brief PowerPoint presentation which includes a bell-ringer and exit-ticket question on the origins of the Cold War. Students will follow along with sentence frames or Cornell notes on key terms and concepts that are answered by the PowerPoint.

Think Pair Share

Students are prompted to think about what we have learned about China thus far in this course. Students are encouraged to refer back to their comparison chart. Teacher asks students to respond to the following prompt in their journals. Students then discuss their response with a classmate:

Why do you feel the Communist Party succeeded in becoming the dominant political party in China?

Closure:

Reading Preview (Background Knowledge) 8 minutes (Kintsch, 1994, p. 279).

A brief reading preview is discussed introducing students to the main topics of the assigned reading. This is designed to increase students background knowledge as they approach the reading assignment.

Differentiated instruction:

The handout accompanying the Cold War in China PowerPoint presentation will be differentiated for EL and SPED students. The handout for these two groups will include sentence frames for them to fill in while the rest of class will be taking notes in Cornell notes.

Assessment Plan:

End of Unit Summative Exam (short answer exam) (Stenlund, Sundstrom & Jonsson, 2016, p. 16).

Content covered in the Introduction to the Cold War PowerPoint presentation will be assessed on the end of Unit Summative Exam.

Summative Retention Quiz (Spacing of study & assessment) (Usman, 2016, p. 365-366) (Rohrer, Pashler & Cepeda, 2007, p. 185) (Rohrer, Taylor, Pashler, Wixted & Cepeda, 2005, p. 1).

The material will be covered on the summative retention quiz that will take place approximately 3 units after it is taught in an effort to space study and assessment.

Assigned Reading Quiz (Spacing of study & assessment) (measure of learning rather than memorizing) (Usman, 2016, p. 365-366) (Rohrer, Pashler & Cepeda, 2007, p. 185) (Rohrer, Taylor, Pashler, Wixted & Cepeda, 2005, p. 1) (Kintsch, 1994, p. 294).

A quiz will be administered covering material from assigned reading approximately 2 days after the reading was assigned as to present a desirable difficulty. Additionally, all quizzes over reading assignments are intentionally written to measure learning as opposed to memorizing. These quizzes will ask questions that do not merely require recall, but rather require students to analyze and understand the underlying concepts being presented in the reading.

Lesson Plan Day 3

Teacher: Kai Thietje

Subject Area: World History

Grade Level: 9th Grade

Unit Title: The Cold War

Lesson Title: Proxy Wars of the Cold War

Materials/Resources Needed: Internet/YouTube, PowerPoint, Handouts, Text-book

Time: 48 minutes

General Instructional Objective:

Students will be able to express the reasons for and results of both the Korean and Viet Nam wars.

Specific Learner Outcomes:

Students will be able to:

Describe the causes of the Korean War

Explain why the U.S.A. involved in the Korean War

Describe the outcome of the Korean War

Describe the causes of the Viet Nam War

Explain why the U.S.A. involved in the Viet Nam War

Describe the outcome of the Viet Nam War

Language Objectives:

Language Objectives:	**Vocabulary:**
(Great verbs for writing language objectives: view, hear, speak, write, listen, read, list, tell, discuss, journal, record, persuade, debate, draft) SWBAT: 1. Discuss with a classmate the causes of the Korean War 2. Explain your understanding of why the U.S.A. involved in the Korean War 3. Discuss with a classmate the outcome of the Korean War 4. Discuss with a classmate the causes of the Viet Nam War 5. Debate with a classmate your understanding of why the U.S.A. involved in the Viet Nam War and whether you feel they should have involved. 6. Write your understanding of the outcome of the Viet Nam War	Kim Ill Sung General MacCarthur Capitalism Dictatorship Ho Chi Minh Ngo Dinh Diem Domino Theory Vietcong Gulf of Tonkin Vietnamization Cambodia Khmer Rouge

State or National Standards:

9.4.3.13.1 - 9.4.3.13.4

Post-World War II geopolitical reorganization produced the Cold War balance of power and new alliances that were based on competing economic and political doctrines. (The World After World War II: 1950-1989)

Benchmark:

9.4.3.13.3

Explain how the Cold War shaped the global geopolitical climate, including proxy wars and the Non-Aligned Movement. (The World After World War II: 1950-1989)

Anticipatory Set: (15 minutes)

Students are introduced to the term proxy war. Brief videos are shown explaining the term as it applies to the Cold War.

https://www.youtube.com/watch?v=OKIjdKqtJjA

https://www.youtube.com/watch?v=A1YUXt-cvJw

Input (includes modeling and checking for understanding):

Proxy Wars of the Cold War PowerPoint Presentation 10 minutes

A brief PowerPoint presentation which includes a bell-ringer and exit-ticket question on the origins of the Cold War. Students will follow along with sentence frames or Cornell notes on key terms or concepts that are answered by the PowerPoint.

Here Now / There Then activity

The teacher asks the entire class to identify what the main reason was for the U.S. involving in both the Korean and Viet Nam Wars. After some dialogue, the answer is revealed: to stop the spread of Communism

Teacher puts up two column's on the white board, and guides the class through the activity.

Teacher points out that the U.S. is not nearly as concerned about stopping the spread of Communism today, and asks why?

Responses to this question are listed in column A

Teacher asks what was different during the cold war era?

Responses are recorded in Column B.

Teachers asks the class why they feel such a change has occurred?

Teacher closes the discussion by asking:

How can we find out more about how people thought back then?

Introduction to the Cold War handout instructions (Spacing of Homework) (desirable difficulty) 5 minutes (Usman, 2016, p. 365-366) (Rohrer, Pashler & Cepeda, 2007, p. 185) (Rohrer, Taylor, Pashler, Wixted & Cepeda, 2005, p. 1) (Usman, 2016, p. 362).

A worksheet on the introductory aspects of the Cold War is assigned, and instructions are given. This is intentionally handed out 2 days after the topics were covered in class as to present a desirable difficulty in the spacing of homework from when the topics were covered in class.

Closure:

Reading Preview (Background Knowledge) 8 minutes (Kintsch, 1994, p. 279).

A brief reading preview is discussed introducing students to the main topics of the assigned reading. This is designed to increase students background knowledge as they approach the reading assignment.

Differentiated instruction

The handout accompanying the Proxy Wars of the Cold War PowerPoint presentation will be differentiated for EL and SPED students. The handout for these two groups will include sentence frames for them to fill in while the rest of class will be taking notes in Cornell notes.

Assessment Plan:

End of Unit Summative Exam (short answer exam) (Stenlund, Sundstrom & Jonsson, 2016, p. 16).

Content covered in the Introduction to the Cold War PowerPoint presentation will be assessed on the end of Unit Summative Exam.

Summative Retention Quiz (Spacing of study & assessment) (Usman, 2016, p. 365-366) (Rohrer, Pashler & Cepeda, 2007, p. 185) (Rohrer, Taylor, Pashler, Wixted & Cepeda, 2005, p. 1).

The material will be covered on the summative retention quiz that will take place approximately 3 units after it is taught in an effort to space study and assessment.

Assigned Reading Quiz (Spacing of study & assessment) (measure of learning rather than memorizing) (Usman, 2016, p. 365-366) (Rohrer, Pashler & Cepeda, 2007, p. 185) (Rohrer, Taylor, Pashler, Wixted & Cepeda, 2005, p. 1) (Kintsch, 1994, p. 294).

A quiz will be administered covering material from assigned reading approximately 2 days after the reading was assigned as to present a desirable difficulty. Additionally, all quizzes over reading assignments are intentionally written to measure learning as opposed to memorizing. These quizzes will ask questions that do not merely require recall, but rather require students to analyze and understand the underlying concepts being presented in the reading.

Lesson Plan Day 4

Teacher: Kai Thietje

Subject Area: World History

Grade Level: 9th Grade

Unit Title: The Cold War

Lesson Title: Proxy Wars of the Cold War (research and presentation)

Materials/Resources Needed: Venn diagram comparison chart, Text-book, laptops

Time: 48 minutes

General Instructional Objective:

Students will be able to express the reasons for and results of both the Korean and Viet Nam wars.

Students will use a Venn diagram as a comparison chart to identify the similarities and differences between the Korean and Vietnam War from the U.S. perspective.

Specific Learner Outcomes:

Students will be able to:

Discuss similarities and differences between the Korean and Viet Nam Wars

Describe the causes of the Korean War

Explain why the U.S.A. involved in the Korean War

Describe the outcome of the Korean War

Describe the causes of the Viet Nam War

Explain why the U.S.A. involved in the Viet Nam War

Describe the outcome of the Viet Nam War

Language Objectives:

Language Objectives:	**Vocabulary:**
(Great verbs for writing language objectives: view, hear, speak, write, listen, read, list, tell, discuss, journal, record, persuade, debate, draft) SWBAT: 1. Compare and contrast the reasons for the Korean and Viet Nam Wars 2. Discuss with a classmate the causes of the Korean War 3. Explain your understanding of why the U.S.A. involved in the Korean War 4. Discuss with a classmate the outcome of the Korean War 5. Discuss with a classmate the causes of the Viet Nam War 6. Debate with a classmate your understanding of why the U.S.A. involved in the Viet Nam War and whether you feel they should have involved. 7. Write your understanding of the	Kim Ill Sung General MacCarthur Capitalism Dictatorship Ho Chi Minh Ngo Dinh Diem Domino Theory Vietcong Gulf of Tonkin Vietnamization Cambodia Khmer Rouge

outcome of the Viet Nam War	

State or National Standards:

9.4.3.13.1 - 9.4.3.13.4

Post-World War II geopolitical reorganization produced the Cold War balance of power and new alliances that were based on competing economic and political doctrines. (The World After World War II: 1950-1989)

Benchmark:

9.4.3.13.13

Explain how the Cold War shaped the global geopolitical climate, including proxy wars and the Non-Aligned Movement. (The World After World War II: 1950-1989)

Anticipatory Set: (10 minutes)

Brief videos are shown on the Korean and Viet Nam Wars:

https://www.youtube.com/watch?v=yxaegqvl4aE

https://www.youtube.com/watch?v=89_3DgW_7mg

Input (includes modeling and checking for understanding):

Venn diagram comparison chart Korea vs. Viet Nam Wars 25 minutes

In small groups, students are assigned a Venn diagram graphic organizer, and in which they are instructed to compare the causes and consequences of the Korean and Viet Nam Wars.

Each group is then assigned one of the two wars, and are then use their comparison charts as well as other resources to discuss and decide: If their small group was advising the President of the United States, and had to make a recommendation to the President whether or not to commit U.S. troops to that war, what would be their recommendation? Explain why they came to that conclusion?

Closure:

At the end of class, each small group briefly stands up and presents to the other groups which of the two wars they were assigned, what their decision was, and why.

Differentiated instruction

Assessment Plan:

Students turn in their Venn diagrams which are graded as a formative assessment.

Each group write up and turns in a brief paragraph summing what their group decided during the group work, and why. This is graded as a Summative assessment.

Lesson Plan Day 5

Teacher: Kai Thietje

Subject Area: World History

Grade Level: 9th Grade

Unit Title: The Cold War

Lesson Title: The Cold War Divides the World

Materials/Resources Needed: Whiteboard**,** Differentiated handout

Time: 48 minutes

General Instructional Objective:

Students will be able to express how the ideological struggle between the USA and USSR effected other nations and parts of the world.

Specific Learner Outcomes:

Students will be able to:

Describe the reasons for and outcomes of the Bay of Pigs invasion

Describe Fidel Castro and how he came to power in Cuba

Explain the Cuban Missile Crisis, as well as the nations involved.

Describe the role played by Afghanistan in the cold war

Language Objectives:

Language Objectives:	**Vocabulary:**
(Great verbs for writing language objectives: view, hear, speak, write, listen, read, list, tell, discuss, journal, record, persuade, debate, draft) 1. Discuss the reasons for and outcomes of the Bay of Pigs invasion 2. Write about Fidel Castro and how he came to power in Cuba 3. Speak with a classmate about the Cuban Missile Crisis, as well as the nations involved. 4. Discuss with a classmate Afghanistan and the role they played in the cold war	Fidel Castro Bay of Pigs Cuban Missile Crisis Afghanistan Mujahideen

State or National Standards:

9.4.3.13.1 - 9.4.3.13.4

Post-World War II geopolitical reorganization produced the Cold War balance of power and new alliances that were based on competing economic and political doctrines. (The World After World War II: 1950-1989)

Benchmark:

9.4.3.13.2

Evaluate the degree to which individuals and groups have shaped the development of various post-colonial governments. (The World After World War II: 1950-1989)

9.4.3.13.3

Explain how the Cold War shaped the global geopolitical climate, including proxy wars and the Non-Aligned Movement. (The World After World War II: 1950-1989)

Anticipatory Set:

Bell Ringer/pair share: 10 minutes

Students write a response to the prompt below in their journals, and then discuss their answers with a classmate.

How do you feel the rest of the world may have been affected by the Cold War between the U.S.A and U.S.S.R?

Students are asked to share their responses and in-class discussion ensues.

Input (includes modeling and checking for understanding):

Cold War in China handout instructions (Spacing of Homework) (desirable difficulty) 5 minutes (Usman, 2016, p. 365-366) (Rohrer, Pashler & Cepeda, 2007, p. 185) (Rohrer, Taylor, Pashler, Wixted & Cepeda, 2005, p. 1) (Usman, 2016, p. 362).

A worksheet on the Cold War in China is assigned, and instructions are given. This is intentionally handed out 2 days after the topics were covered in class as to present a desirable difficulty in the spacing of homework from when the topics were covered in class.

In-class instruction and activity on the Cold War division of the world (rule/example learners) 20 minutes (Usman, 2016, p. 365).

The class is divided into two groups, rule learners and example learners at the discretion of the teacher. Brief instruction and small group activity is completed by one group while the other group completes the assigned reading quiz. Halfway through the 30 minutes, the teacher begins the instruction and activity with the other group, and the original group transitions to taking the quiz.

Closure:

Exit Ticket 5 minutes

Students write a brief response in their journals to the following prompt:

Explain why the U.S.A involved in Cuban attempted to interfere with Cuban affairs during the Bay of Pigs invasion as well as the Cuban Missile Crisis. What drove these decisions?

Journals entries serve as a way for students to meet the language objective, and are typically to be used once to three times a week depending on other activities in that lesson.

Reading Preview (Background Knowledge) 8 minutes (Kintsch, 1994, p. 279).

A brief reading preview is discussed introducing students to the main topics of the assigned reading. This is designed to increase students background knowledge as they approach the reading assignment.

Differentiated instruction

In-class instruction and activity on the Cold War division of the world (rule/example learners) 30 minutes (Usman, 2016, p. 365).

The class is divided into two groups, rule learners and example learners at the discretion of the teacher. Brief instruction and small group activity is completed by one group while the other group completes the assigned reading quiz. Halfway through the 30 minutes, the teacher begins the instruction and activity with the other group, and the original group transitions to taking the quiz.

The teacher will know which group a student belongs to based on assessment taken before this learning segment. The assessment will provide a reading that demonstrates a concept by example, and one that demonstrates a concept by a rule. Students with higher scores in one of the two methods will be grouped accordingly. Students that score equally across the two methods, can be grouped according to need at the discretion of the teacher.

Assessment Plan:

End of Unit Summative Exam (short answer exam) (Stenlund, Sundstrom & Jonsson, 2016, p. 16).

Content covered in the Introduction to the Cold War PowerPoint presentation will be assessed on the end of Unit Summative Exam. The exam will include mostly short answer (fill in the blank) type questions. Additionally, a few short essay questions will be included. These questions will require the student to respond with a brief paragraph answering the question, or describing an event.

Summative Retention Quiz (Spacing of study & assessment) (Usman, 2016, p. 365-366) (Rohrer, Pashler & Cepeda, 2007, p. 185) (Rohrer, Taylor, Pashler, Wixted & Cepeda, 2005, p. 1).

The material will be covered on the summative retention quiz that will take place approximately 3 units after it is taught in an effort to space study and assessment.

Assigned Reading Quiz (Spacing of study & assessment) (measure of learning rather than memorizing) (Usman, 2016, p. 365-366) (Rohrer, Pashler & Cepeda, 2007, p. 185) (Rohrer, Taylor, Pashler, Wixted & Cepeda, 2005, p. 1) (Kintsch, 1994, p. 294).

A quiz will be administered covering material from assigned reading approximately 2 days after the reading was assigned as to present a desirable difficulty. Additionally, all quizzes over reading assignments are intentionally written to measure learning as opposed to memorizing. These quizzes will ask questions that do not merely require recall, but rather require students to analyze and understand the underlying concepts being presented in the reading.

Lesson Plan Day 6

Teacher: Kai Thietje

Subject Area: World History

Grade Level: 9th Grade

Unit Title: The Cold War

Lesson Title: The Cold War Ends

Materials/Resources Needed: Handout, PowerPoint, Exam

Time: 48 minutes

General Instructional Objective:

Students will be able to summarize the events leading to the end of the Cold War.

Specific Learner Outcomes:

Students will be able to:

Describe the political changes in the Soviet Union after the death of Stalin

Explain the concept of detente

Describe the Strategic Defense Initiative (SDI) (Star Wars)

Describe the initiative of Perestroika

Explain the events leading up to the tear down of the Berlin Wall

Describe reasons for the end of the Communist Party, and dissolution of the Soviet Union.

Language Objectives:

Language Objectives:	**Vocabulary:**
(Great verbs for writing language objectives: view, hear, speak, write, listen, read, list, tell, discuss, journal, record, persuade, debate, draft) SWBAT: 1. Discuss with a classmate the political changes that occurred in the Soviet Union after the death of Stalin. 2. Discuss with a classmate the concept of Détente. 3. Write about your understanding of the Strategic Defense Initiative. 4. Write about your understanding of the concept of perestroika 5. Tell a classmate your understanding of the events that led to tearing down of the Berlin Wall 6. Read about the end of the Communist Party and the dissolution of the Soviet Union and discuss with a classmate.	Détente Nikita Khrushchev Leonid Brezhnev Strategic Arms Limitation Talks (SALT) Mikhail Gorbachev Glasnost Ronald Reagan Perestroika Boris Yeltsin

State or National Standards:

9.4.3.13.1 - 9.4.3.13.4

Post-World War II geopolitical reorganization produced the Cold War balance of power

and new alliances that were based on competing economic and political doctrines. (The World After World War II: 1950-1989)

Benchmark:

9.4.3.13.3

Explain how the Cold War shaped the global geopolitical climate, including proxy wars and the Non-Aligned Movement. (The World After World War II: 1950-1989)

Anticipatory Set:

Bell Ringer 10 minutes

Students are asked to respond in writing to a question explaining why they feel the Cold War came to an end. After writing a brief response, students are instructed to share their response with a classmate. After 5 minutes, the teacher calls on students to share their response, and a whole class discussion ensues.

Input (includes modeling and checking for understanding):

Proxy Wars of the Cold War handout instructions (Spacing of Homework) (desirable difficulty) 5 minutes (Usman, 2016, p. 365-366) (Rohrer, Pashler & Cepeda, 2007, p. 185) (Rohrer, Taylor, Pashler, Wixted & Cepeda, 2005, p. 1) (Usman, 2016, p. 362).

A worksheet on Proxy Wars of the Cold War is assigned, and instructions are given. This is intentionally handed out 2 days after the topics were covered in class as to present a desirable difficulty in the spacing of homework from when the topics were covered in class.

The Cold War Ends PowerPoint Presentation 20 minutes

A brief PowerPoint presentation which includes an exit-ticket question on the end of the Cold War. Students will follow along with sentence frames or Cornell notes on key terms or concepts that are answered by the PowerPoint.

Closure:

End of unit Summative Exam review (12 minutes)

Teacher leads the class through a review sheet handout that is designed to prepare them for the exam which will be completed on the next day the class meets.

Think Pair Share

Students will write a response to the following prompt in their journal, and then discuss their answer with a classmate:

Describe the political climate and events that led to the dissolution of the Soviet Union.

Differentiated instruction

For EL students the end of unit summative exam review sheet will utilize images whenever possible.

The handout accompanying the Cold War ends PowerPoint presentation will be differentiated for EL and SPED students. The handout for these two groups will include sentence frames for them to fill in while the rest of class will be taking notes in Cornell notes.

Assessment Plan:

End of Unit Summative Exam (short answer exam) (Stenlund, Sundstrom & Jonsson, 2016, p. 16).

Content covered in the Introduction to the Cold War PowerPoint presentation will be assessed on the end of Unit Summative Exam.

Summative Retention Quiz (Spacing of study & assessment) (Usman, 2016, p. 365-366) (Rohrer, Pashler & Cepeda, 2007, p. 185) (Rohrer, Taylor, Pashler, Wixted & Cepeda, 2005, p. 1).

The material will be covered on the summative retention quiz that will take place approximately 3 units after it is taught in an effort to space study and assessment.

Assigned Reading Quiz (Spacing of study & assessment) (measure of learning rather than memorizing) (Usman, 2016, p. 365-366) (Rohrer, Pashler & Cepeda, 2007, p. 185) (Rohrer, Taylor, Pashler, Wixted & Cepeda, 2005, p. 1) (Kintsch, 1994, p. 294).

A quiz will be administered covering material from assigned reading approximately 2 days after the reading was assigned as to present a desirable difficulty. Additionally, all quizzes over reading assignments are intentionally written to measure learning as opposed to memorizing. These quizzes will ask questions that do not merely require recall, but rather require students to analyze and understand the underlying concepts being presented in the reading.

Lesson Plan Day 7

Teacher: Kai Thietje

Subject Area: World History

Grade Level: 9th Grade

Unit Title: The Cold War

Lesson Title: Capitalism Vs. Communism Debate

Materials/Resources Needed: Text-book, books from teacher resource list

Time: 48 minutes

General Instructional Objective:

Students will be able to research, debate and defend the stance they have been assigned in an in-class debate activity.

Specific Learner Outcomes:

Students will be able to:

Research communism and capitalism, and the rationale behind each model.

Create an argument as to which one is superior and why Germany should operate under that model at the conclusion of World War II.

Defend your stance, and support it with facts and statistics obtained from your research.

Language Objectives:	**Vocabulary:**
(Great verbs for writing language objectives: view, hear, speak, write, listen, read, list, tell, discuss, journal, record, persuade, debate, draft) SWBAT: 1. Debate with a classmate the differing ideologies of the Soviet Union and the U.S.A. and defend which one would have produced greater prosperity in Germany based on facts and statistics obtained through research. which you feel was better	Yalta Conference United Nations Grand Assembly Security Council Satellite Nations Iron Curtain Containment Truman Doctrine Marshall Plan

	West Germany East Germany Operation Vittles North Atlantic Treaty Organization (NATO) Warsaw Pact Berlin Wall Nuclear Threat Brinkmanship U2 Spy Plane ICBM Soviet Sputnik

State or National Standards:

9.4.3.13.1 - 9.4.3.13.4

Post-World War II geopolitical reorganization produced the Cold War balance of power and new alliances that were based on competing economic and political doctrines. (The World After World War II: 1950-1989)

Benchmark:

9.4.3.13.2

Evaluate the degree to which individuals and groups have shaped the development of various post-colonial governments. (The World After World War II: 1950-1989)

9.4.3.13.3

Explain how the Cold War shaped the global geopolitical climate, including proxy wars and the Non-Aligned Movement. (The World After World War II: 1950-1989)

Anticipatory Set:

Input (includes modeling and checking for understanding):

Debate 48 minutes

Students are divided into three groups by the teacher:

1. The United States in favor of Capitalism
2. The USSR in favor of Communism
3. A jury of peers (United Nations)

Each group will present and defend an argument to the United Nations as to why Germany should be set up with that particular style of government/economy at the conclusion of WWII. Each group will conduct in and out of class research that strengthens their argument leading up to the in-class debate. Groups are encouraged to study the state of the economy of countries around the globe at that time that operated under either Communism or Capitalism in order to strengthen their own or weaken their opponents arguments.

Closure:

After each side has presented and debated, and the jury of peers (United Nations) has asked their questions, the jury of peers will briefly meet privately with their teacher present to make a decision. The jury of peers will then present their decision with rationale to the other two groups.

Differentiated instruction:

Assessment Plan:

The teacher will grade each individual student on the overall quality of presentation and debate by their group, or (for the jury of peers) for the way they conducted the debate itself as well as the decision making process.

A detailed rubric will be provided and will explain the process for presentation, debate, jury decision making process, and will include point allocations for each.

Chapter IV: DISCUSSION AND CONCLUSION

Summary

The first question guiding this thesis was, "Are there methods of teaching that are more likely to result in long-term retention of the concepts being taught?" The overwhelming answer to that question based on the findings of this thesis is yes. Several studies have been reviewed, discussed, and cited in this thesis that show evidence of teaching techniques and approaches that produce superior retention when compared to others.

The second guiding question was "If so, what are the proven strategies of teaching content that are most likely to result in long-term retention of learned material?" The answer to the second guiding question requires a much longer response. The author will address each of the most compelling teaching strategies pertaining to instruction, self-study, reading, homework, and testing and assessment as done above.

Generative Learning

First among the most compelling strategies for teaching for long-term retention is the use of generative learning. This refers to teaching that requires the students to generate the response rather than simply recall the correct answer. It is believed that the effort necessary to generate the answer or solution rather than simply recall it is what creates the long-term learning. Related to this is the concept

of “desirable difficulties” coined by Elizabeth and Robert Bjork which refers difficulties in the learning process that create better learning outcomes because they utilize generative or active learning rather than recall or passive learning (Usman, 2016, p. 362). Related to the concept of generative learning is the movement away from teaching that employs overlearning. There is much consensus in that researchers believe that the forgetting that takes place between practice sessions is actually useful in generating long-term memory. (Usman, 2016, p. 365-366) (Rohrer, Pashler & Cepeda, 2007, p. 183) (Rohrer, Taylor, Pashler, Wixted & Cepeda, 2005, p. 1).

Learning versus Memorizing

Another compelling strategy for teaching for long-term retention is to place emphasis on assessments that measure learning as opposed to memorizing. This involves asking questions of students that require them to have understood a concept mentioned in the reading, or in class, rather than simply memorizing something specifically stated in the reading or in class. Kintsch has demonstrated that assessments that require an understanding of the subject matter acquired can be used productively while memorizing merely requires a shallower understanding, or ability to recount was read (Kintsch, 1994, p. 294).

Assessments as Learning Events

Perhaps the most compelling consistency found in research regarding teaching for long-term retention is the belief in the treatment of tests as learning

events. A surprising discovery in the writing of this thesis was the quantity of compelling research indicating that the methods used in assessment can have an impact on retention. While this phenomenon can be summed up as "test enhanced learning," this thesis discusses a great deal of research about approaches that utilize testing and assessment in the interest of long-term retention of learned concepts (Halamish & Bjork, 2011, p. 801). Related to this is research indicating that practice testing is a beneficial alternative to restudy when teaching with long-term retention in mind (Nungester & Duchastel, 1982, p. 18). Additionally, the testing effect as well as test enhanced learning and retrieval practice and the benefits they offer in the interest of long-term retention are discussed at length (Toppino & Cohen, 2009, p. 253) (Roediger & Karpicke, 2006, p. 253) (Butler, 2010, p. 1118) (Roediger & Butler, 2011, p. 20-21) (Larsen, Butler & Roediger, 2013, p. 674) (Stenlund, Sundstrom & Jonsson, 2016, p. 16). Additionally, the pros and cons of various testing formats, and their effect on retention as well as their relevance to certain age groups of students was explored. (Butler & Roediger, 2008, p. 604) (Wheeler, Ewers & Buonanno, 2003, p. 574, 576) (Bauer, Wenner, Dropik, & Wewerka, 2003, p. 2).

Professional Application

When considering the research, it is evident that there are many strategies and approaches to teaching that can be implemented in the classroom in the interest of achieving long-term retention in our students. While teaching for long-term retention is not an exact science, and all approaches may not have the same positive

results within every student, there are several approaches that every teacher with long-term retention in mind should keep at the front of mind.

When training to be licensed teachers, we all learned the value of using an anticipatory set when introducing topics and concepts in the classroom. When Usman uses the phrase "making learning difficult," and references the term "desirable difficulties" coined by Elizabeth and Robert Bjork she is referring to students being asked to answer a question without first being taught the content (Usman, 2016, p. 361-362). Many teachers already do this in their anticipatory sets. Those that do not, can simply include some questions about the upcoming content that have not been answered yet. Some teachers may even choose to utilize a unit introduction quiz as was included in the lesson plans above, but even an informal verbal assessment would be sufficient. The key to this approach is to include instruction in such a way that is not threatening to the students. It is important to emphasize to students that responding to questions is an important part of education, that there is no penalty for responses that are not accurate, and that this type of dialogue is an important part of learning. (Usman, 2016, p. 361-362).

Another valued approach to long-term retention as mentioned in the literature review is the addition of sufficient background knowledge for all students. A simple way to teach toward long-term retention is to provide a reading preview that briefly introduces the concepts in the reading assignment through discussion, brief video, or class activity prior to the student reading. This approach is an

effective method of providing the needed background knowledge for each student, which has been shown to have positive effects on retention. (Kintsch, 1994, p. 279).

Yet another approach to teaching for long-term retention that would not be terribly difficult to execute would be differentiating teaching for "rule learners" and "example learners." Many teachers are already differentiating instruction for the various skill levels in their classroom. Another way to differentiate as acknowledged by Usman plays on the students' tendency to learn by either rules or examples (Usman, 2016, p. 357 & 363). Students who tend to learn through rules extract the rules that produce a certain outcome from an example, whereas students who learn from an example of a concept or phenomenon tend to commit the example itself to memory. This approach is certainly worth trying in the classroom to determine if it works for your students.

Another simple adjustment to ensure teaching for long-term retention will include an emphasis on varied and interspersed practice of the same concept (rather than massed practice). This will require that the same concept is taught, or that knowledge of the concept is assessed over a longer period of time than one learning unit. Consistent with this approach will be class discussion, and exam questions, that refer back to or compare to concepts taught in previous units. This approach will achieve the double objective of tying new concepts to previous knowledge as well as spacing the learning and assessment of concepts taught. (Usman, 2016, p. 365-366) (Rohrer, Pashler & Cepeda, 2007, p. 185) (Rohrer,

Taylor, Pashler, Wixted & Cepeda, 2005, p. 1). While the retention quizzes included in the lesson plans in the application of the research occurred three units after the content was taught, simply including a comprehensive exam at the end of each term would be considered interspersed practice.

Another great way to teach toward long-term retention is to keep in mind the difference between memorizing and learning when writing assessment questions. By asking questions that require the student to understand what was read rather than just remember it word-for-word, we are assessing learning rather than memorizing because learning has a greater likelihood of lasting into the long-term (Kintsch, 1994, p. 294).

The findings discussed in this thesis should also give secondary teachers reason to give consideration to practice testing or test enhanced learning, and the role that it may play in achieving long-term retention. Given the results of the above mentioned studies, one approach to testing that might maximize long-term retention, and therefore a grade that truly reflects long-term retention, would be short term practice testing with little to no weight on final grade, and a final exam, with a heavy weight on the final grade. While this approach seems uncommon for secondary Social Studies, this approach is not unheard of in education as many Law Schools use a similar approach (Nungester & Duchastel, 1982, p.18) (Halamish & Bjork, 2011, p.801) (Toppino & Cohen, 2009, p. 253) (Roediger & Karpicke, 2006, p.253) (Butler, 2010, p 1118).

An additional best practice will have teachers move away from multiple-choice tests in favor of short-answer or essay tests. As discussed above, a testing format that requires retrieval process as does writing an answer in sentences to a short answer or essay question, will have greater long-term retention results than a format that does not require retrieval such as multiple-choice testing (Nungester & Duchastel, 1982, p.18) (Stenlund, Sundstrom & Jonsson, 2016, p. 16). For those teachers that do not feel that it is feasible to grade short answer exams in as timely a fashion as multiple-choice exams, a best practice when choosing to utilize multiple-choice exams would be a policy of always providing detailed feedback (Butler & Roediger, 2008, p. 604).

Limitations of Research

Limitations of this research exist in areas that were not explored in as great a detail as others. This was mainly due to the fact that a greater body of research has been done pertaining to some areas covered in this paper more-so than others. Upon choosing this topic, the author expected to find a great deal of strategies, approaches and teaching methods that could be used in the classroom during instruction in the interest of long-term retention. The author did not expect to find a great deal of research pertaining to assessments having an impact on long-term retention. The author however, found that a great deal more research appeared to have been done pertaining to testing and assessments than the other areas addressed in this paper.

As a result of there being so much more available research pertaining to testing and assessment, perhaps the greatest area of limitation in this thesis pertains to instruction methods in the classroom that have been shown to strengthen long-term retention. Other areas of limitation pertain to self-study, and assigned reading, as not as much research pertaining to long-term retention has been done in these areas.

Another area of limitation of this research is that the methods and strategies addressed are generally more conducive to the secondary education classroom. Seeing that approaches to teaching tend to differ between primary and secondary education, the primary teacher may be challenged to find a great deal of approaches covered in this thesis that would be useful in their classroom.

Implications for Future Research

Given what the author has read on this subject, a few areas of need can be identified pertaining to research on long-term retention. As stated above in regard to limitations of this research, it was surprising to be challenged to find a great deal of research on classroom instruction methods pertaining to long-term retention. For many who hear the word teaching, the first aspect that comes to mind is classroom instruction. In order to have a perfectly well rounded guide to best-practices on long term retention as this was intended to be, there is a need for more research pertaining to instruction methods that are best for teaching to long-term retention. There are still questions to be answered pertaining to specific teaching

methods or activities that have been shown to benefit long-term retention. While the approaches discussed by Usman, and Doucet, Vrins & Harvey in the literature review were informative, many of them were general, and it would be valuable to see research on some specific techniques and approaches.

Other topics covered in this thesis that appear to need additional research are self-study and assigned reading. While there is a great deal of research done by several researchers pertaining to testing and assessment for instance, the section of this thesis pertaining to self-study only produced a few suggested approaches to achieving long-term retention. Additionally, much from that section was consistent with research covered in the section of the literature review on instruction methods (Rohrer, Pashler & Cepeda, 2007, p. 185) (Rohrer, Taylor, Pashler, Wixted & Cepeda, 2005, p. 1) (Usman, 2016, p. 365-366). Additionally, only two substantive approaches to assigned reading were addressed in this thesis due to there being significantly less research on this topic when compared to other aspects of teaching relating to long-term retention.

Conclusion

In conclusion, there is still a great deal of work to do in order for teachers to maximize their efforts in teaching toward long-term retention. While there has traditionally been a disconnect in the Social Studies in terms of teaching for long-term retention, this thesis discusses much of the current and past research on this topic and has highlighted some of the more promising methods as best-practices.

The author invites Social Studies teachers to use this thesis, as well as the accompanying lesson plans as a guideline in teaching toward long-term retention. Additionally, much of what is discussed in this thesis is not relevant to just the Social Studies, but should be useful to any secondary teacher interested in teaching toward long-term retention.

References

Bauer, P. J., Wenner, J. A., Dropik, P. L., & Wewerka, S. S. (2000). Parameters of remembering and forgetting in the transition from infancy to early childhood. *Monographs of the Society for Research in Child Development, 65*(4), 1.

Butler, A. C., Karpicke, J. D., & Roediger, H. L. (2007). The effect of type and timing of feedback on learning from multiple-choice tests. *Journal of Experimental Psychology: Applied, 13*(4), 273-281. doi:10.1037/1076-898X.13.4.273

Butler, A., & Roediger, H. (2008). Feedback enhances the positive effects and reduces the negative effects of multiple-choice testing. *Memory & Cognition, 36*(3), 604-616. doi:10.3758/MC.36.3.604

Butler, A. C. (2010). Repeated testing produces superior transfer of learning relative to repeated studying. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 36*(5), 1118-1133. doi:10.1037/a0019902

Cadaret, C., & Yates, D. (2018). Retrieval practice in the form of online homework improved information retention more when spaced 5 days rather than 1 day after class in two physiology courses. *Advances in Physiology Education, 42*(2), 305. doi:10.1152/advan.00104.2017

Doucet, M., Vrins, A., & Harvey, D. (2009). Effect of using an audience response system on learning environment, motivation and long-term retention, during case-discussions in a large group of undergraduate veterinary clinical pharmacology students. *Medical Teacher, 31*(12), e570-e579. doi:10.3109/01421590903193539

Halamish, V., & Bjork, R. A. (2011). When does testing enhance retention? A distribution-based interpretation of retrieval as a memory modifier. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 37*(4), 801-812. doi:10.1037/a0023219

Halpern, D. F., & Hakel, M. D. (2002). Learning that lasts a lifetime: Teaching for Long-Term retention and transfer. *New Directions for Teaching and Learning, 2002*(89), 3-7. doi:10.1002/tl.42

Kintsch, W. (1994). *Text comprehension, memory, and learning*. Arlington, Va.: doi:10.1037/0003-066X.49.4.294

Klemm W. R. (2007). What Good Is Learning if You Don't Remember It? Journal of Effective Teaching, 7(1), 61-73

Larsen, D. P., Butler, A. C., & Roediger Iii, H.,L. (2013). Comparative effects of test-enhanced learning and self-explanation on long-term retention. Medical Education, 47(7), 674-682. doi:10.1111/medu.12141

Lysne, S. J., & Miller, B. G. (2017). A comparison of long-term knowledge retention between two teaching approaches.(RESEARCH and TEACHING)(report). *Journal of College Science Teaching, 46*(6), 100.

Maltese, A. V., Tai, R. H., & Fan, X. (2012). When is homework worth the time?: Evaluating the association between homework and achievement in high school science and math. *The High School Journal, 96*(1), 52-72.

Nungester, R. J., & Duchastel, P. C. (1982). Testing versus review: Effects on retention. *Journal of Educational Psychology, 74*(1), 18-22. doi:10.1037/0022-0663.74.1.18

POGIL. (2019). *What is POGIL?.* Pogil.org. https://pogil.org/about-pogil/what-is-pogil

Roediger, H. L., & Butler, A. C. (2011). The critical role of retrieval practice in long-term retention. *Trends in Cognitive Sciences, 15*(1), 20-27. doi:10.1016/j.tics.2010.09.003

Roediger, H. L., & Karpicke, J. D. (2006). Test-enhanced learning: Taking memory tests improves long-term retention. *Psychological Science, 17*(3), 249-255. doi:10.1111/j.1467-9280.2006.01693.x

Rohrer, D., & Pashler, H. (2007a). Increasing retention without increasing study time. *Current Directions in Psychological Science, 16*(4), 183-186. doi:10.1111/j.1467-8721.2007.00500.x

Rohrer, D., Taylor, K., Pashler, H., Wixted, J. T., & Cepeda, N. J. (2005). The effect of overlearning on long-term retention.

Smith, T. A., & Kimball, D. R. (2010). Learning from feedback: Spacing and the Delay–Retention effect. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 36*(1), 80-95. doi:10.1037/a0017407

Sovereen, D. (2013). Research for the classroom: Mini vocabulary lessons for maximum recall. English Journal, 102(3), 116.

Stenlund, T., Sundström, A., & Jonsson, B. (2016). Effects of repeated testing on short- and long-term memory performance across different test formats. *Educational Psychology, 36*(10), 1710-1727. doi:10.1080/01443410.2014.953037

Toppino, T. C., & Cohen, M. S. (2009). The testing effect and the retention interval: Questions and answers.*Experimental Psychology, 56*(4), 252-257. doi:10.1027/1618-3169.56.4.252

Usman, E. A. (2016). Making legal education stick: Using cognitive science to foster long-term learning in the legal writing classroom. *Georgetown Journal of Legal Ethics, 29*(2), 355.

Vanags, T., Pammer, K., & Brinker, J. (2013). Process-oriented guided-inquiry learning Improves long-term retention of information. *Advances in Physiology Education, 37*(3), 233. doi:10.1152/advan.00104.2012

Wheeler, M., Ewers, M., & Buonanno, J. (2003). Different rates of forgetting following study versus test trials.*Memory, 11*(6), 571-580. doi:10.1080/09658210244000414