The Effects of Teaching Using Interdisciplinary Integration and Traditional Strategies on Student Performance in a 7th Grade English Class

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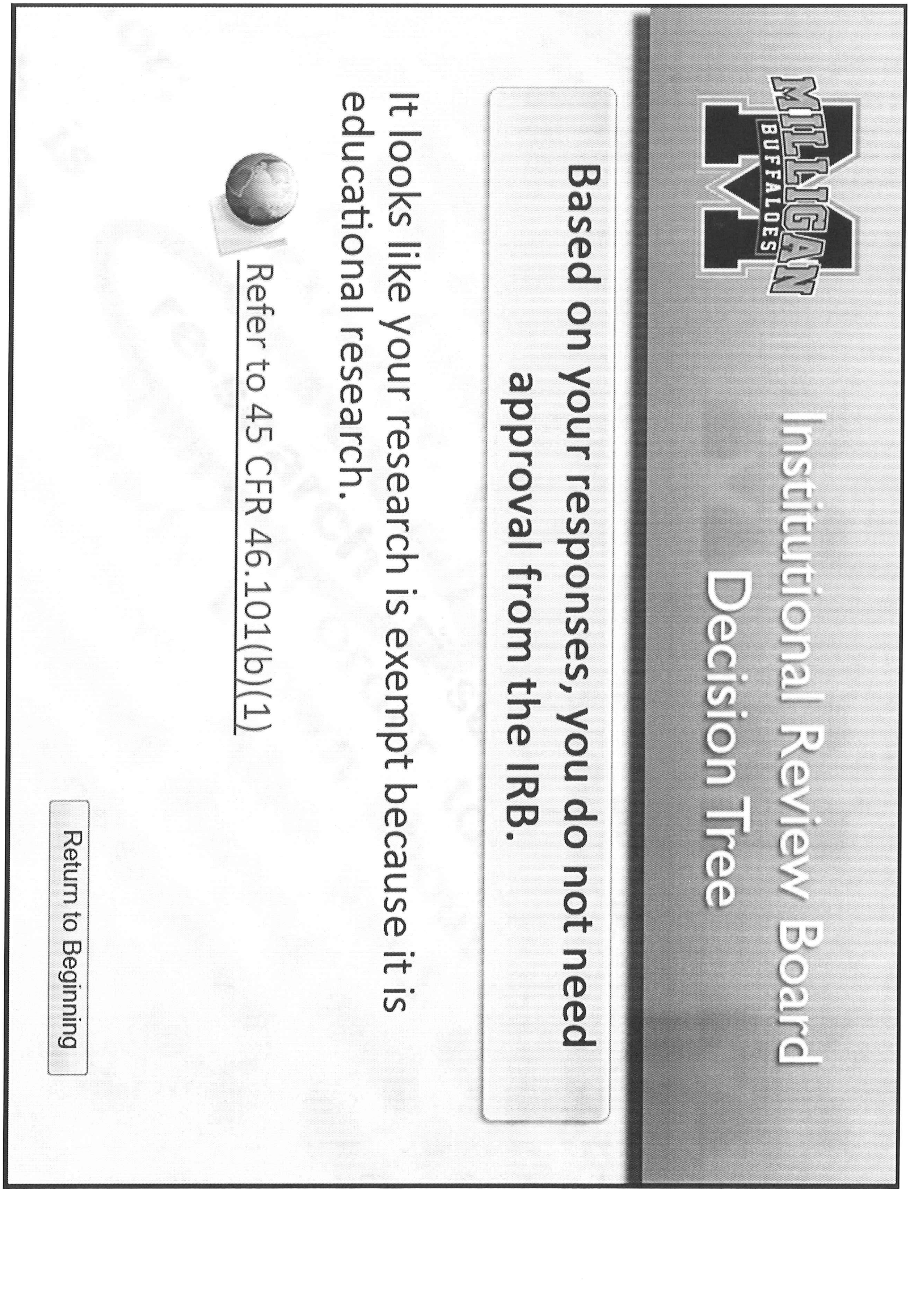

Abstract

The purpose of this study was to examine the effects of teaching using interdisciplinary integration and traditional strategies on student performance in a seventh grade English class. The sample consisted of two intact seventh grade classes (7A and 7B) at a Northeast Tennessee private school. One class served as the experimental group and consisted of 19 students while the other class served as the control group and consisted of 17 students. Both groups were given pretests to determine basic vocabulary skill, and then exposed to 5 short daily vocabulary lessons. The experimental group's lessons were augmented by the inclusion of content from the students' Geography class. Data were analyzed using ANCOVA to covary out the pretest. The results indicated no significant difference between interdisciplinary integration strategies and traditional teaching methods ($F(1,28)=.230$, $p>.05$). Similarly, no significant difference was found between genders when taught using interdisciplinary integration ($F(1,26)=.522$, $p>.05$).

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Chapter 1

Introduction

When students grow up, often after attending some form of post-secondary education, they enter what is colloquially known as the real world. It seems reasonable, then, to assume that a primary purpose of education is to prepare students for success in this real world—indeed, the Tennessee Department of Education has declared college- and career-readiness to be the defining characteristic of its academic standards (Academic Standards, n.d.). As they move through their academic careers, however, students are sent off with increasing frequency to separate classrooms to receive increasingly specialized education in particular subjects. By the time students reach the secondary grades, the school day is broken up into very distinct sections. A student is no longer in Mrs. Bell's class or Mr. Arnold's class, where they will learn reading, writing, and arithmetic. Instead, they go to Physics class and then English class and then Art class and so on, receiving specialized training for each individual subject with little regard for other academic disciplines (Robinson, 2001).

It is important to note that this separation is inevitable and necessary. As learning becomes more specialized, it requires more preparation and expertise on behalf of a teacher,

and a teacher who is highly qualified in upper-level mathematics is not usually as highly qualified in language arts. Unfortunately, this results in a system wherein various disciplines are clearly divided and taught as separate entities, which is simply not how the real world works. To fully understand a piece of visual art or literature, one must first gain an adequate understanding of the societal values of the era in which it was created. Engineers and architects must be concerned not only with the structural integrity of their projects, but also with the artistic and aesthetic aspects that come into play (Goble & Sousanis, 2010).

The discrepancy between this highly divided method of education and the holistic, interdisciplinary nature of the real world poses a problem to the research community that remains largely unanswered. There are certainly indications, however, that a more integrated method of education may be beneficial to students. In a case study involving English sixth graders, Hickman and Kiss (2010) found that while students didn't necessarily know whether they felt interdisciplinary links were actually beneficial to their learning, they expressed a positive affectation toward these links and demonstrated an increased level of participation when links were explicated by a teacher. Similarly, Pavlou and Athansiou (2014) found that exposure to music while viewing visual art prompted participants to respond

more elaborately to the artwork. In both of these studies, results suggest that integration of subject matter encourages higher levels of engagement in learning.

In addition to these affective elements, interdisciplinary integration may also be beneficial to the cognitive process of encoding information for memory. Constructivism, a theory of learning that is well supported by research (Semerci & Batdi, 2015), asserts that learners actively construct new knowledge based on prior knowledge. As an individual encodes new information, that information becomes tied to pre-existing webs of related knowledge, or *schemas*, which promotes long-term memory retention (van Kesteren, 2014). The higher the quantity and quality of connections made between new information and prior knowledge, the better learned the new information will be.

This is significant with respect to this present study because cross-curricular integration implicitly provides students with more opportunities to establish connections between the new information being presented and previously learned information from other subjects, thus cementing the knowledge more firmly in their minds. Furthermore, students' learning may also benefit from the review of material from other classes, particularly because it is being revisited in a different spatial context than the one in which the material was originally presented (Chu, 2003).

Statement of the Problem

The amount of research that exists on the subject of interdisciplinary integration in schools is minimal at best. There is plenty of research that vaguely points toward the potential benefits of such integration, but very little which actively explores these benefits in practical, feasible ways. Thus, the problem of this study was to examine the effects of interdisciplinary integration on student performance in a seventh grade English class.

Purpose of the Study

The purpose of this study was to examine the effects of teaching using interdisciplinary integration and traditional strategies on student performance in a seventh grade English class.

Significance of the Study

This study primarily serves to prop open the door for further research into the realm of interdisciplinary education and cooperation between teachers of different subjects. This research could benefit students and teachers by demonstrating the tangible effects on students' academic performance of cross-curricular integration on a feasible scale.

Limitations

The following limitations were encountered:

1. The population of this study was comprised of the seventh grade class at a local private school, and therefore the results could not be generalized with confidence.
2. The instruments used to collect data were designed by the classroom teacher and were not tested for reliability or validity.

Definitions

The following were important operational definitions used in this study:

1. Cross-curricular/interdisciplinary: These terms are used interchangeably to describe anything that involves an interaction between two or more disciplines or subjects, such as Math, English, Science, or Art.
2. Contextualization: An interdisciplinary strategy in which the teacher presents content from his own class curriculum and supports this content by drawing explicit connections to concurrent content from students' other classes.
3. Academic performance: Sometimes referred to simply as *performance*, this is measured in the present study by a vocabulary quiz at the end of each week, created and administered by the seventh grade English teacher.

Overview

This study is made up of five chapters. Chapter one gives an introduction to the study; offers a statement of its problem, purpose, and significance; describes its limitations; presents definitions for important terms and concepts; and offers an overview of the study. Chapter two is a review of the literature, chapter three describes the methodology and procedures of the study, and chapter four presents the data analysis. Finally, chapter five discusses the findings, conclusions, implications, and recommendations of the research.

Chapter 2

Review of the Literature

Interdisciplinary integration offers many potential benefits to educators of all kinds. First, its inclusion in the curriculum offers students a more robust experience of and preparation for life in the real world, which is the implicit purpose of education. Furthermore, research indicates that learning occurs as learners form connections between new and old information, which suggests that linking new information with prior knowledge from other classes only serves to strengthen learning in the classroom. Relatedly, addressing the same information in multiple classroom settings has been shown to eliminate the phenomenon of context-dependent forgetting, where a learner is likely to forget information in contexts other than the one in which it was learned. Finally, interdisciplinary integration increases student participation and engagement in the classroom, which directly contributes to students' academic achievement and socioemotional well-being (Upadyaya & Salmela-Aro, 2013). The following literature review examines the existing research regarding these topics, using this body of knowledge as a starting point from which to consider this present study.

The Real World

The influential educational psychologist and philosopher John Dewey (1897) firmly believed that education ought to prepare students for participation in the society at large by mimicking that very society on a smaller, more manageable scale. The Tennessee Department of Education echoes this sentiment with its Academic Standards (n.d.), declaring that these standards are set in place in accordance with developmentally appropriate preparation for what we might colloquially call *the real world.* Unfortunately, schools appear to be missing a major component which characterizes work and life beyond academia: interdisciplinary integration.

Admittedly, the root cause of this deficiency is a heavily increased need for specialization in all fields (Robinson, 2001). As the speed and ease of communication has increased, the universal body of knowledge has flourished. No longer must researchers wait months or years to hear of the latest scientific discoveries; scientists across the globe can now communicate ideas in real-time, with clarity and precision. Our present world of instant access enables collaboration and criticism which produces new knowledge daily. In such a world, a learned person is simply unable to fully grasp more than a small fraction of all available knowledge, even in a single field (Robinson, 2001).

Thus, as students move into middle and high school, classes become increasingly specialized in order to accommodate a level of educational progression where teachers are not—nor should they be expected to be—able to proficiently teach all of the available subjects and specializations. The single-teacher days of elementary school are divided into Math, Science, Art, and English. Later, each of these subjects is further subdivided. Math becomes Calculus or Statistics; Science becomes Physics, Biology, and Chemistry; and Art becomes Choir, Pottery, Drama, Band, Orchestra, and more. Each class having its own highly-qualified teacher, students benefit from the availability of extensive knowledge in each discipline (Robinson, 2001).

In terms of specialization, the education system has effectively mirrored the world of working adults; it is in communication across specializations that education has fallen short. The development of interdisciplinarity came about in scholarly professions several decades ago in response to increasing specialization. In 1980, Clifford Geertz made the monumental declaration that genres were becoming blurred. Since that time, interdisciplinary communication and collaboration have become commonplace in society (Newell & Klein, 1996; Dreifus, 2008). Scientists and professionals work in interdisciplinary teams to achieve things that otherwise wouldn't be possible. Interdisciplinary work—in both the

laboratory and the workplace—has been hailed as a chief source of creativity and innovation (Goble & Sousanis, 2010). It is interesting to note that this phenomenon of widespread interdisciplinarity is a significant factor in the ever-increasing of specialization of various fields (Newell & Klein, 1996).

With so much of society working regularly on an interdisciplinary plane, schools that fail to allow and encourage communication and collaboration across disciplines are also failing to give students the opportunity to participate in society as it truly exists, and thus these schools offer students inadequate preparation for participation in the society and economy as adults. If schools want their students to enact innovative change in their world, they must prepare them with the necessary tools, skills, and experience for working across domains.

Schools that do incorporate interdisciplinary integration into their curricula find their students more prepared for leadership and entrepreneurism. A recent study from China clearly demonstrated the effectiveness of an interdisciplinary program on students' critical thinking skills (Cai & Sankaran, 2015). Other research echoes this result, finding that interdisciplinary integration enhances skills such as problem solving, cooperation, and critical analysis, skills which are

highly desirable in today's workforce (Bruce & Ricketts, 2008; Scroggs, Sattler, & McMillan, 2009).

As a whole, research indicates that schools more completely fulfill their mission of preparation for life when they mimic society's tendency to blur disciplinary boundaries and communicate across domains of specialization.

Learning and Memory

Constructivism is a theory of cognitive development, established by Jean Piaget in the first half of the 20th century, which is widely accepted among psychologists, and the implications of which are profoundly supported by research (Semerci & Batdi, 2015). The constructivist viewpoint asserts that children—and, indeed, all learners—construct their own knowledge from their experiences by incorporating new information from their surroundings into their own pre-existing webs of knowledge called *schemas*. Over time, new information causes schemas to adapt and develop, constantly forming, strengthening, or dissolving connections between bits of knowledge (Parke & Gauvain, 2009). The more connections made between a new piece of information and one's pre-existing schemas, the more firmly the new information holds (van Kesteren, 2014).

When students are exposed to new information, constructivists say, the only way they will truly learn it is by connecting the new information securely to what they already know. This is precisely what interdisciplinary integration does for students. When a new concept is introduced in a class without any interdisciplinary contextualization, the student is somewhat limited in the connections that can be made. She will search her mind for contact-points upon which to secure this new information. Because of a phenomenon called *context-dependent forgetting*, the student will primarily be sifting through information previously presented in her current classroom, which severely limits the number of contact-points which may be used (Smith & Vela, 2001). This is not to say that it is impossible to stretch beyond the limits of context for informational anchor-points, only that it is significantly less likely.

However, if a teacher presents a new concept to a group of students along with explicit connections to information or concepts previously learned in other disciplines, students have many more anchor points from which to secure the new information in their minds. This works both ways, especially if teachers reference concurrent material from other classes. If an English teacher uses a concept that his students are currently studying in History to augment the students' understanding of a new vocabulary word, the students are enabled to multiply the

security of their connections for both concepts. Furthermore, the English teacher's reference to the History concept, since it was made in a different context than the initial presentation, has the potential to eliminate the aforementioned context-dependent forgetting effect for that piece of information (Chu, 2003). When context-dependent forgetting is eliminated, students are better able to take their learning with them away from the classroom and into daily life.

Thus, based on the Piagetian theory of constructivist learning, interdisciplinary integration has significant potential to improve academic acquisition of new information and concepts, and can even help to set information free from the classroom so it can be applied in student's daily lives.

Student Engagement

Teachers are often plagued with a lack of student participation. When students are disengaged from the material at hand, teachers may become discouraged and perhaps even apathetic, while the students themselves suffer academically and even with respect to their overall well-being.

A 2010 study by Richard Hickman and Lauren Kiss explored the effects of interdisciplinary integration on student participation. Through interviews and observations, they found that students appreciated the implicit and explicit

interdisciplinary connections made by their teachers and became more attentive and engaged in class discussion to a greater degree. Another study, published by Pavlou and Athansiou (2014), found that inexperienced art viewers were more expressive and engaged in writing and discussion concerning the artwork when music accompanied the viewing.

According to these studies, incorporation of interdisciplinary strategies in education could save teachers the constant headache of trying to teach disengaged students. Furthermore, though neither study directly addresses it, the higher levels of engagement indicated by this research also predict higher levels of academic achievement, albeit gradually. Studies have shown that student engagement in the classroom is strongly correlated with long-term academic growth (Upadyaya & Salmela-Aro, 2013; Park, 2005).

Higher levels of classroom engagement have also been shown to be linked with students' socioemotional well-being. Adolescents who are more engaged in class are more likely to report high levels of general, subjective life satisfaction (Lewis, Huebner, Malone, & Valois, 2011). Similarly, students with higher levels of classroom engagement are at much lower risk of delinquency, problematic behavior, and other indicators of malevolent youth development (Upadyaya & Salmela-Aro, 2013).

Conclusion

This review of literature details many ways in which interdisciplinary integration holds a great deal of potential for the world of education. First and foremost, a curriculum infused with interdisciplinary contextualization more accurately mirrors the larger society and more adequately prepares students for full entry into that society, equipping them with experience and skills that are necessary in the 21st century workforce, such as cooperation, critical analysis, and problem solving skills (Cai & Sankaran, 2015; Bruce & Ricketts, 2008). An interdisciplinary education also encourages creativity and innovation in a way that compartmentalized specializations cannot achieve on their own (Goble & Sousanis, 2010).

Additionally, the constructivist model provides a framework for understanding how interdisciplinarity could improve students' learning first-hand. Referencing content from other classes and disciplines can benefit learning for both the referencing class as well as the referenced class by encouraging connections to diverse areas of prior knowledge and minimizing the deleterious effects of context-dependent memory (van Kesteren, 2014; Chu, 2003).

Finally, interdisciplinary interaction can increase student participation in discussion and engagement with classroom material (Hickman & Kiss, 2010; Pavlou & Athansiou, 2014).

This, in turn, is predictive of higher levels of academic growth and achievement over time, and is also linked with positive effects on well-being and youth development (Upadyaya & Salmela-Aro, 2013; Park 2005).

Despite all these indications of benefit, there is still much more to be discovered concerning interdisciplinary integration in schools. Interdisciplinarity as a principle is somewhat abstract, and it takes time, thought, effort, and a great deal of cooperation to implement effectively (Bruce & Ricketts, 2008).

Teachers may wish to know, despite strong indications of long-term benefits, if it would be worth the trouble to implement such a strategy. Especially with the state's decrees of constant vigilance concerning teacher performance, teachers should be able to be certain of the effect of interdisciplinary integration on their students' immediate grades. This is the direction of the present study: to examine the tangible, small-scale, short-term effects of a very basic interdisciplinary integration plan on everyday classroom grades.

Chapter 3

Methodology and Procedures

Based on the review of the literature concerning interdisciplinary integration in education, research was conducted at a specific Northeast Tennessee private school to investigate the immediate effects of interdisciplinary integration on in-class academic performance. Scores were compared across the experimental and control groups, and gender differences were also considered. This chapter contains five sections: population, sample, data collection instruments, procedure, and research questions.

Population

This research took place in a semi-rural K-12 private school in Northeast Tennessee. The school had 489 students enrolled (263 female, 226 male) and 92.1% were white. As a private school, the economic demographic was decidedly middle-class.

Sample

The sample for this study was comprised of two intact 7th grade classes, namely 7A and 7B. 7A consisted of 19 students (10 female, 9 male) while 7B consisted of 17 students (11

female, 6 male). These classes were not randomly selected; students were assigned to classes by the school administration at the start of the academic year. Across both classes, 89% of students were White (n=32) and 11% were African American (n=4), though two out of the four African American students had been adopted into White families.

Data Collection Instruments

For both the experimental group and the control group, data were collected using two teacher-made vocabulary assessments. One assessment was given to both groups on each Friday of two contiguous weeks—one as a pretest and the other as a post-test—to assess a set of vocabulary words taught and practiced throughout the course of each week. These brief quizzes were comprised of supply-type (fill-in-the-blank) questions regarding the meanings of the week's vocabulary words and their respective Greek roots.

Procedures

Before the study began, permission was sought from the Institutional Review Board (IRB), and this study was found to be exempt. The study was carried out in two seventh grade English classes using traditional teaching methods and interdisciplinary integration over the course of one full week (5 school days).

As groups were not randomly assigned, this quasi-experimental study used a pretest-posttest design, wherein each group is given an identical pretest prior to the experiment in order to establish equivalency between the groups and eliminate possible confounding variables which might threaten internal validity. After experiencing different conditions for the length of the experiment, both groups are given identical posttests and results are compared. A coin flip determined that 7A would be the experimental group and 7B would be the control.

In both groups, students were given vocabulary words with example sentences on Monday and found the definitions for homework that evening which they checked in class on Tuesday. Tuesday night's homework assignment asked students to write their own example sentences for three words (assigned by the teacher). Wednesday, the teacher called on students for example sentences for each word, and Thursday's class included a short review activity. Friday, the quiz was given at the beginning of class.

The groups differed in that the example sentences given to the experimental group on Monday were related to concepts recently discussed in the students' Geography class. Students in the experimental group were also required write Geography-related example sentences for Tuesday's homework. Those in the control group received no such interdisciplinary integration.

Upon completion of the data collection period, the assessments were compared for analysis, using ANCOVA to equate the groups. A 2 x 2 factorial design was used to determine the interaction between gender and level of interdisciplinary integration in instruction.

Research Questions and Related Hypotheses

Research Question #1: Is there a difference between students' academic performance when using traditional teaching methods and when using interdisciplinary integration?

Research Hypothesis #1: There is a difference between students' academic performance when using traditional teaching methods and when using interdisciplinary integration.

Null Hypothesis #1: There is no difference between students' academic performance when using traditional teaching methods and when using interdisciplinary integration.

Research Question #2: Is there an interaction between gender and level of interdisciplinary integration in instruction?

Research Hypothesis #2: There is an interaction between gender and level of interdisciplinary integration.

Null Hypothesis #2: There is no interaction between gender and level of interdisciplinary integration.

Chapter 4

Data Analysis

The purpose of this study was to examine the effects of teaching using interdisciplinary integration and traditional strategies on student performance in a seventh grade English class. The study was conducted at a K-12 private school in Northeast Tennessee. Student performance was measured with teacher-made vocabulary quizzes. This chapter relates the data organization and analysis.

Collection of Data

Data were collected from two seventh grade English classes. This sample consisted of a total of 31 students, divided into two classes by the school administration at the beginning of the academic year. The demographics of this sample are displayed in Table 1. The two classes were assigned by a coin flip to either the experimental or control condition. An Analysis of Covariance (ANCOVA) was used to equate the groups by covarying out the effects of basic vocabulary aptitude (using a pretest). The experimental group experienced vocabulary lessons with integrated Geography-related concepts, while the control group experienced no interdisciplinary integration. Data were collected using teacher-made vocabulary quizzes.

Table 1

Demographic Profile of Participants

Students	**Frequency (f)**	**Percent (%)**
Gender		
Male	14	45.2
Female	17	54.8
Total	*31*	*100*
Ethnicity		
Caucasian	28	90.3
African-American	2	6.5
Mixed	1	3.2
Total	*31*	*100*

Research Questions and Related Hypotheses

To guide the analysis of the data collected for this study, two research questions were considered. Each question was followed by a related research hypothesis and null hypothesis. The .05 level of significance was used to analyze all data.

Research Question #1: Is there a difference between students' academic performance when using traditional teaching methods and when using interdisciplinary integration?

In order to answer Research Question #1, the means of the two groups were compared, covarying out the effects of vocabulary aptitude as measured by a pretest. The mean score in the control condition was 17.8, while the mean score for the

experimental group—the class which experienced interdisciplinary integration during the week's vocabulary instruction—was 16.9.

Research Hypothesis #1: There is a difference between students' academic performance when using traditional teaching methods and when using interdisciplinary integration.

Null Hypothesis #1: There is no difference between students' academic performance when using traditional teaching methods and when using interdisciplinary integration.

To calculate the result, a one-way between subjects ANCOVA was calculated to examine the difference in performance between students who were and were not exposed to interdisciplinary integration during their vocabulary lessons. The effects of intelligence and aptitude level (as determined by the pretest) were covaried out, as these were significantly related to performance as measured by the posttest ($F(1,28)=8.571$, $p<.05$). However, the main effect of interdisciplinary integration on the performance of the group was not significant ($F(1,28)=.230$, $p>.05$), with the control group ($M=17.77$, $sd=1.73$) and the experimental ($M=16.91$, $sd=3.33$) showing no significant difference. Therefore, the null hypothesis was retained. The results are displayed in Table 2.

Table 2

One-way ANCOVA for groups with & without interdisc. integration

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	54.606[a]	2	27.303	4.788	.016
Intercept	9.574	1	9.574	1.679	.206
Pretest	48.874	1	48.874	8.571	.007
Group	1.310	1	1.310	.230	.635
Error	159.668	28	5.702		
Total	9516.500	31			
Corrected Total	214.274	30			

[a]. R Squared = .255 (Adjusted R Squared = .202)

Research Question #2: Is there a difference between males' and females' academic performance when they are exposed to interdisciplinary integration and traditional teaching strategies?

In response to Research Question #2, the scores of males and females in both treatment conditions were analyzed using a two-way ANCOVA (again, covarying out the effects of aptitude as measured by the pretest). The means are shown in Table 3.

Table 3

Means by Gender and Treatment Group

	Male	Female	Both Genders
Control	17.25	18.11	17.77
Experimental	16.50	17.31	16.91
Both Groups	16.82	17.74	17.32

Research Hypothesis #2: There is a difference between males' and females' academic performance when they are exposed to interdisciplinary integration and traditional teaching strategies.

Null Hypothesis #2: There is no difference between males' and females' academic performance when they are exposed to interdisciplinary integration and traditional teaching strategies.

To test whether there is a difference between boys' and girls' test scores when taught using interdisciplinary integration and traditional teaching strategies, a two-way between-subjects ANCOVA was conducted. The main effect of treatment group was not significant ($F(1,26)=.134$, $p>.05$), nor was the main effect of gender ($F(1,26)=.522$, $p>.05$). Similarly, the interaction between group and gender was not found to be significant ($F(1,28)=.091$, $p>.05$). The mean for girls ($M=17.74$, $sd=2.30$) was not significantly different from the mean for boys ($M=16.82$, $sd=3.08$), regardless of teaching style. Therefore, the second null hypothesis was also retained. The results are displayed in Table 4.

Table 4

Two-way ANCOVA of Group and Gender

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	58.173[a]	4	14.543	2.422	.074
Intercept	9.677	1	9.677	1.612	.215
Pretest	47.131	1	47.131	7.850	.009
Group	.804	1	.804	.134	.717
Gender	3.133	1	3.133	.522	.477
Group * Gender	.544	1	.544	.091	.766
Error	156.101	26	6.004		
Total	9516.500	31			
Corrected Total	214.274	30			

[a]. R Squared = .271 (Adjusted R Squared = .159)

Chapter 5

Discussion

The purpose of this study was to examine the effects of teaching using interdisciplinary integration and traditional strategies on student performance in a seventh grade English class. The results were analyzed using the ANCOVA procedure. This chapter contains a summary of findings, conclusions, recommendations, and implications of the research.

Summary of Findings

Research Question #1: Is there a difference between students' academic performance when using traditional teaching methods and when using interdisciplinary integration?

The ANCOVA results indicated that there was no significant difference ($F(1,28)=.230$, $p=.635$) between the academic performance of students when taught using interdisciplinary integration strategies and traditional teaching methods. These results were not consistent with the literature discussed in Chapter 2.

In particular, the results of this study did not conform to the well-established Constructivist notion that more explicit connections between new information and prior knowledge serve to benefit the retention of that new information (van Kesteren,

2014). Other inconsistencies with prior research are more subtle, and may have had to do with a few possible explanations, given below.

First, the nature of group assignment was problematic, as the groups had been predetermined from the start of the academic year. This meant that treatment groups could not be randomly assigned. A pretest was given and ANCOVA used to mitigate the effects of differing vocabulary aptitudes between classes, but there may have been other confounding variables which were unidentified (and perhaps unidentifiable). A larger sample size with random selection and random assignment would offer more valid results, both internally and externally.

Secondly, this study dealt with the integration of two subject areas (i.e., Geography and English), while data were only gathered from one of these. Perhaps there were effects of the integration which may have been better measured in Geography than in English. A more robust and inclusive method of measurement may have revealed academic gains in areas other than vocabulary.

Finally, a greater degree of curricular control would have allowed for more substantial manipulation of the experimental condition. A greater procedural difference between treatment conditions may have produced results more in line with previous research in the field.

Research Question #2: Is there a difference between males' and females' academic performance when they are exposed to interdisciplinary integration and traditional teaching strategies?

The results of a Two-Way ANCOVA indicated no significant interaction ($F(1,28)=.091$, $p=.766$) between gender and interdisciplinary integration. This means that both genders responded in the same way to the manipulation of the primary independent variable (i.e., interdisciplinary integration vs. traditional teaching methods). This finding suggests that boys and girls are similarly affected by interdisciplinary integration and that teachers should not worry about differences in gender when considering interdisciplinary integration in the classroom.

Conclusion

The purpose of this study was to examine the effects of teaching using interdisciplinary integration and traditional strategies on student performance in a seventh grade English class. More specifically, this study attempted to explore the practical short-term effects of a manageable interdisciplinary integration plan on everyday classroom grades. The results indicated that there was no significant difference between the academic performance of students when taught using

interdisciplinary integration strategies and traditional teaching methods. There was also no significant interaction between gender and interdisciplinary integration. Therefore, both null hypotheses were retained.

Recommendations

1. Future research into the subject of interdisciplinary integration should use larger, more representative samples, and groups should be randomly assigned.
2. Future research should consider the academic effects of interdisciplinary integration on all disciplines involved in a particular curricular convergence.
3. The effects of interdisciplinary integration on subjects other than Geography and English should be explored in future research.

Implications

1. Teachers should not favor one gender over another when considering interdisciplinary integration programs for their classrooms.
2. Teachers should not expect an immediate rise in the grades of their students upon the implementation of a small-scale interdisciplinary integration program.

3. Educators may consider an interdisciplinary integration plan wherein two (or more) teachers cooperatively reference each other's material in their classes, which would allow each to reap the potential benefits of referencing and of being referenced.

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