

The Effects of Teaching Cornell Notes on Student Achievement

A Capstone Project
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Abstract

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Acknowledgements

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Chapter One

Introduction

During my first five years of teaching, I have implemented many forms of note-taking. I gave notes on the board expecting students to copy my notes, used skeleton notes so students only wrote key pieces of information, and gave students copies of completed notes. Recently, I attended a conference on Advancement via Individual Determination (AVID) training in Dallas, Texas, where I learned the Cornell note-taking (CN) method. During the 2011 school year, I showed students the basics of CN. The “ah ha” moments that occurred when students realized why they took notes the way they did made me want to do research for additional information on this note-taking strategy. I want to determine whether this format of note-taking can impact student achievement.

Motivation for the Project

For the first time I found a better plan with CN. I returned from Dallas with confidence that CN could encourage effective and increased note-taking. The best aspect of this note-taking format is its transferability. I can teach my students to take notes, not only in my class, but in all their classes. I also believe my administration can implement CN as a school-wide method, because it does not require teachers to change their pedagogical techniques.

Background on the Problem

As a teacher, I ask students to take notes. I have tried different methods for providing notes. I tried a different method for students taking notes each year while looking for positive learning. I still haven't found a magical way. The problem each year was I did not teach the students to effectively use the new method I was trying.

Studies show an increase in student achievement with the incorporation of guided notes (Boyle, 2011; Faber, Morris, & Lieberman, 2000; Haydon, Mancil, Kroeger, McLeskey, & Lin, 2011). Students believe “taking notes is a necessity that will provide them with a source from which to study at a later time” (Faber et al., 2000, p. 257). If I can increase the number of students who take notes and improve the quality of their notes, then their achievement may increase in my class. Also, students can use the same method in other classes, which may increase their grades in those other courses.

Statement of the Problem

“Note-taking is the most common method used by students to learn information from content lectures” (Boyle, 2011, p. 51). The problem with note-taking is students are rarely taught to take effective notes (Kiewra, 2002). I have not instructed students how to take good notes, nor have their previous teachers. I have left it up to students to decide methodology for note-taking, and some students are unsure of themselves. Teaching students CN will give them the guidance they need for note-taking.

Last year, I first “taught” students CN. I use “taught” loosely because I only showed them the basics of CN. I don’t think I solved the problem of truly teaching the students a way to take notes successfully. This year, I want to teach students how to take effective notes instead of introducing them to a note-taking strategy like I did in the past.

Statement of Purpose

The purpose of my study is to determine the impact teaching students CN has on their achievement in my math classroom.

Research Questions

Will teaching my Algebra II students CN improve their mathematics achievement?

Subsequent questions include:

- Will students perform higher on tests and quizzes after they were taught CN versus students who were not taught CN?
- Will teaching CN to students increase the quality of notes students take?

Definitions

Cornell Notes—A note-taking format designed by Walter Pauk which involves sectioning paper to record main ideas, supporting details, and summaries (Pauk & Owens, 2011).

Summary

My high school history teacher taught me the basics of note-taking. I further developed my note-taking skills in college. As a high school mathematics teacher, I specialize in teaching mathematical concepts not note-taking. Therefore, I believe I have overlooked teaching the process of note-taking during my first few years of teaching. I think teaching students an easy, efficient method for taking notes will not only benefit them in my class, but also in their other classes. In this study, I plan to determine whether teaching CN in my classes will positively impact the achievement of my Algebra II students. In the following chapter I discuss note-taking as a whole, the impact teaching note-taking strategies had in different studies, and CN.

Chapter Two

Review of Literature

Note-taking is the process of taking notes from reading, lectures, or class lessons (Sedita, 2010). Students use note-taking to learn or recall material. They are expected to know how to take notes effectively by the time they reach college. “[Students] spend so much of [their] academic life accumulating information, it’s unwise to do so haphazardly...The key is to take notes effectively” (Pauk & Owens, 2011, p. 234). Teachers not teaching students how to take notes creates the problem that I wish to research.

The purpose of my project is to determine the impact teaching Cornell notes (CN) has on mathematical achievement. In this chapter I discuss the following topics: note-taking as a means of recording information; teaching note-taking and its impact on student achievement; and CN.

Note-Taking

Note-taking is a common strategy used by students to gather information from the classroom setting. “You forget almost half of what you hear or read within an hour” (Indiana Career and Postsecondary Advancement Center, 1996, p. 9), which is why students take lecture notes in their secondary and post-secondary careers. The problem is students usually haven’t been taught how to take complete notes from a lecture. Studies described below show that interventions can improve the quality of notes students take. These interventions are, but not limited to, guided or skeleton notes, completed notes, and CN.

Students use note-taking as a process of encoding and storage. The process requires students to use multiple skills at once, such as, listening, synthesizing, organizing, and writing (Czarnecki & Rosko, 1998; Haydon et al., 2011). Many students find taking notes difficult because it “requires the integrations of auditory processing skills, visual-motor skills, writing

skills, reading or listening comprehension skills, and sustained attention” (Sedita, 2010, p. 69). Even though difficult, note-taking is a popular method students use to record information.

Kenneth A. Kiewra (2002), a professor of educational psychology at the University of Nebraska-Lincoln, paraphrased Palmatier and Bennet, “99% of college students record lecture notes” (p. 72). He also paraphrased Dunkel and Davy’s statement that “94% of American students believe that note taking is a valued and important activity” (as cited in Kiewra, 2002, p. 72). Note-taking is a popular method used by and demanded from students. With such popularity, why isn’t note-taking taught better?

Students come to college inadequately prepared in note-taking. Students’ ability to record main ideas during lectures is below average (Kiewra, 2002; Neef, McCord, & Ferreri, 2006). This inability comes from lack of teaching note-taking strategies by teachers during the middle and high school years. Dr. Allen Ornstein, a Professor of Education at St. John’s University in New York, stated “Many students do not learn these skills, or learn them too late, simply because they were not explicitly taught them” (as cited in Faber et al., 2000, p. 260). Tsai-Fu and Wu (2010) also noticed a lack of note-taking skills in college students. They noted an importance of teaching students note-taking skills and making sure an adequate amount of time is spent doing it.

Backman (1994) suggested using guided instruction to effectively introduce and teach note-taking strategies. Teachers can then scaffold instruction so students take notes independently. Czarnecki and Rosko (1998) stated memorizing the strategy is the next step, followed by controlled practice and feedback, advanced practice and feedback, and then generalization. Kiewra (2002) further discussed how to embed note-taking strategies. Teachers

must first introduce a proven strategy to students, then sell the strategy, generalize the strategy, and perfect it.

Backman (1994) noted some key attributes to note-taking. A consistent format aids students in the note-taking process. Format also helps organization of notes, which benefits students when they use their notes for review. Another key attribute was listing objectives for students each day to copy in their notes. This activity let students know exactly the material to be covered, and they were able to organize by topic when it came to review. Sedita (2010) stated, using a two-column approach similar to CN is a good format for students to use. She also noted re-reading and revising notes is a key to note-taking. Marzano, Pickering, and Pollock (2001) also listed revising as a key attribute. Notes are a work in progress and should be continually read, re-read, and revised. They also stated revision should be worked into classroom time for teacher guidance to aid in the revision process. The last attribute they stated was summarizing. Students should write summaries of their notes to synthesize the information they have written down. Summarizing also helps with retention of material, and provides students with a fast, efficient way to review. Davis and Hult (1997) conducted a study strictly on writing summaries at the college level. They found summary writing paired with note-taking helped students retain information for a longer period of time compared to students who didn't write summaries. Marzano, Pickering, and Pollock (2001) posited summarizing and note-taking as "two of the most powerful skills students can cultivate" (p. 48). Unfortunately, summaries are what students struggle the most with (Donohoo, 2010; Marzano et al., 2001).

In their book, *How to Study in College*, Pauk and Owens (2011) gave a four step outline to take notes effectively; be prepared, start with the Cornell System, gather information, and tie things together. I discuss these topics in greater detail in the following paragraphs.

Students should be prepared to take notes from a lecture or textbook, before they begin to physically take notes. Pauk and Owens (2011) described ways for students to be prepared for either situation. They suggested students get acquainted with the textbook they will be using. Students can do this by looking through the table of contents and introductions. Also, reading through a few sections gives an idea of how the book reads. This helps preview some topics that will be covered during the year. The advice given for lecture preparation is similar since many lectures are accompanied by suggested readings. They also stated reviewing previous lecture notes will aide in understanding the forthcoming lecture. They suggested this since time “will rarely permit a rehash of ideas that have already been fully explained.” (p. 243). This time constraint requires students to revisit previous material, which also increases students understanding of that material.

Starting with the Cornell System will be discussed in more detail later in this chapter. I will skip ahead to gathering information. Engagement is the key to gathering information, whether it is from a textbook or a lecture. Having an inquisitive mindset is the key to engagement. Pauk and Owens (2011) posited students should formulate questions while they are reading or listening to lectures to stay engaged and process information in a more meaningful way. Asking questions during a lecture clarifies information for the listener, although some students are too timid to ask. Teachers should always remind students of the old adage “the only dumb question is the one that is never asked” (Pauk & Owens, 2011, p. 255). Students taking notes from a textbook can also formulate questions while reading. Writing down questions helps summarize material students have read. Rewording headings in the text to formulate questions is one hint the authors gave for students who struggle with creating questions. Other signs to look for during lectures or textbook readings are changes in intonation. Changes in pace and volume

are examples of intonation during lectures. Changes in size, color, and font are examples of intonation in textbooks. The final piece of gathering information is writing efficiency. Pauk and Owens (2011) suggested developing a system of shorthand writing. Using symbols in place of words allows students to record notes more efficiently. Students who spend less time writing every word are able to concentrate more on the lecture and record more pieces of information.

The final key Pauk and Owens (2011) stated is tie things together. A great opportunity arises at the end of a lecture or end of a reading. Students have the ability to summarize material they received while it is fresh in their minds. This crucial time allows students to rerun through the lecture in their minds or skim back through the text to recall any information they may have missed. The authors suggested adding any information to the students' notes that they might have missed. It is also a time for students to formulate questions they may still have about the presented material. The studies listed next show, by using these guidelines and key attributes, teachers can increase student achievement.

Note-taking and Achievement

Working through the strategies listed above produced many positive results on student achievement. A study done on college students showed an improvement on quiz scores with the use of guided notes. Guided notes are teacher-prepared notes that students receive to fill in important pieces of information. The results of the study also showed students preferred the use of guided notes to traditional notes (Neef et al., 2006). Similarly, a study done by Musti-Rao, Kroeger, and Schumacher-Dyke (2008) showed an increase in college students' quiz scores with implementation of guided notes. They also concluded students preferred using guided notes to the traditional form of note-taking.

Studies have also been done at the secondary level. Backman (1994) conducted a study in her math classroom on finding an effective note-taking system for math students. She allowed students to develop their own sets of notes and then used surveys to find commonalities amongst the notes. Some of the commonalities included “definitions, diagrams, sample problems, rules or steps to do a problem, and a list of items that gave them trouble” (Backman, 1994, p. 77). Some students also used “different color ink, labels, outlines, highlighting and underlining, and special symbols like stars or asterisks” (p. 79). Students then took those commonalities and incorporated them into their own notes. Backman observed an increase in note-taking and also an improvement in students’ grades.

Wamsley and Hickman (2006) piloted a study in their math classes to compare the effectiveness of three styles of note-taking; traditional notes, column notes, and mini-textbooks. The findings of the study found column notes were the favored method of students. Column notes contained similar attributes to CN such as listing essential questions and using one column for supporting details. Students also noted they took more notes when using the column style method which made understanding easier. Their results showed students used column notes to improve their understanding of material.

Boyle (2011) conducted a similar study on middle school students, but only showed one strategy of note-taking versus three strategies. Boyle used a strategic note-taking method, which taught students to “link prior knowledge, cluster main ideas, summarizing like ideas, recognize vocabulary, and review main lecture points” (p. 54). The results of the study found students who were taught the method outperformed their counterparts by recording more important lecture cues. These students also outperformed students on compressive tests. Boyle also found students

preferred being taught a method to take notes because it improved their note-taking ability and grades.

Faber, Morris, and Lieberman (2000) conducted a study on the effects of active note-taking. They taught ninth grade students to take notes using CN. They noted a lack of instruction on note-taking, which resulted in lower comprehension by students. Students were not only taught note-taking strategies, but also prereading and questioning strategies. The results of their study showed students who were taught CN improved their encoding process. Also, students scored higher on tests than their counterparts. They also showed the teaching of note-taking benefited students of all abilities. Therefore, teaching note-taking strategies facilitates higher comprehension regardless of student ability.

Donohoo (2010) also performed a similar study teaching CN to her students. Her first attempt was unsuccessful. She then followed guidelines, similar to Backman (1994), to introduce CN to her students. She used modeling, guided instruction, collaboration, and independent practice to teach the CN strategy. The results of her study showed an increase in student achievement compared to other classes and also a 10%-12% increase in individual scores from the previous semester. The findings of her study were so compelling; CN became a school-wide strategy the following year.

Tsai-Fu and Wu (2010) performed a study on Taiwanese college students. They investigated the effects of teaching CN and note-taking languages on college students' comprehension. The study focused on teaching CN and the effects it would have during short conversations and long lectures at the college level. Students were also categorized by the language in which they took the notes, either English or Chinese. The findings of the study showed students who were taught CN scored significantly higher on both short conversation and

longer lecture recall. They also noted that CN may not have replaced previous note-taking strategies students had, but did show an advantage because CN are a “well-established, practical way to summarize and highlight important information for later study and review” (p. 127). Another point noted by the authors was intentional, sustained instruction of note-taking strategies is imperative to help students, but is usually absent from most curriculum.

Cornell Note-taking

Cornell notes got its name from Walter Pauk at Cornell University. Walter Pauk, a director of the reading study center at Cornell University and an author of numerous study skills texts, developed CN in the 1950s. Pauk, influenced greatly by the SQ3R Method, a method for reading and studying that stands for surveying, questioning, reading, reciting, and reviewing, changed his speed reading course during 1953, into a study skills course (Kerstiens, 1998).

Cornell notes takes students through a systematic approach of recording information. All students have the same outline to follow while recording notes. The students start by dividing their paper into two columns by drawing a vertical line about a third of the way in from the left edge of the paper stopping two inches from the bottom. Students then draw a horizontal line across the paper, two inches from the bottom of the paper. An illustration is given in Figure 1.

Students now begin the note-taking process. They write classroom or textbook notes in the right-hand column they created. The first chance they get, students reduce key ideas from the notes and write them in the left-hand column they created. Covering the right-hand side of the paper, students should use the key terms or questions they wrote to recite the main ideas of the lecture. This will help students retain the knowledge they wrote down.

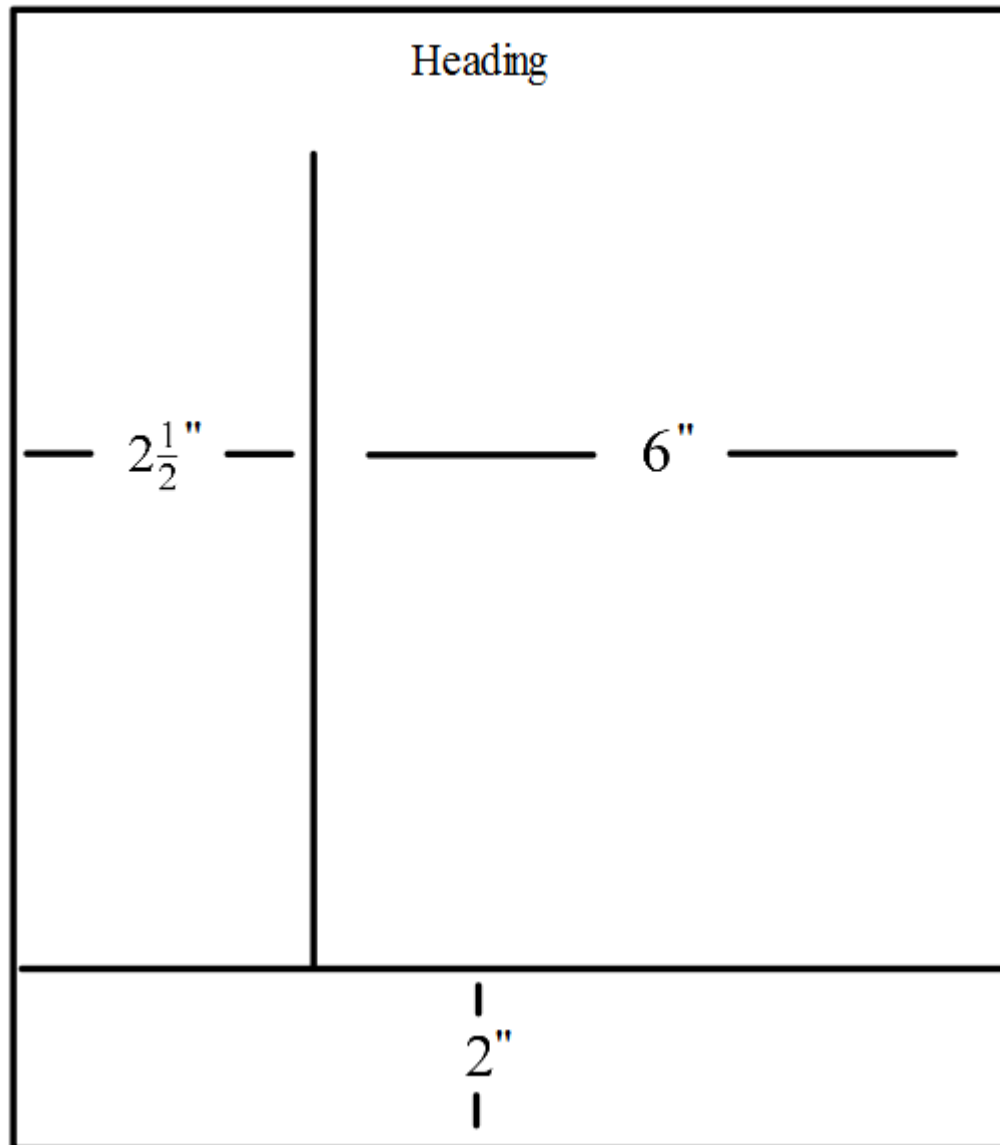


Figure1, [Illustration of Cornell layout for student note-taking.]

Think and reflect are the next steps. Students should think about the notes they have taken and why the material they noted is important to them. They can then write summaries about the notes on the bottom of the page in the section they created. This task helps them internalize the information and review for tests, which is the final step in the note-taking process—review the notes they have taken. Students can re-read the summaries they wrote, ask

themselves the questions they wrote in the left margins, or just re-read all the original notes they took. This process is Cornell notes.

Summary

Note taking is a vital skill students need to learn before they reach college. Unfortunately, this skill is often overlooked by middle and high school teachers. The note-taking process encompasses many different skills that require students to perform multiple tasks at once. Some students are not prepared enough to take on such tasks all at one time, which is why teaching the art of note-taking is so crucial to middle and high school students.

Some of the key aspects found in the studies listed above included not only the elements of note-taking, but also how to teach note-taking. Introducing, selling, generalizing, and perfecting are ways to teach a note-taking strategy. This process provides teachers a way to integrate teaching note-taking into their classrooms. Format, revising, and summarizing were the key elements for taking notes. Students should develop or be taught to use a certain format, such as CN. They should also revisit their notes frequently to add any details that may have been missed. The final step students take in the process is summarizing. This allows students to review and tie important pieces of information together to improve their overall understanding of the material.

Using these key strategies listed above can result in an increase of student achievement. The studies discussed earlier showed an increase in student achievement when teaching note-taking strategies. When taught a note-taking strategy, students' quiz scores, retention of material, participation in class, recording of key lecture points, and overall grades increased. This shows why teaching students a strategy, such as CN, is so important.

Cornell notes is a strategy designed to force students to revisit their notes. It involves separating paper into columns for supporting details, main ideas, and summaries. This style of note-taking was developed by Walter Pauk and embeds many of the key attributes of note-taking stated above. I will teach this strategy to my students to determine if it will increase their achievement in mathematics.

Chapter Three

Research Design and Method

The intent of this study is to determine if teaching students Cornell notes (CN) increases their achievement in Algebra II. In this chapter I outline the setting of the study, implementation, and the data collection process.

Setting

I am currently in my sixth year as a mathematics teacher and my fifth year at my current school. Working at one of the largest schools in the state, I have approximately 120 Algebra II students. The total enrollment at my high school is just shy of 1600 students grades 10-12. With many of my Algebra II students having aspirations of going to college, I thought teaching them a style of note-taking would benefit not only their grades, but hopefully they would carry this skill with them to college.

The participants in this study consisted of approximately 120 Algebra II students in grades 10-12. The students take the same class from me throughout different parts of the day. I started the study with 60 females and 58 males, consisting of 28 sophomores, 28 juniors, 4 seniors, and 26 sophomores, 27 juniors, and 5 seniors, respectively.

A circumstance which could affect the outcomes of this study is students who may have already been taught CN. Running the study with a control group that has students who already have prior knowledge of CN may affect the results of the study.

Intervention/Innovation

Throughout the course of this study I plan to teach two of my Algebra II classes how to take notes using CN. I plan to teach students the key attributes of CN and how they can use them to help review for assessments. In the other two Algebra II classes I will present the same

material, but without giving them the background of CN. Students in all four Algebra II classes will receive the same material, delivered the same way, but two classes will be taking notes on the information using CN, and the other two classes will take notes in the format of their liking. All classes will be learning about square root, cubed root, exponential, and logarithmic functions during the study.

Design

The action research project on CN will be a quantitative approach. Numerical data will be produced from quizzes and tests and also from note checks. Descriptive and inferential analysis will be applied to the data collected. The quality of students' notes will be graded according to a rubric (see Appendix A), which will provide data to compare the quality of notes that students take during class.

Description of Methods and Analysis Strategy

Prior to the start of the research project, I will give a consent form to the parents/guardians of the intervention classes and base classes, as well as a student assent form for the intervention classes and base classes (see Appendix B, Appendix C, Appendix D, and Appendix E, respectively) to gain the approval of their children being involved in the data collection process. The school's principal also signed a permission letter (see Appendix F) approving the study. Permission will be obtained from Minot State University's Institutional Review Board (see Appendix G). After all necessary criteria are met, I will start my study by doing note checks to get a baseline of the quality of notes students are taking by using a rubric to record scores (see Appendix A). I will randomly select 30 students from the intervention classes and 30 students from the base classes over the course of a week to measure and record the

quality of their notes according to the rubric. These rubric results will also establish a reference for comparative data at the end of the third nine-weeks.

At the beginning of the nine-weeks, I will use a 95% confidence level (or 0.05 level of significance) and a *t*-test of independent samples to determine if the two classes have comparable note-taking skills. My null hypothesis will be no difference in note-taking rubric scores of the intervention and base classes, and my alternative hypothesis will be a significant difference in note-taking rubric scores of the intervention and base classes. I will also do the same test using MAP scores of the students in my intervention and base classes to determine if the intervention classes and base classes have similar levels of math achievement. My null hypothesis will be no difference in math achievement levels of the intervention and base classes, and my alternative hypothesis will be a significant difference in math achievement levels of the intervention and base classes. If their math achievement levels are significantly different I will need to use an ANCOVA, rather than a *t*-test of independent samples, to compare the two classes after the intervention has taken place.

Throughout the nine-weeks I will record test and quiz scores from the base and intervention classes. I will take the assessment results from both classes and use them to determine if teaching CN increases student achievement in my Algebra II classes. At the end of the nine-weeks, I will select the same 30 students from my intervention and base classes and record the quality of their notes according to the rubric used at the start of the nine-weeks.

I will calculate mean, median, and standard deviation for note check data. When comparing these results, I will use a 95% confidence level (or 0.05 level of significance) and a *t*-test of independent samples to determine if the quality of notes students took in the intervention classes compared to the base classes was significantly higher. My null hypothesis is there is no

difference in the quality of notes of the base and intervention classes, and my alternative hypothesis is the intervention class has higher rubric scores for the quality of their notes. This method of analyzing note quality is appropriate because this is the standard statistical method to determine if there is a significant difference in data of two groups.

I will also calculate mean, median, standard deviation, and percentages for all achievement data. When comparing achievement results, I will use a 95% confidence level (or 0.05 level of significance) and a *t*-test of independent samples, if the classes were deemed similar, to determine if student achievement in the intervention classes compared to the base classes was significantly higher. Student achievement will be measured using identical quizzes and tests administered to both classes. My null hypothesis is there is no difference in student achievement of the base and intervention classes, and my alternative hypothesis is the intervention class has higher student achievement. This method of analyzing student achievement is appropriate because this is the standard statistical method to determine if there is a significant difference in data of two groups.

Expected Results

I hypothesize students will perform better on assessments because of the style of note-taking they learned. I also hypothesize that students will become better note takers after learning the Cornell style of note-taking. I believe teaching students a way to take notes would help improve their ability to process and record information. This will also help students perform better on quizzes and tests.

Timeline for the Study

The timeline for the study will be seven weeks. I will begin by teaching the students how to take notes using CN. This will take approximately two weeks. I will then administer quizzes

and tests throughout the remaining five weeks. During the final weeks I will be doing note checks again to compare the quality of notes students are taking. I will quantify this data through the use of a rubric. The analysis of the data and writing of the results will take additional time after the completion of the study.

Summary

Throughout the course of the study, two of my Algebra II classes will be provided guidance on how to take notes. The format with which they will take the notes is CN. I will collect data from quizzes, tests and note checks. I will compare the quiz and test data to my other two Algebra II classes, which have not been taught how to take CN. I will compare these data to determine if teaching CN increases student achievement in my Algebra II classes. In addition, I will compare the pre and post note checks of the classes that were taught CN. The results of the study are provided in the next chapter.

Chapter Four

Results and Interpretations

Use an introductory paragraph to remind the reader of your purpose and to give them a brief description of what is included in this chapter.

Results of Data Analysis

Address each data collection method separately and provide its results (e.g., chapter test, survey, interview, etc.). Be sure to do the following:

- Summarize the results of surveys or other instruments.
- Display numerical or statistical results in tables or figures.
- Report the results of any statistical analyses you conducted.
- Theme and summarize narrative data, including representative quotes when appropriate.

Note: You may need to remind the reader of what you did to analyze the data while you are presenting the results.

Interpretation of Results

Revisit each research question and present the data that answer that question. Include the following:

- Did you successfully answer your question?
- Did you get the results you expected?
- Discuss significance and rigor (i.e., quality, validity, accuracy, credibility, trustworthiness) as needed.
- Discuss unusual circumstances as needed

Summary

Briefly summarize what you wrote in Chapter Four, highlighting the key findings, and transition the reader to the next chapter.

Chapter Five

Conclusions, Action Plan, Reflections, and Recommendations

Add an introduction here. Otherwise the two levels of headings, the one at the top that names Chapter Five and the Conclusions heading beneath it, are too close and look weird. You can reiterate your purpose and/or tell the reader what to expect in this chapter.

Conclusions

Draw conclusions about your research questions based on your results. Someone reading only this section should get a sense of your research purpose and findings.

Action Plan

Present a plan of action. What will you do now? Will you continue, modify, or throw out your innovation? Why? Speculate on your “next steps” in the action research cycle.

Reflections and Recommendations for Teachers

This section is all for you—your opinions, impressions, frustrations, and celebrations.

- What would you do differently?
- What were the highlights of your project?
- Advice to teachers about your intervention.
- Advice to teachers about action research.

Summary

This is the last paragraph of the paper. Briefly summarize what you wrote in Chapter Five and give any last comments that will help wrap up the paper.

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Appendices

Appendix A

Note Rubric

	1	3	5
Legibility	<ul style="list-style-type: none"> Notes are difficult to read. It is difficult to see different sections. Indentation or bullet points are not used. 	<ul style="list-style-type: none"> 1 – 3 words are difficult to read. Spaces missing between some sections. Indentation or bullet points are not used. 	<ul style="list-style-type: none"> Neat and completely legible. Adequate spacing between sections. Indentation and bullet points help organize information.
Notes	<ul style="list-style-type: none"> Notes are incomplete. No use of abbreviations. 	<ul style="list-style-type: none"> Notes may/may not be accurate, information is not always paraphrased. Uses little abbreviation. No highlighting or underlining evident. 	<ul style="list-style-type: none"> Notes are selectively and accurately paraphrased. Use of logical abbreviations. Notes have been edited. Key words have been highlighted or underlined. Revisions/additions are made in a different color.
Thoroughness	<ul style="list-style-type: none"> Students didn't write down examples or steps for problems 	<ul style="list-style-type: none"> Students copied some examples with some steps for problems copied 	<ul style="list-style-type: none"> Students copied all of the examples with all steps shown for the problems

Appendix B

The Effects of Teaching Cornell Notes on Student Achievement

Parent/Guardian Consent Form: Intervention Class

Purpose of the Research

I am currently completing work toward my Masters of Arts in Teaching: Mathematics degree through Minot State University. For my final degree requirement, I am conducting an action research project in my Algebra II classrooms during quarter 3, January 14th to March 19th, to determine if teaching Cornell notes increases student achievement and note-taking quality.

Specific Procedures

In Algebra II, students will be taught how to take notes using the Cornell style of note-taking. I will be present to facilitate this process and help correct any mistakes students might make. The teaching of the note-taking will last approximately two weeks.

At the end of the quarter, student assessment (quizzes and tests) results will be analyzed to determine whether teaching Cornell notes increased student achievement in Algebra II. Assessment results will be compared with the other Algebra II classes that were not taught Cornell notes. In addition, I will analyze data from pre and post note checks. My results will be summarized and included in my research paper. No students will be identified in my results. Mr. Clark, principal of West Fargo High School, has approved this research study.

Confidentiality

The researcher (myself) will treat all data confidentially. All data will be kept safe in a locked cabinet or on my password-protected computer. All data will be destroyed once the paper has been defended. The researcher agrees to maintain strict confidentiality; which means your student's name will not be discussed or divulged with anyone.

Voluntary Nature of Participation

I hope you approve of your student being involved in this study because a large sample size improves the accuracy of the results of my study. If you decide to participate, you are free to withdraw your consent at any time. If you do not consent or withdraw your consent, your student's data will not be included in my results, but your student will still participate in the classroom as it is part of the course work.

Human Subject Statement

The Institutional Review Board of Minot State University has given me permission to conduct this research. If you have questions regarding the rights of research subjects please contact the Chairperson of the MSU Institutional Review Board (IRB), Dr. Bryan Schmidt at 701-858-4250 or bryan.schmidt@minotstateu.edu.

Offer to Answer Questions

If you have any questions or concerns now or during the study, feel free to contact me at dbroe@west-fargo.k12.nd.us. Thank you for your consideration.

Consent Statement

You are voluntarily making a decision whether or not to participate in this study. With your signature below, you are indicating that upon reading and understanding the above information, you agree to allow your student's assessment results to be used in this study.

Participant (Please Print Student's Name)

Signature of Parent or Guardian

Date

Appendix C

The Effects of Teaching Cornell Notes on Student Achievement

Parent/Guardian Consent Form: Base Class

Purpose of the Research

I am currently completing work toward my Masters of Arts in Teaching: Mathematics degree through Minot State University. For my final degree requirement, I am conducting an action research project in my Algebra II classrooms during quarter 3, January 14th to March 19th, to determine if teaching Cornell notes increases student achievement and note-taking quality.

Specific Procedures

In Algebra II, students take notes to help retain material. I will be presenting material to all of my Algebra II classes using the same methods. Students in two of my other Algebra II classes will be taught a specific style of note-taking, Cornell notes.

At the end of the quarter, student assessment (quizzes and tests) results will be analyzed to determine whether teaching Cornell notes increased student achievement in Algebra II. Assessment results will be compared with the other Algebra II classes that were taught Cornell notes. My results will be summarized and included in my research paper. No students will be identified in my results. Mr. Clark, principal of West Fargo High School, has approved this research study.

Confidentiality

The researcher (myself) will treat all data confidentially. All data will be kept safe in a locked cabinet or on my password-protected computer. All data will be destroyed once the paper has been defended. The researcher agrees to maintain strict confidentiality; which means your student's name will not be discussed or divulged with anyone.

Voluntary Nature of Participation

I hope you approve of your student being involved in this study because a large sample size improves the accuracy of the results of my study. If you decide to participate, you are free to withdraw your consent at any time. If you do not consent or withdraw your consent, your student's data will not be included in my results, but your student will still participate in the classroom as it is part of the course work.

Human Subject Statement

The Institutional Review Board of Minot State University has given me permission to conduct this research. If you have questions regarding the rights of research subjects please contact the Chairperson of the MSU Institutional Review Board (IRB), Dr. Bryan Schmidt at 701-858-4250 or bryan.schmidt@minotstateu.edu.

Offer to Answer Questions

If you have any questions or concerns now or during the study, feel free to contact me at dbroe@west-fargo.k12.nd.us. Thank you for your consideration.

Consent Statement

You are voluntarily making a decision whether or not to participate in this study. With your signature below, you are indicating that upon reading and understanding the above information, you agree to allow your student's assessment results to be used in this study.

Participant (Please Print Student's Name)

Signature of Parent or Guardian

Date

Appendix D

The Effects of Teaching Cornell Notes on Student Achievement

Student Assent Form: Intervention Class

Purpose of the Research

I am currently completing work toward my Masters of Arts in Teaching: Mathematics degree through Minot State University. For my final degree requirement, I am conducting an action research project in my Algebra II classrooms during quarter 3, January 14th to March 19th, to determine if teaching Cornell notes increases student achievement and note-taking quality.

Specific Procedures

In Algebra II, you will be taught how to take notes using the Cornell style of note-taking. I will be present to facilitate this process and help correct any mistakes you might make. The teaching of the note-taking will last approximately two weeks.

At the end of the quarter, your assessment (quizzes and tests) results will be analyzed to determine whether teaching Cornell notes increased your achievement in Algebra II. Assessment results will be compared with the other Algebra II classes that were not taught Cornell notes. In addition, I will analyze data from your pre and post note checks. My results will be summarized and included in my research paper. None of your names will be identified in my results. Mr. Clark, principal of West Fargo High School, has approved this research study.

Confidentiality

The researcher (myself) will treat all data confidentially. All data will be kept safe in a locked cabinet or on my password-protected computer. All data will be destroyed once the paper has been defended. The researcher agrees to maintain strict confidentiality; which means your name will not be discussed or divulged with anyone.

Voluntary Nature of Participation

I hope you approve being involved in this study because a large sample size improves the accuracy of the results of my study. If you decide to participate, you are free to withdraw your consent at any time. If you do not consent or withdraw your consent, your data will not be included in my results, but you will still participate in the classroom as it is part of the course work.

Human Subject Statement

The Institutional Review Board of Minot State University has given me permission to conduct this research. If you have questions regarding the right of research subjects please contact the Chairperson of the MSU Institutional Review Board (IRB), Dr. Bryan Schmidt at 701-858-4250 or bryan.schmidt@minotstateu.edu.

Offer to Answer Questions

If you have any questions or concerns now or during the study, feel free to contact me at dbroe@west-fargo.k12.nd.us. Thank you for your consideration.

Consent Statement

You are voluntarily making a decision whether or not to participate in this study. With your signature below, you are indicating that upon reading and understanding the above information, you agree to allow your assessment results to be used in this study.

Participant (Please Print Name)

Signature of Participant

Date

Signature of Researcher

Date

Appendix E

The Effects of Teaching Cornell Notes on Student Achievement

Student Assent Form: Base Class

Purpose of the Research

I am currently completing work toward my Masters of Arts in Teaching: Mathematics degree through Minot State University. For my final degree requirement, I am conducting an action research project in my Algebra II classrooms during quarter 3, January 14th to March 19th, to determine if teaching Cornell notes increases student achievement and note-taking quality.

Specific Procedures

In Algebra II, you take notes to help retain material. I will be presenting material to all of my Algebra II classes the same. Students in two of my other Algebra II classes will be taught a specific style of note-taking, Cornell notes.

At the end of the quarter, your assessment (quizzes and tests) results will be analyzed to determine whether teaching Cornell notes increased achievement in Algebra II. Assessment results will be compared with the other Algebra II classes that I taught Cornell notes. My results will be summarized and included in my research paper. None of your names will be identified in my results. Mr. Clark, principal of West Fargo High School, has approved this research study.

Confidentiality

The researcher (myself) will treat all data confidentially. All data will be kept safe in a locked cabinet or on my password-protected computer. All data will be destroyed once the paper has been defended. The researcher agrees to maintain strict confidentiality; which means your name will not be discussed or divulged with anyone.

Voluntary Nature of Participation

I hope you approve being involved in this study because a large sample size improves the accuracy of the results of my study. If you decide to participate, you are free to withdraw your consent at any time. If you do not consent or withdraw your consent, your data will not be included in my results, but you will still participate in the classroom as it is part of the course work.

Human Subject Statement

The Institutional Review Board of Minot State University has given me permission to conduct this research. If you have questions regarding the rights of research subjects please contact the Chairperson of the MSU Institutional Review Board (IRB), Dr. Bryan Schmidt at 701-858-4250 or bryan.schmidt@minotstateu.edu.

Offer to Answer Questions

If you have any questions or concerns now or during the study, feel free to contact me at dbroe@west-fargo.k12.nd.us. Thank you for your consideration.

Consent Statement

You are voluntarily making a decision whether or not to participate in this study. With your signature below, you are indicating that upon reading and understanding the above information, you agree to allow your assessment results to be used in this study.

Participant (Please Print Name)

Signature of Participant

Date

Signature of Researcher

Date

Appendix F

School Principal Consent Form

Dear Mr. Clark:

I am completing work toward the Master of Arts in Teaching: Mathematics degree through Minot State University. As a degree requirement, I must conduct a research project in my classroom during the third quarter this year. I am planning to teach students how to take notes the Cornell way to determine if teaching note-taking strategies increases student achievement in my Algebra II classes. To accomplish this, I would like to work with the students in my Algebra II classes.

During this time, students will be taught how to take notes using the Cornell style of taking notes in two of my Algebra II classes. The other two Algebra II classes will be taught the same material, but not shown how to take notes the Cornell way. All classes will be given the same assessments. The data from those assessments will be used for data analysis.

At the completion of the study, I will analyze the data from the assessments. Classroom and student confidentiality will be observed regarding all data collected and no individual will be identified by name.

Before the study begins, I will send home consent forms for parents/guardians to notify them of this project and request their permission allowing their student to participate in the research study. A copy of this letter is attached for your inspection. Students will complete a similar assent form.

I am requesting your permission to carry out this research in my classroom. Please contact me if you have any questions. Thank you for your consideration.

_____ I grant permission for Duane Broe to conduct the above mentioned research in his classroom.

_____ I do not grant permission for Duane Broe to conduct the above mentioned research in his classroom.

Signature of Mr. Gary Clark, Principal at West Fargo High School

Date

Appendix G
IRB Approval Letter