Culminating Experience Action Research Projects, Volume 7, Fall 2005

Edited by
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College of Health, Education, and Professional Studies
The University of Tennessee at Chattanooga

Introduction

As a part of the teacher licensure program at the graduate level at The University of Tennessee at Chattanooga (UTC), the M.Ed. Licensure candidate is required to complete an action research project during a 3-semester-hour course that coincides with the 9-semester-hour student teaching experience. This course, Education 590 Culminating Experience, requires the student to implement an action research plan designed through (a) the Education 500 Introduction to Inquiry course, (b) one of the two learning assessments required during student teaching, or (c) a newly-designed project not used as one of the learning assessments.

With funding through a UTC Teaching, Learning, and Technology Faculty Fellows award, the Education 590 course is conducted through the use of an online, course management system (Blackboard Learning System Release 6), allowing for asynchronous discussion and use of the digital drop box feature for submitting required papers.

The course syllabus for Education 590 Culminating Experience is presented in the next section, followed by action research projects from fall semester 2005.

Deborah A. McAllister

Sarah C. Fritch

February 2007

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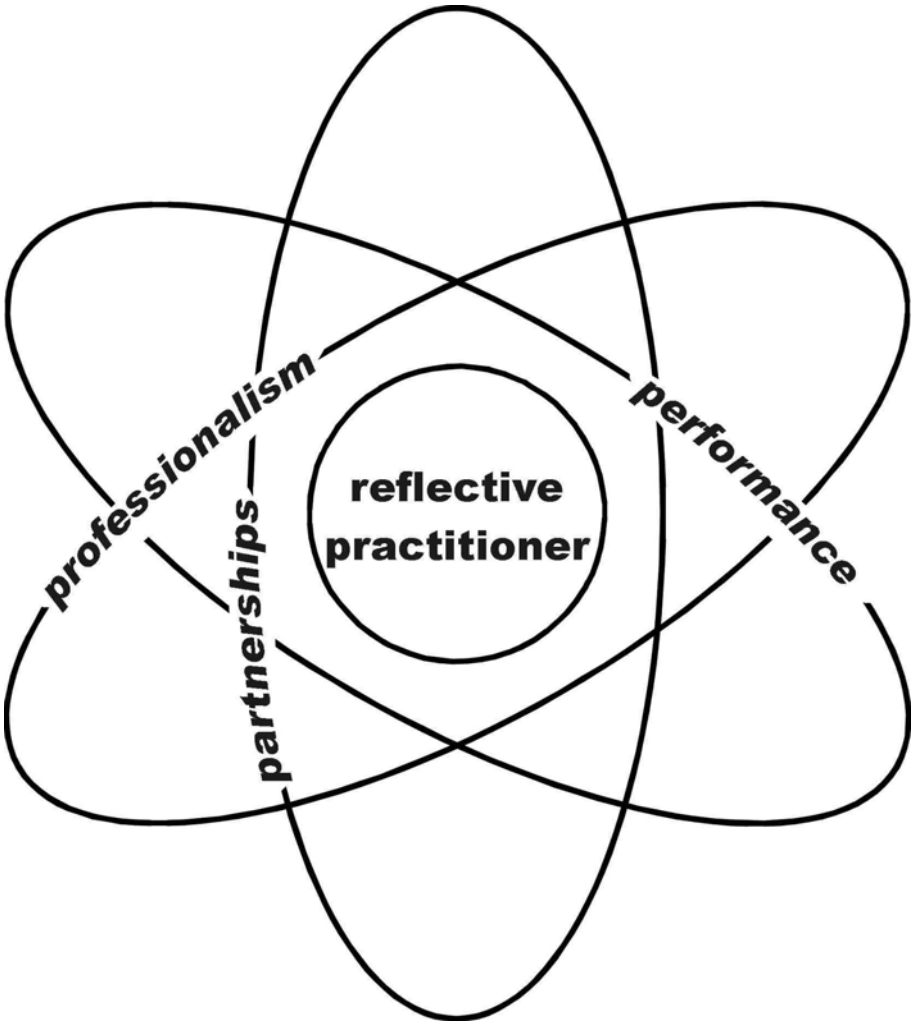


ATTENTION: If you are a student with a disability (e.g., physical, learning, psychiatric, etc.) and think that you might need assistance or an academic accommodation in this class or any other class, contact the Office for Students with Disabilities at 423-425-4006 or come by the office, 110 Frist Hall.

To enhance student services, the University will use your UTC email address (firstname-lastname@utc.edu) for communications. (See http://onenet.utc.edu/ for your exact address.) Please check your UTC email on a regular basis. If you have problems with accessing your email account, contact the Help Desk at 423-425-2678.

Educ 590 Culminating Experience – Fall 2005
Section 001, By Appointment, 3 credit hours

Instructor

Dr. Deborah A. McAllister
Office: Hunter 310C
Office hours: M and Tu 12:30 p.m. to 5:00 p.m., or by appointment
Phone: 423-425-5376 (Office), 423-842-1607 (Home)
Email: Deborah-McAllister@utc.edu
Web site: http://oneweb.utc.edu/~deborah-mcallister/
Graduate Assistant: Teresa Jurczak

Catalog description

Directed research or development project under faculty supervision. *Prerequisite: Admission to candidacy, approval of M.Ed. committee.*

Recommended text and web sites

American Psychological Association. (2001). *Publication manual of the American Psychological Association* (5th ed.). Washington, DC: Author.

Online Writing Lab at Purdue University. (2004). *Using APA format.* Retrieved April 19, 2005, from the Purdue University OWL Web site: http://owl.english.purdue.edu/handouts/research/r_apa.html

Degelman, D., & Harris, M. L. (2005). *APA style essentials.* Retrieved April 19, 2005, from the Vanguard University Web site: http://www.vanguard.edu/faculty/ddegelman/index.cfm?doc_id=796

University of Wisconsin - Madison Writing Center. (2004). *Writer's handbook: APA documentation style.* Retrieved April 19, 2005, from the University of Wisconsin - Madison Writing Center Web site: http://www.wisc.edu/writing/Handbook/DocAPA.html

Objectives

1. The student can apply a variety of research strategies for use in the elementary, middle grades, and/or secondary classroom, or with professionals in the field. Reflective decision making, a process involving reading, reflecting, and responding, will be applied by the student to evaluate ongoing research techniques, procedures, and materials, in order to become a reflective practitioner.
2. The student will select or design surveys and/or rubrics for data collection in the content area.

3. The student will understand current issues in the content area, including current research methods, materials, professional development and grant opportunities, and programs suitable to all learners, from exceptional populations to diverse ethnic and cultural groups.
4. The student will demonstrate the ability to connect new learning with prior knowledge and skills through a case study conducted during the Induction Experience.

Requirements

1. Select a case study option:
   a. Implementation of the project designed in Educ 500 as your case study. Include modifications to the project, if necessary, based on knowledge gained since the completion of Educ 500. Submit a corrected copy.
   b. Plan to use one of your learning assessments from your first placement as your case study. Submit an outline of the topic, what will be assessed, who will be assessed, how and when assessment will occur, and what instruments will be used. Submit an outline.
   c. Design a new project of your own choosing. Submit an outline for approval.

2. **Prior to data collection, complete the REQUIRED process for UTC's Institutional Review Board For the Protection of Human Research Subjects (http://www.utc.edu/~instrb/). Request either an Exemption from IRB Review (Form A) if your sample includes only adults, or an Expedited Review (Form B), if your sample includes children. Form C must be completed at the end of the study. I will print Form C for you to sign. Review the information and forms on the IRB web site for additional details. An Exemption requires approximately 1 week to process. An Expedited Review may require several weeks to process. (Full board approval is required if there is more than minimal risk to the subject.) Any updates to the IRB process will be followed. Submit one signed copy; I will make the photocopies after obtaining signatures. Your instrument, consent form, and/or assent form MUST contain the following statement:**

   THIS PROJECT HAS BEEN REVIEWED BY THE INSTITUTIONAL REVIEW BOARD FOR THE PROTECTION OF HUMAN SUBJECTS AT THE UNIVERSITY OF TENNESSEE AT CHATTANOOGA.

   If there is evidence of prior research that you have done or evidence stated in the literature for your project, place that on the IRB approval form (a sentence or two). If not, cite the HCDE standards that are addressed by your project so the IRB members know why you are teaching/investigating the topic. Check the IRB's Review Status link for updates on your proposal.

3. Implementation of the project will be completed during the Induction Experience (Educ 596) or the Professional Teaching Experience (Educ 591). Implementation **cannot** occur prior to IRB approval.

4. Completion of the written project, **in APA style**. Include the following elements, each of which should be centered at the top of that section of the paper (not italic, not bold; see p. 113 in the APA style manual:
   a. Introduction to the Problem. Why was this topic selected for study? Is this topic a current national, state, or local issue? Is this topic a staple of the curriculum in your field? Etc.
   b. Review of Literature. Use at least five refereed sources. The online Education Resources Information Center (ERIC) advanced search should be used to locate references in educational journals and documents. See ERIC (http://www.eric.ed.gov/) and/or select the link to the advanced search (http://www.eric.ed.gov/ERICWebPortal/Home.portal?_nfpb=true&_pageLabel=advanced). **You must use a page number or a paragraph number for all direct quotes. All references should contain complete page numbers (not the first page only, as may be listed in online documents).**
   c. Data Collection and Results. Describe data collection procedures. Provide results of the project, in narrative form and including a chart and/or graph to display the data collected. Analysis of results is from the perspective of higher order cognitive skills. Use descriptive statistical measures (mean, median, mode, frequency distribution, charts, graphs, etc.) for communication of project results. Charts and graphs are imported from Excel to Word and cited as tables and figures. See Microsoft Excel [spreadsheet] software, used in Educ 575.
   d. Conclusions and Recommendations. What generalizations, if any, can be made, based on the results of the case study? What is the consensus of your professional organization with regard to the problem studied? What recommendations would you make for teacher professional development? Is grant money available to support further research in this area? What role could be assumed by the use of technology in this area? **Please address all items in this section.**
   e. Copies of the instrument(s) used for data collection. Instrument(s) are placed in individual appendices. Word process instruments from the Web, books, etc., but place a citation on the page and in the reference list.

5. Communication:
   a. Current email address registered with UTC for communication between student and instructor. The UTC email address will point to the email address you have on file. See http://itd.utc.edu/email/stu_saindex.shtml for more details.

b. Web access to check course announcements and post messages to the discussion forum on Blackboard a minimum of once per week. See http://bb2.utc.edu/.

6. All work is to be computer-generated and turned in through the Blackboard digital drop box. You may complete your project either on the Macintosh or Windows platform. Please use Microsoft Word and Microsoft Excel. If other software is to be used, please ask for approval. Keep a copy of your work on a hard drive or a disk so that it can be accessed, if needed. Reminder: You will need a student ID card to use the university student lab in the University Center.

7. Please note:
   a. Ask another person to proofread your work for correct syntax and semantics before submitting it. You are encouraged to post it to the Blackboard discussion forum.
   b. The Writing Center is located in 119 Holt Hall. See http://www.utc.edu/~scribble/ for hours and information.
   c. Case studies may be displayed at a professional meeting and/or gathered for a publication.

Grading rubric

Criteria	A	B	C	F
Project outline and IRB approval	Submitted online. Submitted for IRB approval; approval received.	Submitted online. Submitted for IRB approval; approval received.	Submitted online. Submitted for IRB approval; approval received.	Not submitted online. Not submitted for IRB approval, or IRB approval denied.
Instruments	Items appear to be reliable and valid for the case study.	Items appear to be reliable and valid for the case study.	Reliability or validity is questionable.	Reliability and validity cannot be defended.
Data collection and results	Narrative gives descriptive account of data collection and results, and higher order analysis of results; data chart and graph display results accurately and appropriately.	Narrative provides descriptive account of data collection and results, but analysis of results is weak; data chart and graph display results satisfactorily.	Narrative provides limited descriptive account of data collection and results; analysis of results is flawed; data chart and graph display results, but contain errors.	Neither narrative nor chart and graph convey the data collection procedures and results of the study.
Conclusions and recommendations	Provides a cohesive summary to the project; all recommendation areas addressed satisfactorily.	Provides a cohesive summary to the project; most recommendation areas addressed satisfactorily.	Summary lacks insight to the intent of the project; recommendation areas not completely addressed.	Conclusions do not reflect results; recommendation areas not completely addressed.
APA style	APA style elements present: headings, subject-verb	APA style elements present, with minor errors.	Ideas are understandable; acceptable writing	Written style is inconsistent; difficult to follow

	agreement, citations, references, abbreviations, commas, semicolons, lists, tables, figures, appendices, etc.		style, though not APA.	the flow of ideas.
Spelling and typographical errors	No spelling errors; minimal typographical errors; correct use of plural and possessive forms.	Spelling and typographical errors present.	Errors detract from quality of project.	Poorly written.
Completion time	All elements completed on time.	Major elements completed on time; some minor elements late.	Most major elements completed late; some or most minor elements late.	No time deadline.
Communication	Open communication between student and instructor. Progress message posted to the discussion forum at least weekly.	Response time is less than once each week.	Response time is less than once in 2 weeks	Response time is less than once in 4 weeks.
Professional quality and usefulness	Previous and current suggestions, and modifications, fully incorporated into project outline; project is relevant to education.	Previous and current suggestions, and modifications, selectively incorporated into project outline; project is relevant to education.	Previous and current suggestions, and modifications, minimally incorporated into project outline; project is relevant to education.	Previous and current suggestions, and modifications, not incorporated into project outline; project has little relevance to education.
Represents graduate level work	Completed project is presented as a coherent whole.	All project elements present but project is not presented as a coherent whole.	One or more project elements missing; project is not presented as a coherent whole.	Major project elements missing; project is not presented as a coherent whole.

Week (Tentative course schedule, subject to change.)		**Assignment due**
1	Week of 08/22/05 (and prior meeting 04/20/05) Student teacher meetings; 1st placement begins	Check email account; access Blackboard; Educ 590 will meet once.
2	Week of 08/29/05	Case study option selected; proposed outline posted to discussion forum. **Paperwork submitted for IRB approval (Exemption/Form A, Expedited Review/Form B).** **Instruments must be included with both Form A and Form B.** **Parental consent form and student assent form must be included with Form B.** **Participant consent form should be included with Form A.** **Copy of IRB approval placed in my mailbox in Hunter 311, when received, if not sent by email.**
3	Week of 09/05/05 Labor Day Holiday - M 09/05 (UTC/HCDE)	Begin case study work on introduction, review of literature, and instruments; place file in digital drop box for review and for a check of APA style.
4	Week of 09/12/05	Begin data collection, with IRB approval.
5	Week of 09/19/05	Case study work continues.
6	Week of 09/26/05	Case study work continues.
7	Week of 10/03/05	Data collection is complete.
8	Week of 10/10/05 1st placement ends (?)	Writing of case study.
9	Week of 10/17/05 Fall break M 10/17 – F 10/21 (HCDE)	Writing of case study.
10	Week of 10/24/05 Second placement begins (?) Fall break, 10/24-10/25 (UTC)	Writing of case study.
11	Week of 10/31/05	Writing of case study.
12	Week of 11/07/05	Writing of case study.
13	Week of 11/14/05	Writing of case study.
14	Week of 11/21/05 Thanksgiving Holiday – 11/23-11/25 (UTC/HCDE)	Proofreading of case study.
15	Week of 11/28/05	**Completed case study due, Sa 12/03/05, 12:00 p.m. (noon)** **Case study assembled in a single file; placed in digital drop box.**
16	Week of 12/05/05 Second placement ends	**Late case studies accepted.**
17	Week of 12/12/05 Student teacher meetings Th 12/15/05 - Grades due for all students, 12:00 p.m. Su 12/18/05 - Commencement, 2:00 p.m.	**IRB Form C completed when we meet (I will provide Form C.)** **Late case studies accepted; not guaranteed to be graded by 12/15/05.**

APA style (general guidelines; use reverse indent)

1. Journal

Last name, Initials., & Last name, Initials. (year). Title of the article in lower case letters except first letter of the title and proper nouns. *Journal name, volume*(number), page number-page number.

Many, W., Lockard, J., Abrams, P., & Friker, W. (1988). The effect of learning to program in Logo on reasoning skills of junior high school students. *Journal of Educational Computing Research, 4*(2), 203-213.

2. Book

Last name, Initials., & Last name, Initials. (year). *Title of the book in lower case letters except first letter of the title and proper nouns.* Place of publication: Publishing Company.

Turner, T. N. (1994). *Essentials of classroom teaching elementary social studies.* Needham Heights, MA: Allyn and Bacon.

3. Software

Last name, Initials., & Last name, Initials. (year). *Title of the Software in Upper Case First Letters* [Computer software]. Place of publication: Publishing Company.

Microsoft Corporation. (1996). *Encarta 97 Encyclopedia* [Computer software]. Redmond, WA: Author.

In example 3, the author and the publishing company are the same, so the word 'Author' is used.

4. Online source

Last name, Initials., & Last name, Initials. (year). *Title of the web site in lower case letters except first letter of the title and proper nouns*. Retrieved today's date, from complete URL

National Council of Teachers of Mathematics. (2000). *Principles and standards for school mathematics*. Retrieved April 19, 2005, from http://standards.nctm.org/

In example 4, I omit the period '.' at the end so it will not be confused in the address. Others choose to leave one space, then place the period at the end of the URL.

5. ERIC document

Last name, Initials., & Last name, Initials. (year). *Title of the paper in lower case letters except first letter of the title and proper nouns.* Paper presented at name, place, and date of conference, or other relevant information. (ERIC Document Reproduction Service No. XXXXXX)

McAllister, D. A., Mealer, A., Moyer, P. S., McDonald, S. A., & Peoples, J. B. (2003). *Chattanooga math trail: Community mathematics modules, volume 1*. Washington,

DC: U.S. Copyright Office. (ERIC Document Reproduction Service No. ED478915)

Professional Organizations (examples)

American Council on the Teaching of Foreign Languages. (2005). Retrieved April 19, 2005, from http://www.actfl.org/

Council for Exceptional Children. (2005, April 19). Retrieved April 19, 2005, from http://www.cec.sped.org/

International Reading Association. (2005). Retrieved April 19, 2005, from http://www.reading.org/

International Society for Technology in Education. (n.d.). Retrieved April 19, 2005, from http://www.iste.org/

National Art Education Association. (n.d.). Retrieved April 19, 2005, from http://www.naea-reston.org/

National Association for Music Education. (n.d.). Retrieved April 19, 2005, from http://www.menc.org/

National Association for the Education of Young Children. (n.d.). Retrieved April 19, 2005, from http://www.naeyc.org/

National Council for the Social Studies. (2005). Retrieved April 19, 2005, from http://www.ncss.org/

National Council of Teachers of English. (2005). Retrieved April 19, 2005, from http://www.ncte.org/

National Council of Teachers of Mathematics. (2005). Retrieved April 19, 2005, from http://www.nctm.org/

National Middle School Association. (2005). Retrieved April 19, 2005, from http://www.nmsa.org/

National Science Teachers Association. (2005). Retrieved April 19, 2005, from http://www.nsta.org/

Rubrics (examples)

Chicago Public Schools. (2000). *The rubric bank.* Retrieved April 19, 2005, from http://intranet.cps.k12.il.us/Assessments/Ideas_and_Rubrics/Rubric_Bank/rubric_bank.html

Chicago Public Schools. (2000). *How to create a rubric.* Retrieved April 19, 2005, from http://intranet.cps.k12.il.us/Assessments/Ideas_and_Rubrics/Create_Rubric/create_rubric.html

LessonPlanZ.com. (2005). Retrieved April 19, 2005, from http://lessonplanz.com/ (use 'rubric' as a search term)

South Dakota State University. (n.d.). *Rubric template.* Retrieved April 19, 2005, from http://edweb.sdsu.edu/triton/july/rubrics/Rubric_Template.html

Teachnology. (2005). Rubric, rubrics, teacher rubric makers. Retrieved April 19, 2005, from http://teachers.teach-nology.com/web_tools/rubrics/

The Landmark Project. (n.d.). *Rubric construction set.* Retrieved April 19, 2005, from http://landmark-project.com/classweb/rubrics/4x4rubric.html

Surveys (examples)

The International Consortium for the Advancement of Academic Publication. (2004, May 18). *Resources for methods in evaluation and social research.* Retrieved April 19, 2005, from http://gsociology.icaap.org/methods/

University of Southern Indiana Sociology Department. (2005). *Social research and statistical links.* Retrieved April 19, 2005, from http://www.usi.edu/libarts/socio/stats.htm

Bibliography

American Association for the Advancement of Science. (1993). *Benchmarks for science literacy*. Retrieved April 19, 2005, from http://www.project2061.org/tools/benchol/bolintro.htm

Association of College and Research Libraries. (2003). *Information literacy competency standards for higher education.* Retrieved April 19, 2005, from http://www.ala.org/acrl/ilstandardlo.html

Creswell, J. W. (2005). *Research design: Planning, conduction, and evaluating quantitative and qualitative research.* Upper Saddle River, NJ: Pearson Education, Inc.

Fogarty, R. (1995). *The mindful school: How to integrate the curricula awareness program.* Palatine, IL: IRI/Skylight Training and Publishing, Inc.

Freiberg, H. J., Driscoll, A., & Stetson, R. H. (1992). *Universal teaching strategies.* Boston, MA: Allyn and Bacon.

Gay, L. R., & Airasian, P. (2003). *Educational research: Competencies for analysis and applications* (7th ed.). Upper Saddle River, NJ: Pearson Education, Inc.

Hamilton County Department of Education. (2005, February 7). *HCDE standards and benchmarks*. Retrieved April 19, 2005, from http://www.hcde.org/standards/stindex.html

Institute of Education Sciences. (n.d.). *Education resources information center: Welcome to the ERIC database*. Retrieved April 19, 2005, from http://www.eric.ed.gov/

Johnson, A. P. (2005). *A short guide to action research* (2nd ed.). Boston, MA: Pearson Education, Inc.

Leedy, P. D., & Ormrod, J. E. (2005). *Practical research: Planning and design*. Upper Saddle River, NJ: Pearson Education, Inc.

Martin, D. B. (1999). *The portfolio planner.* Upper Saddle River, NJ: Prentice-Hall, Inc.

McAllister, D. A. (2004). *Faculty page – McAllister*. Retrieved April 19, 2005, from http://oneweb.utc.edu/~deborah-mcallister/

McMillan, J. H., & Schumacher, S. (2001). *Research in education* (5th ed.). New York, NY: Addison Wesley Longman, Inc.

Menges, R. J., & Weimer, M. (1996). *Teaching on solid ground: Using scholarship to improve practice.* San Francisco, CA: Jossey-Bass Inc.

Mills, G. E. (2003). *Action research: A guide for the teacher researcher* (2nd ed.). Upper Saddle River, NJ: Pearson Education, Inc.

Mills, S. C., & Roblyer, M. D. (2003). *Technology tools for teachers: A Microsoft Office tutorial.* Upper Saddle River, NJ: Pearson Education, Inc.

National Council of Teachers of Mathematics. (2000). *Principles and standards for school mathematics*. Retrieved April 19, 2005, from http://standards.nctm.org/

National Research Council. (1999). *How people learn.* Washington, DC: National Academy Press. (see also http://www.nap.edu/readingroom/books/howpeople1/notice.html)

National Research Council. (1995). *National science education standards*. Retrieved April 19, 2005, from http://www.nap.edu/readingroom/books/nses/

Novak, J. D., & Gowin, D. B. (1984). *Learning how to learn.* New York, NY: Cambridge University Press.

Palloff, R. M., & Pratt, K. (2001). *Lessons from the cyberspace classroom: The realities of online teaching.* San Francisco, CA: Jossey-Bass Inc.

Provenzo, E. F., Jr. (2002). *The Internet and the World Wide Web for teachers.* Needham Heights, MA: Allyn & Bacon.

Reed, A. J. S., & Bergemann, V. E. (2001). *A guide to observation, participation, and reflection in the classroom* (4th ed.). New York, NY: McGraw-Hill.

Roblyer, M. D. (2003). *Integrating educational technology into teaching* (3rd ed.). Upper Saddle River, NJ: Pearson Education, Inc.

Roblyer, M. D. (2003). *Starting out on the Internet: A learning journey for teachers* (2nd ed.). Upper Saddle River, NJ: Pearson Education, Inc.

Tennessee Department of Education. (n.d.). *Curriculum frameworks*. Retrieved April 19, 2005, from http://www.state.tn.us/education/ci/cistandards.htm

Thomas, R. M. (2005). *Teachers doing research: An introductory guidebook*. Boston, MA: Pearson Education, Inc.

Treffinger, D. J., Hohn, R. L., & Feldhusen, J. F. (1979). *Reach each you teach.* Buffalo, NY: D. O. K. Publishers, Inc.

Tuckman, B. W. (1999). *Conducting educational research* (5th ed.). Fort Worth, TX: Harcourt Brace & Company.

Items available in Lupton Library

Campbell, L., Campbell, B., & Dickinson, D. (1996). *Teaching and learning through multiple intelligences.* Needham Heights, MA: Allyn and Bacon.

Haladyna, T. M. (1997). *Writing test items to evaluate higher order thinking.* Boston, MA: Allyn and Bacon.

Krulik, S., & Rudnick, J. A. (1995). *The new sourcebook for teaching reasoning and problem solving in elementary schools.* Boston, MA: Allyn and Bacon.

Ross, S. M., & Morrison, G. R. (1995). *Getting started in instructional technology research.* Washington, DC: Association for Educational Communications and Technology.

Silberman, M. L. (1996). *Active learning: 101 strategies to teach any subject.* Boston, MA: Allyn and Bacon.

Wilson, B. G. (Ed.). (1996). *Constructivist learning environment: Case studies in instructional design.* Englewood Cliffs, NJ: Educational Technology Publications.

Parental Involvement in Algebra 1 Homework and its Effects on Gateway - Algebra Scores

EDUC 590
Fall Semester - 2005
Jonathan Adcock

The Institutional Review Board of the University of Tennessee at Chattanooga (FWA004149) has approved this research project 04-166.

Introduction to the Problem

The importance of a solid mathematics education is vital to all American students who want to succeed in a technologically driven world. The importance of being able to think logically and to be able to break a complex problem into smaller problems are skills primarily taught in mathematics classes. Everyone agrees that our students need a well-rounded, challenging mathematics curriculum. Despite these expectations, our eighth grade students are not learning mathematics as well as students from many other countries. According to the Third International Mathematics and Science Study-Repeat of 1999 (U.S. Department of Education, 2001), American eighth graders ranked 19th out of 38 countries in mathematics ability and had scores significantly lower than 14 nations. Since these eighth graders become the ninth graders in our high school, some type of intervention needs to be introduced early in high school to ensure that these students advance in mathematics education.

The purpose of this study is concerned with parental involvement in helping Algebra 1 students with their homework and its effects on Tennessee Gateway-Algebra exam scores. Since the concepts taught in Algebra 1 are the foundation for the other branches of mathematics taught at the high school level, and since the majority of Algebra 1 students are ninth graders, the researcher implemented a program that would encourage parents to work with their teenagers on Algebra 1 homework and measured its effect on student achievement.

Review of Literature

Introduction

Homework and parental involvement have always been topics of debate for educational policymakers, school administrators, teachers, parents, and students. Numerous studies have been completed concerning both of these important aspects of modern education. This literature review will discuss the findings of the studies concerning homework, parental involvement in general, and parental involvement with homework. Few studies have been conducted to measure the effect of parental

involvement with mathematics homework and academic achievement. Where applicable, these studies are mentioned and recommendations listed.

Homework

Homework is defined as performing school curriculum tasks outside regular school hours (Cooper, 1989; Walberg & Paschal, 1995). This definition excludes in-school guided study, most commonly called seatwork. Teachers assign homework for a variety of reasons. The most often mentioned reasons include the following:

- Homework extends the amount of time spent on schooling.
- Homework provides practice on the material covered in class.
- Homework teaches self-discipline and responsibility.
- Homework helps to focus family life and parents' attention to education.
- Homework encourages good study habits.
- Homework acclimates students to self-directed work and develops the ability to learn autonomously.
- Homework helps to hone organizational and time management skills.
- Homework helps students to learn persistence, diligence, and delayed gratification.
- Homework helps students to get ready for the next day's class.
- Homework can help students learn to use resources, such as libraries, reference materials, and encyclopedias.
- Homework allows students to explore subjects more fully than time permits in the classroom.
- Homework can help to encourage a lifelong love of learning.

Without giving homework, it is impossible for most teachers to cover the intended curriculum contents (de Jong, Westerhof, & Creemers, 2000).

Homework is a fact of life for most students, regardless of grade level. However, researchers have debated homework's effectiveness since the early 1900s. Harris Cooper, a psychology professor from the University of Missouri, wrote a pioneering book in 1989 that reviewed more than 100 studies on the effect of homework on student achievement. Cooper's review shows that homework is in its third renaissance since 1950, and this

renaissance has carried over into the 21st century. According to Cooper (1989), "taken as a whole, homework does have a positive effect on academic-related outcomes." He also showed that homework has a more positive effect on academic-related measures than supervised studies offered during normal class time (seatwork). Cooper's (1989) findings were expanded in a recent article published by ERIC's National Parent Information Network, titled *Homework: What does the research say*. In this article, it was found that high school students who receive school-assigned homework perform 69% better on standardized tests and have better grades than students who do no homework.

An important finding in Cooper's (1989) book is that the effects of homework are similar for students of different gender, race, and socioeconomic standing (SES). The following studies elaborate on Cooper's (1989) findings. Timothy Keith (1987), of the University of Iowa, and several colleagues found that homework's power to influence success ranks second only to ability, and ahead of race and family background. British researchers, Michael Holmes and Paul Croll (1989), found that working-class children benefited more from homework than did their wealthier schoolmates. Working class boys who spent 1 hour or more at night on homework achieved just as much as middle-class boys who did the same – whereas, among low-homework boys, class differences were pronounced. One interesting finding, by Herbert Walberg and colleagues at the University of Illinois-Chicago (1984), was that graded homework was found to produce an effect three times larger than social class on achievement.

Before we all jump on the homework bandwagon, we need to review what else Harris Cooper said about homework and grade level. For elementary school students, Cooper (1989) describes homework's effect on achievement as small. However, this finding runs counter to the fact that, in the last 20 years, homework has increased only in the lower grades (Brookings Institution & Rand Corp., 2004). According to researchers at the University of Michigan, 6 to 9 year olds in 1981 spent 44 minutes per week on homework; in 1997 they spent 134 minutes per week. This is a 204.5% increase with very little research supporting this rate of increase in homework. Homework's effect increases as students move up to higher grades, with high school students reaping the

most benefit. According to Cooper (1989), “homework’s effect on achievement of high school students is large relative to the effect of other instructional techniques.” Cooper (1989) summarizes his findings by stating that, “a teacher might expect the average student doing homework over a 10-week unit to outscore about 52% of no-homework students if the class is in the upper elementary grades (grades 4 – 6), about 60% in junior high grades, and about 69% in high school grades.”

A recent study by the National Assessment of Educational Progress (NAEP) seems to support Cooper’s notions that homework starts to benefit elementary students as they progress through the upper elementary grades and middle school grades. The NAEP 2000 study also shows that there seems to be a point of diminishing returns when it comes to the amount of homework performed by these students. According to the data, fourth graders who studied over 45 minutes per day had lower mathematics scores than students who studied less. Eighth graders who studied over 1 hour per day had lower mathematics scores than students who did less. (National Council of Teachers of Mathematics, 2000)

These findings have led many educational organizations to offer recommended guidelines for assigning homework. The National PTA and the NEA recommend 10 – 20 minutes per night in first grade, and an additional 10 minutes per grade level thereafter. The recommendation for high school students is vague since the amount of homework performed each night will depend on various factors. However, Cooper’s (1989) reviews discovered that, “homework for high school students may not have a positive effect until somewhere between 1 to 5 hours per week are done. Additional homework appears to have accumulating positive effects on achievement, at least through 10 hours a week.” Obviously, more studies need to be conducted to determine if there is a point of diminishing returns for the amount of homework performed by high school students.

Since this study will be dealing with the effects of mathematics homework on student achievement, we need to discuss the findings researchers have found concerning this subject, in particular. Julian Betts (1996), of the University of California, San Diego, examined surveys on the homework habits of 6,000 junior and senior high school

students over a 5-year period. Betts determined that the overall amount of mathematics homework assigned was a better indicator of student achievement than the size of the class, the quality of the teacher, or the amount of homework that was taken up and graded. The quality of mathematics homework had absolutely no influence on mathematics achievement for older children. These results were confirmed in a 1999 study of eighth grade Dutch students by de Jong, Westerhof, and Creemers (2000). Cooper (1989) also made a very interesting finding concerning mathematics homework. He discovered that, "a teacher of mathematics in junior or senior high school could expect a student doing preparation and/or practice homework to outperform about 55% of students doing homework based only on the current day's lesson. This effect would not disappear on delayed measures of achievement." This finding suggests that middle and high school math teachers need to include review problems of previous material in homework to improve retention and achievement.

The 1989 Curriculum and Evaluation Standards of the National Council of Teachers of Mathematics (NCTM) has become the centerpiece of most efforts to reform school mathematics. Concerning homework, however, there is hardly any mention of it and no recommendations are made for it use or the amount that needs to be assigned on a periodic basis for the different grade levels. This silence is explained by Jack Price a former president of the NCTM. He states that, "The Standards emphasize high expectations and high standards for teacher and student alike without specific recommendations for homework, grades, or any one part of the educational enterprise. Would it help if these issues were dealt with overtly? Undoubtedly…The Standards provide a philosophy to guide decision making" (Andrews & Price, 1997, p. 82).

Parental Involvement

No one questions the necessity of parental involvement in a child's education, but what does the research state about this topic? Anne Henderson and Nancy Berla summarized all of the previous studies on parental involvement in 1994. Some of their findings include the following:

- The most accurate predictor of a student's achievement in school is not income or social status, but the extent to which that student's family is able to create a home environment that encourages learning, expresses high expectations for their child's achievement and future careers, and becomes involved in their child's education at school and in the community. In Fan's 2001 study, parents' educational aspirations for their children stood out as having a consistent effect on student's academic growth. This was consistent across academic subject areas, ethnicity, and SES.
- When parents are involved at school, not just at the home, children do better in school and stay in school longer.
- Studies that correlate levels of parental involvement with increments in student achievement invariably find that the more extensive the involvement, the higher the student achievement. The form of the involvement does not seem to be as important as the amount and variety.
- There were very few studies done that look at parental involvement at the high school level, but these studies reached similar findings. Students whose parents monitored their school work and daily activities, talked frequently to their teachers, and helped to develop their plans for education or work after school, were much more likely to graduate and go on to postsecondary education. Earlier studies done by Eva Eagle in 1980 and 1986 showed that when SES is controlled, parental involvement during the high school had the most significant positive impact upon student achievement of the factors studied. (Henderson & Berla, 1994)

In addition to the above findings, many studies link parental involvement with a range of positive student outcomes, including student achievement, improved school attendance, increased cooperative behavior, enhanced school retention, and lower dropout rates (Balli, Demo, & Wedman, 1998). Students who experience a high level of parental involvement also have better social skills, adapt well to school (Henderson & Mapp, 2002), and are less likely to use drugs.

One of the problems with parental involvement research is how to define this concept. According to Xitao Fan's 2001 study, parental involvement is a multi-dimensional topic and can include the following:

1. Parental aspirations for their children's academic achievement.
2. Parent's communication with their children about education and school matters.

3. Parent's participation in school activities.
4. Parent's communication with teachers about their children.
5. Parental supervision at home.

In a previous study by Fan and Chen (1999), it was determined that not all dimensions of parental involvement are equal. Fan's (2001) research also showed that the effects of parental involvement appear to be more consistent for younger children.

Numerous studies show that parental involvement declines dramatically when children make the transition from the elementary to the middle grades (Balli, Demo, & Wedman, 1998). This decline continues in the high school years. These findings can be understood since the time from 8th to 12th grade is viewed as a transitional period for most adolescents who are seeking independence and want to detach themselves from their family (Fan, 2001). Rebecca Kahlenberg, of the Washington Post, eloquently described this situation in a Feb. 4, 2003 article:

> Parents and educators point to a variety of explanations (for the decline of parental involvement in high schools) with reasons ranging from adolescents not wanting their parents to be actively engaged in their schooling as they get older to difficult schoolwork sometimes making parents believe they cannot be as helpful with their child's homework. Others believe that parents are further cut out of the loop as students stop bringing home notices, and finally, they believe the decline is due to the structure of the school year as students get in higher grades – as classes often don't meet every day, and there are no specially allocated days for parent teacher conferences.

Fan also cited several researchers who found no measurable effect of parental involvement on academic achievement for middle and high school students. This contradicts the findings of Henderson and Berla (1994) and also stresses the need for more research in this area.

One of the reasons behind this discrepancy seems to be the existence of different attitudes towards parental involvement at the elementary and secondary levels. Most elementary teachers seem to encourage parental involvement, whereas secondary teachers seem to feel that parental involvement needs to stay in the home (Ramirez, 2001). Due to having different classes and more students, secondary teachers generally do not contact

parents unless there is a problem (Ramirez, 2001). Many teachers are uneasy talking to parents, and many parents are uneasy talking to teachers. Fred Ramirez (2001) states, "Many parents are already self-conscious about their parenting abilities and do not feel like they have the educational background to help their children with their education." Despite these differences, enough evidence exists to support the need for increased parental involvement at the middle and high school levels.

Because the research is so strongly in favor of parental involvement at all the grade levels, parental involvement is a cornerstone of many federal and state education programs like Head Start, Reading First, Early Reading First, Even Start, Parents as Teachers, and Home Instruction Program for Preschool Youngsters. During the Clinton administration, part of the GOALS 2000 plan called for every school to promote partnerships that will increase parental involvement and participation in promoting the social, emotional, and academic growth of children. Now, the No Child Left Behind (NCLB) legislation of the Bush administration also stresses the necessity of parental involvement to a whole new level. NCLB requires every school receiving Title 1 money to jointly develop with parents a written Parental Involvement Policy and a School-Parent Compact. In addition, "parents will know their children's strengths and weaknesses and how well schools are performing; they will have other options and resources for helping their children if their schools are chronically in need of improving" (U.S. Department of Education, 2003).

Parental Involvement with Homework

Perhaps the most important aspect of parental involvement that can help middle and high school students is involvement with homework. Homework can be the bridge that connects the parents to the school. One important study on this topic was the Balli, Demo, and Wedman study (1998) that examined family involvement with middle school children's homework. The researchers discovered that families are more likely to be involved with homework if their child or their child's teacher prompted them to be involved than if they were not prompted. Another important finding of this study was

that families are more likely to be involved with homework from subjects other than mathematics. These findings led to the following recommendation for parents:

> Because many parents will not be prompted by their children nor by their children's teachers, parents need to regularly monitor homework assignments so they will know how much homework their children have, how long it will take to complete the assignments, and whether younger children, especially, will need assistance. *Parents also need to understand that helping with homework and encouraging students to achieve academically do not require parents to provide hands-on assistance throughout the duration of the homework assignments*. This is important for parents to understand because many parents feel ill-prepared to help with homework due to competing demands on their energy and time and due to perceived (and sometimes real) inadequacies of their knowledge. (Balli, Demo, & Wedman, 1998)

These suggestions have been espoused by other educational organizations such as the U.S. Department of Education, NEA, National PTA, Eisenhower National Clearinghouse, etc.

One important way that parents can help their children succeed is to create a climate of acceptance towards homework. A stark contrast can be shown between the attitudes towards homework of American families and families from Asian nations. "For Asian countries, homework is not a problem because it is an expected and welcomed aspect of the education process," states Romesh Ratnesar in 1999 *Time Magazine* article. Researchers Chen and Stevenson (1990) found that 11-year-old Chinese students do four times as much homework as U.S. students. Yet it is the Chinese students who report liking homework the most. The Americans liked it the least. This speaks of an educational culture totally different than most American families. Parents who want to help their children to succeed need to follow the recommendations of the National PTA, which suggests that parents need to "let their children know that nothing worthwhile comes without effort, and learning is no exception. Academic skills like reading, math, and writing require much practice to master. That mastery comes only through time and repetition. Help your children to see that the struggles to understand academic concepts are often a vital part of the learning process."

Howard Gardner, the creator of the theory of multiple intelligences, made the following statement in a 1999 article for Time Magazine: "If families see homework as an occasion for energized action rather than angry reaction, homework can become a far more productive and even enjoyable activity." Gardner recognizes the need for parents to see homework as a daily occurrence and not an intrusion on family life. Parents must have a positive attitude towards homework and must set the stage giving children the space and resources they need.

This need for parents to have a positive attitude towards homework is especially important for success in mathematics. Far too often, parents undermine their children's mathematical education by saying that they "never have enjoyed math" or that "only some people have a talent for math." Suzanne Sutton (1997), a mathematics educator, lecturer, and founder of Newton's Window Web site, describes mathematics this way: "Math is a struggle for everyone. The struggle is evidence that we are in the good stuff." According to Sutton (1997), "One of the most significant things parents can do is to help their children understand the normalcy and the value of struggle in mathematics."

Final Comments

From the gathered research, we can see an interesting dynamic occurring between homework and parental involvement as children progress through the grade levels. During the elementary years, homework is low and parental involvement is high. As students progress from middle school to high school, the amount of homework increases but the amount of parental involvement decreases dramatically. There are numerous factors behind this decline, and we all hope our children will become self-sufficient learners. However, we must ask ourselves if increasing the amount of parental involvement in high school homework will lead to an increase in academic achievement. This study looked at this situation in a high school Algebra 1 class consisting mainly of 9th and 10th grade students.

Data Collection and Results

Study Overview

This parental involvement program was introduced to two Algebra I classes at an urban high school with a population of around 1,200 students. One of the classes was the experimental group and the other was the control group. The experimental group contained 25 students and the control group contained 22 students. Both classes were very diverse with students of varying ability. The program started the 3rd week of the semester and lasted for 13 weeks. Each parent and student was given a notice about this program that detailed their responsibilities and how important it was for their participation. Amazingly, every parent and student in the experimental group had Internet and e-mail access. This allowed the researcher to create a list group of parental e-mail addresses that made communication extremely convenient and easy. Parents were also given a sheet with helpful hints on how they can provide a proper study area for their children, and what they needed to ask their teenager each night concerning their Algebra I homework. This sheet can be viewed in Appendix A.

Since all the students and parents had Internet access, one of the main resources for information concerning the course was provided in the researcher's school Web page. Both students and parents were instructed on how to access this Web site, which contained important dates, weekly schedules, homework assignments, test dates, extra examples, and practice tests for each chapter covered. There was also a section devoted to practice for the Gateway exam.

Parents were also given information on how to access their teenager's grades online. This allowed parents to see grades, attendance, and conduct reports 24-hours a day. In addition to online access, progress reports were issued every 4.5 weeks. The researcher also made his e-mail address and phone number available to the parents.

Group e-mails were sent out periodically as determined by the researcher. In addition to the group e-mails, individual e-mails were sent to the parents of students who were

struggling with the material, with suggestions for improvement. If a parent did not reply to the e-mail, the researcher would call the parents.

At the end of the semester, the Gateway exam was conducted and the researcher was given detailed reports on both groups. Final averages were also recorded to be used for data analysis. In addition, parents and students were given a questionnaire asking them various ‘before and after’ questions about the program.

Gateway Scores and Final Class Averages

The primary quantitative data gathered for this study were the students' Gateway scores and their final class averages. The data for the control and experimental groups can be viewed in Appendix B. The primary measure of success was to be the students' scores on the Gateway Exam since this is a graduation requirement and is how the students and school are measured by NCLB. All of the students in the control and experimental groups passed the Gateway exam. This is an impressive accomplishment and is a testament to the students, their families, and the high expectations of the school.

To determine if there was a statistical difference between the Gateway scores and final averages of the control and experimental groups, a t-test was used since the sample size was less than 30. This nonparametric test allows for non-pared data to be compared to determine if their mean scores come from the same or different probability distributions (Siegel, 1956). The t-test utilizes the null hypothesis, which assumes that there is no difference between the test scores for the control group and the experimental group. It was the researcher's desire to prove that the null hypothesis could be rejected, which would demonstrate that there was a statistical difference between the control group and experimental group, thus proving that the intervention did have a positive impact on student achievement. The researcher tested to see if the null hypothesis could be rejected at the .05 confidence level. Given the degrees of freedom from the test data of 43, a t-

score greater than 1.682 would have been required to reject the null hypothesis. This was not the case for either the Gateway scores or the final averages(see Figure 1).

	T-Score	Needed T-Score
Gateway Scores	0.32803964	1.682
Final Averages	0.211958357	1.682

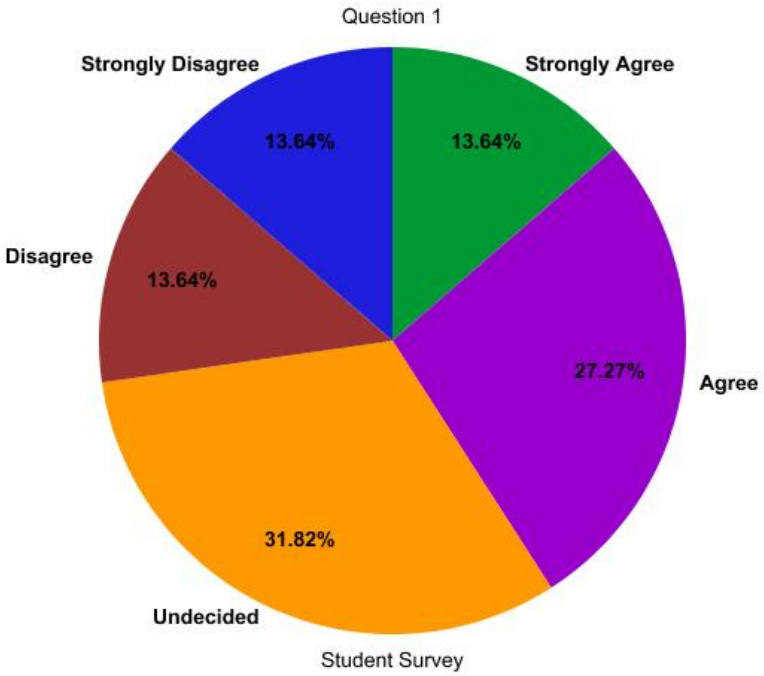
Figure 1. Results of a T-test comparing Gateway scores and final averages.

This proves that the intervention did not affect student outcomes in a statistically significant way.

Student Surveys

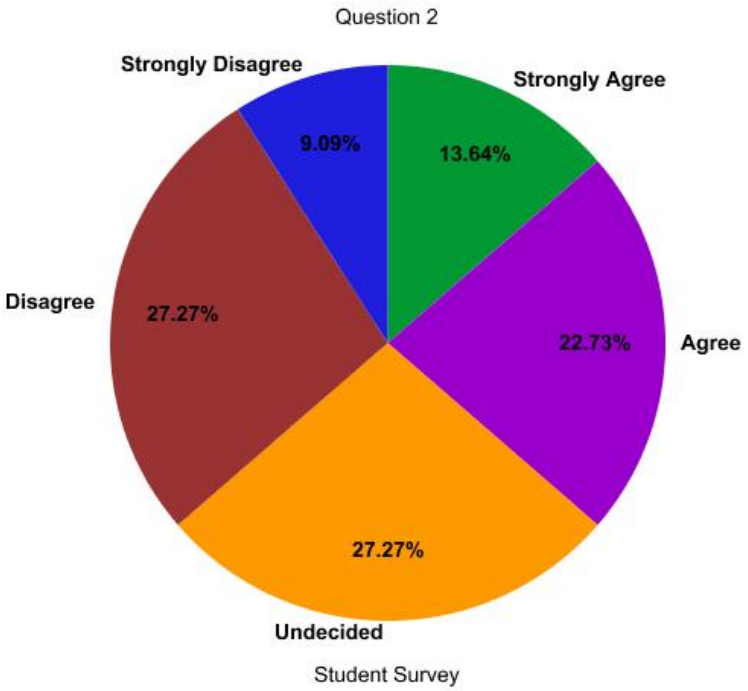
The following section documents the results of the student survey given at the end of the study. The survey form can be viewed in Appendix C.

Question 1 - I believe that this parental involvement program did have a positive impact on my performance in Algebra 1.



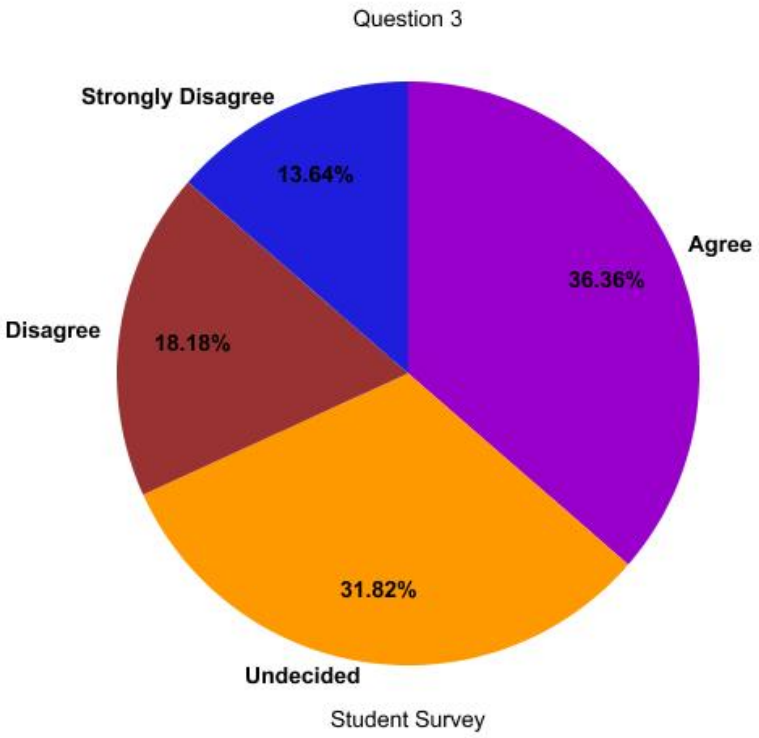
Less than half (40.91%) of the students either strongly agreed or agreed that this program did have a positive impact on their performance. The remainder (59.09%) were either undecided or disagreed in some manner with the effectiveness of this program.

Question 2 - I was more inclined to do my homework because I knew my parents/guardians would be asking me about it.



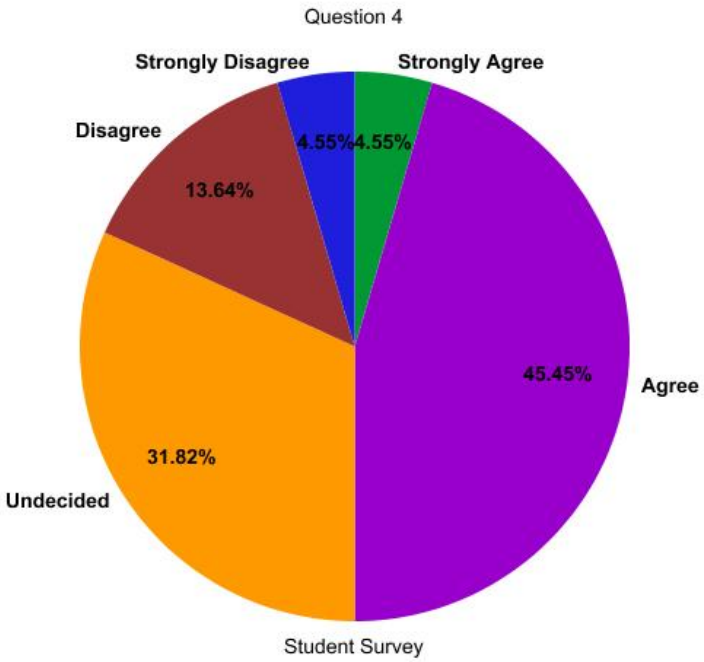
Only 36.37% of the students agreed or strongly agreed with this question. The remainder of the students (63.63%) were either undecided or disagreed with the question. This large percentage of students who did not agree with the question could have been due to the fact that many of the students were able to complete their homework during normal class time or that they were already conditioned to completing their homework without any parental involvement.

Question 3 - As a result of this program, I have a better attitude towards math in general.



No student strongly agreed with this question. Only 36.36% of the students agreed, while the remainder were either undecided or disagreed in some manner with the question. This is one of the most important questions in the survey since it is the researcher's experience that many ninth graders come into high school with an overall bad attitude towards mathematics.

Question 4 - As a result of this program, I am more inclined to ask the teacher questions concerning homework problems that I was not able to complete.

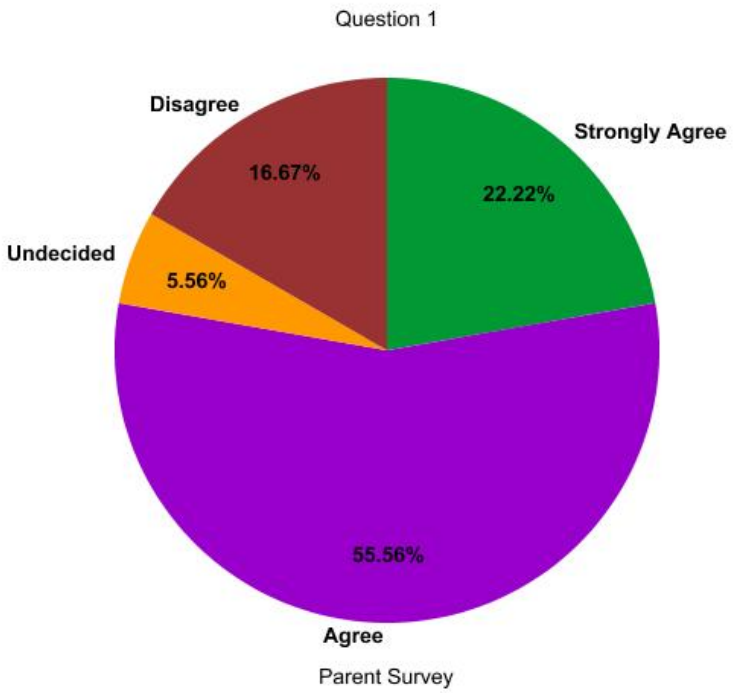


Perhaps the one bright spot in the student survey was their response to this question. Fifty percent of the students either strongly agreed or agreed that this program did make them more inclined to ask questions concerning their homework. It has been the researcher's experience that many students will not ask questions when they are struggling with the material. Any kind of an improvement in this area is a welcomed change. A student who asks questions is a more involved student, and these questions can help the teacher to determine areas for reteaching.

Parental Surveys

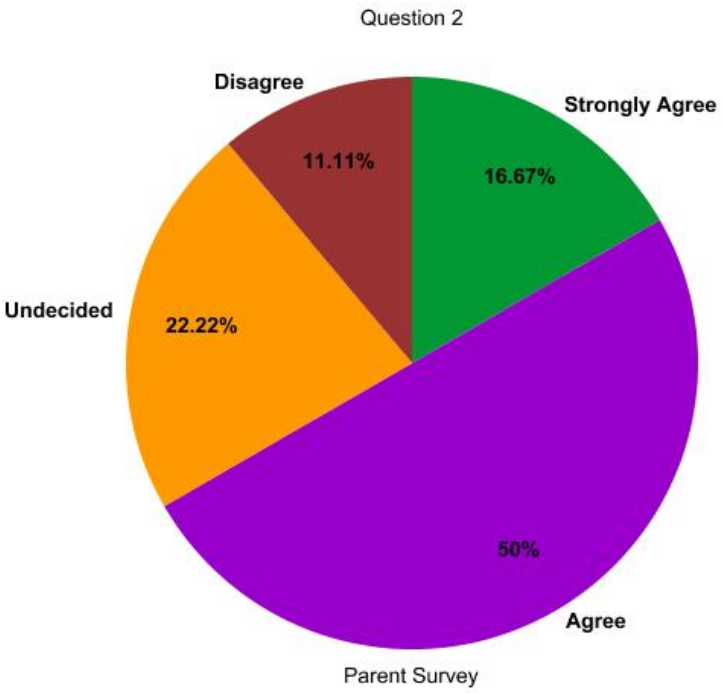
The following section documents the results of the parental survey given at the end of the study. The survey form can be viewed in Appendix D.

Question 1 - I believe that this parental involvement program did have a positive impact on my child's performance in Algebra 1.



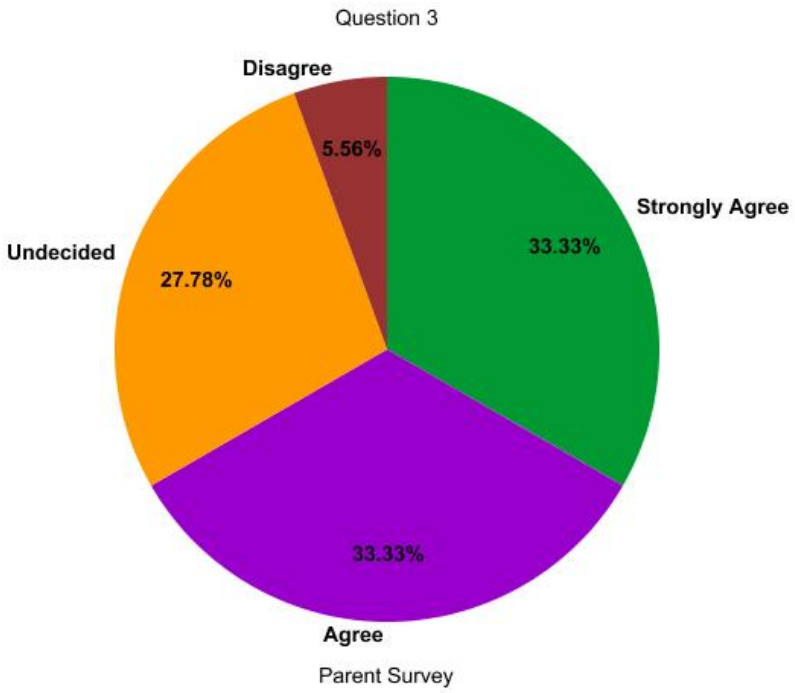
Nearly 78% of the parents surveyed either strongly agreed or agreed with this question. This is in sharp contrast to the student response to the same question, in which only 40.91% of the students either strongly agreed or agreed.

Question 2 - This parental involvement program did help me to feel more involved in my child's education.



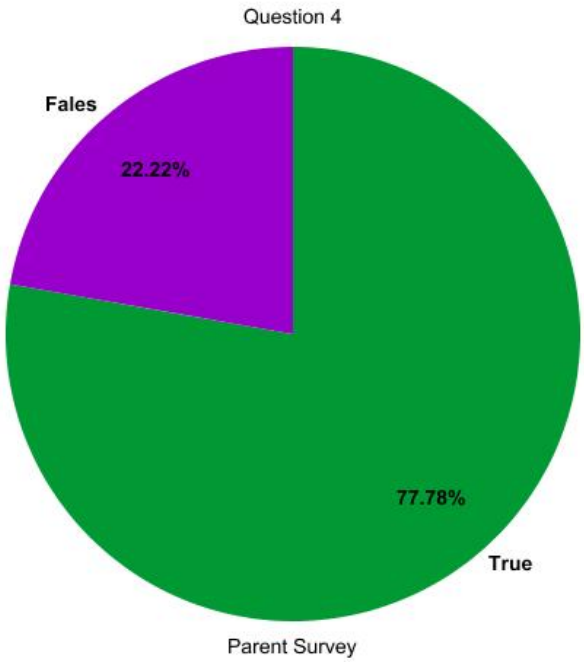
Nearly 67% of the parents surveyed either strongly agreed or agreed with this question. Having parents more involved in their child's education is extremely important and is an important predictor of future success.

Question 3 - I believe that this parental involvement program did improve parent-teacher relations.



Nearly 67% of the parents surveyed either strongly agreed or agreed with this question. Improving parent-teacher relations is always an important goal of high schools. As research demonstrates, when students move into their high school years, many parents and students are reluctant to contact each other with questions or concerns. The prevalence of e-mail should help both parents and teachers alleviate these fears and communicate more openly.

Question 4 - True/False: I am more likely to be involved with math homework if my child or my child's teacher asks me to be involved than if I am not asked.



The response to this question reinforces the previous research in this area. It is important for teachers to encourage their students to ask questions when they do not understand the material, and it is important for teachers to communicate to parents how important it is to be involved in their child's mathematical education even if they do not have the expertise to help.

Conclusions and Recommendations

Despite the fact that this parental involvement program did not have a significant impact on student achievement, there does appear to be some merit in its effects on improving parental involvement and improving parent-teacher relations. This researcher believes that this type of program needs to be implemented over a span of several semesters to determine best practices and to see if it can have a positive impact on students from lower socioeconomic backgrounds than those utilized in this study. The fact that all of the parents and students had access to the Internet and e-mail is obviously not typical of all high school settings. Being able to compose one e-mail message and send it off to 25 parents made communication extremely convenient and efficient. It would have been much more difficult to call all of these parents as often as the researcher sent out e-mail messages.

This program demonstrated how effective a teacher's Web site and e-mail messages can be in improving communications between students and parents. A simple Web site can provide students and parents with a central repository for class information, schedules, assignments, important dates, extra examples, class notes, and enrichment opportunities. Teachers need to be trained in how to set up Web pages and how to utilize e-mail to communicate with parents. This is extremely important in our technology driven world and provides a simple way to incorporate technology into the curriculum.

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Appendix B
Experimental Control Group Data

Experimental Group Data

	Gateway	
Student ID	**Number Correct**	**Final Average**
E001	43	84.5
E002	44	82.3
E003	42	80.6
E004	53	93.5
E005	53	84.8
E006	47	82.4
E007	39	74.5
E008	54	86.2
E009	53	88.5
E010	51	84.9
E011	55	96
E012	51	87.4
E013	43	86.3
E014	34	73.7
E015	32	71.2
E016	35	44.1
E017	54	89.7
E018	49	85.3
E019	54	98.6
E020	36	66.9
E021	50	81.3
E022	49	90
E023	34	77.4
E024	52	100
E025	33	59.8
Mean	45.60	82.00
Variance	62.42	150.62
Standard Deviation	7.90	12.27
Degrees of Freedom	43	43
T-Test	0.32803964	0.2111958

Appendix B, Continued

Control Group Data

	Gateway	
Student ID	**Number Correct**	**Final Average**
C001	52	95.7
C002	54	96
C003	40	72.5
C004	34	66.1
C005	34	79
C006	36	75
C007	45	93
C008	39	78.2
C009	47	83.5
C010	50	85.5
C011	48	93.3
C012	50	79.5
C013	44	84.8
C014	31	72.9
C015	49	86.9
C016	42	85
C017	49	95.7
C018	47	83.9
C019	51	84.9
C020	53	94.5
C021	49	92.6
C022	38	79.7
Mean	44.64	84.46
Variance	46.72	72.97
Standard Deviation	6.84	8.54

Appendix A
Parent Information Sheet

Dear Parents/Guardians:

Your teenager's class has been selected as the experimental group in my parental involvement research project. Since this project deals with parental involvement, you will be expected to do the following:

1) Talk to your teenager each night about their Algebra class. Ask them what they learned. You can also ask them to explain how to do a particular homework problem.

2) You will need to sign their homework *each night* for completeness. If you see that your teenager was not able to complete certain problems, encourage them to ask questions the following day during homework check.

3) You will receive notices about test/quiz dates and projects. Remind your teenager about these dates and encourage them not to procrastinate. You can always see the class calendar on my web site: http://www.clevelandschools.org/webs/jadcock/alg1calendar.html

4) You will also receive a list of web sites that reinforce the material we are covering in class. Encourage your teenager to visit these sites and perform the exercises. Most of these web sites can be found on my web page.

5) The Gateway - Algebra exam is the final exam for this class and is a graduation requirement. Performing well on this test is a major goal of the CHS Math Dept. You will receive sample tests and other practice items. Some of the practice items can be viewed from http://www.clevelandschools.org/webs/jadcock/gateway.html. Encourage your teenager to do these practice tests. **May 3 is the date of the Gateway exam**.

6) Help your teenager to have a positive attitude towards math. Don't ever tell them that you are "no good at math." Struggling with math is natural. It is through this struggle that we learn persistence and logical thinking.

Please feel free to e-mail, call, fax, or mail me at any time. I am here for your teenager and for you. I've enjoyed being your teenager's teacher and I look forward to working with you.

Appendix C

Student Before/After Questionnaire

Please respond to the following items by drawing a circle around the response that most closely reflects your opinion: strongly agree (SA), agree (A), undecided (U), disagree (D), or strongly disagree (SD).

1. I believe that this parental involvement program did have a positive impact on my performance in Algebra 1.

   SA A U D SD

2. I was more inclined to do my homework because I knew my parents/guardians would be asking me about it.

   SA A U D SD

3. As a result of this program, I have a better attitude towards math in general.

   SA A U D SD

4. As a result of this program, I am more inclined to ask the teacher questions concerning homework problems that I was not able to complete.

   SA A U D SD

Additional Comments or Suggestions: (Feel free to use the back of the page)

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Appendix D

Parental Before/After Questionnaire

Please respond to the following items by drawing a circle around the response that most closely reflects your opinion: strongly agree (SA), agree (A), undecided (U), disagree (D), or strongly disagree (SD).

1. I believe that this parental involvement program did have a positive impact on my child's performance in Algebra 1.

   SA A U D SD

2. This parental involvement program did help me to feel more involved in my child's education.

   SA A U D SD

3. I believe that this parental involvement program did improve parent-teacher relations.

   SA A U D SD

4. Circle true or false to indicate if you agree or disagree with the following statement: "I am more likely to be involved with math homework if my child or my child's teacher asks me to be involved than if I am not asked."

   True False

Additional Comments or Suggestions:

_____

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_____

_____

_____

Teaching Grammar to Eighth Graders:
Cooperative Learning and Direct Instruction

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Education 590
Deborah McAllister
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The Institutional Review Board of the University of Tennessee at Chattanooga (FWA004149) has approved this research project 05-220.

Introduction to the Problem

While some members of the language arts education community have the leisure to argue whether grammar should even be taught, the majority of middle and high school English teachers not only must teach grammar, but they also must struggle to find ways to teach it effectively. In recent years, cooperative learning has become more accepted as an increasing number of educators have successfully adapted the idea to various disciplines. The rationale of the research described in this paper is simply an effort to determine whether cooperative learning is advantageous for teaching grammar, and, more specifically, whether it has a significant positive effect on teaching grammar to low-level students. As a matter of disclaimer, I must confess that grammar has never been something I enjoyed about learning languages. Part of my motivation in seeking a more effective methodology is that I do not wish to inflict boredom and angst on my students any more than is necessary – certainly not to the extent to which I was subjected. As a further disclaimer, I mention that I do not come to the research classroom as an experienced teacher; I have spent most of my working life in industry, and upon receiving my certification, I will enter the teaching profession rather late, but with a set of experiences, perspectives, and skills somewhat different from those of other teachers my age.

Review of Literature

My first difficulty in research was an apparent absence of literature related to both cooperative learning and grammar. There is a historical explanation for the lack of literature containing both topics; the rise of interest in cooperative learning coincided with a decline in emphasis on grammar. There is no reason to believe that the increased trust in cooperative learning was related to the decreased emphasis on grammar. In the last 20 years, cooperative leaning has become well established in the various disciplines, and it is well-researched and proven. However, a resurgent grammar requirement in mainstream classrooms goes back only as far as the No Child Left Behind Act of 2002 (NCLB). Prior to NCLB, grammar was not ignored, but its importance was far behind that of affective literacy, outcomes-based theories, and reader response theory. My problems, with respect to research, became clearer when I sought literature on cooperative learning methods, and on a separate line of reasoning, literature related to teaching grammar.

Recent literature related to cooperative learning is vast and diverse. Rather than try to utilize all of the recent literature on cooperative learning, I chose to focus only on papers that outlined the potential problems with cooperative learning, and those that illustrated methods or subject matter closely related to language arts. I ignored altogether the overwhelming quantity of research that has as its primary purpose the proving of cooperative learning's validity; after all, I do not doubt cooperative learning's value and I know of no one who does.

Beatrice Volkman (1997) acknowledges that cooperative learning scenarios are not always the preferred method, and that action research is necessary to determine its

efficacy for each topic within each discipline. Volkman clearly believes in the overall usefulness of cooperative learning methods, but not for every subject all of the time. Volkman suggests that group successes depend on several factors, and if all or most of those factors are missing, grouping students into learning teams might be unwise. Volkman's advice seems to be pragmatic; if the right conditions are not present for cooperative learning, the instructor should fall back on direct instruction or individualized instruction methods. Among the conditions Volkman deems necessary are a match of subject to technique, a carefully orchestrated assignment of group members, implementation of cooperative strategies at an appropriate point, and management procedures for instructors.

John R. Magney (1997) writes about several of the virtues of cooperative learning from a perspective of technical education. Much of Magney's research and analysis regarding cooperative learning can be applied to language arts, though his notations of classroom scenarios that are not suitable for group activity may be his most useful contribution. Magney finds that group size is important; if the class is large, the groups tend to be either too numerous for the instructor to manage properly or too large to permit development of the most important desired results. Magney's survey of 142 instructors also revealed that cooperative learning requires additional planning beforehand, additional time management difficulties during the lesson, and greater difficulties assigning fair grades after the lesson. These factors were given as reasons why group work is sometimes rejected; the instructors often feel that they can teach more material in less time and with less effort using individualized or direct instruction. Magney

elaborates the benefits of group work, enhanced social skills, stronger teamwork skills, and quicker mastery of some types of topics and activities. His conclusion is that each instructor has to weigh the pros and cons for each class and make decisions accordingly. He does not advocate cooperative learning in every class, every time.

Kathleen Lewis Thompson and Julian M. Taymans (1996) illustrate some of the problems caused by behavioral clashes. Their article shows that successful group learning depends on training the students to do group work before expecting them to handle curriculum content in a group scenario. Students who might have zeal for learning but lack skills in cooperation and collaboration will easily allow bad behavior, either their own or someone else's, to derail the group. Thompson and Taymans also address the need for additional classroom management styles; "normal" classroom management is different from that needed for controlling groups, and transitions to and from group structure also require solid management skills of an uncommon degree. Of all the articles I read before engaging in the research, Thompson and Taymans' proved to be the most valuable during the research. Not only do they identify and describe potential pitfalls of cooperative learning, they give numerous suggestions for methods and procedures that could help keep a group activity on task and productive.

When I set out to do research, I had in mind finding a better method for teaching grammar skills. As I read the literature, especially the article by Joseph R Jenkins, Laurence R. Antil, Susan K. Wayne and Patricia F. Vadasy (2003), I realized that I could possibly gain additional information. My question was, if group tasks facilitated grammar lessons, would cooperative learning assist low-level learners to a greater degree than

mainstream students? I knew that most classrooms have students whose language skills are far below their grade level, and some of them seem never to catch up with their peers. If cooperative learning were to be the method of choice for all students learning grammar, could it also facilitate closing the gap for low-level students? I began to have a hope that it would. Jenkins et al, cited dozens of ways in which special learners were assisted by group tasking. They were reporting from a wide range of teaching disciplines and a wide range of student demographics, and their analysis seemed to indicate that cooperative learning is especially effective for exceptional students. The question remained, would cooperative learning lend itself specifically to grammar? Nowhere in the Jenkins et al. article could I find reference to a task similar to grammar. What I did find was a continuous listing of problems associated with low-level learners and how group tasks might have to be modified for them. As I began actually implementing the research, I was faced with almost all of the problems Jenkins and his group related; I found myself discovering, in their paper, the attributes of many of my students. During my student teaching, I was never allowed to view records that would indicate whether a particular student was exceptional. In that respect, I was somewhat handicapped in my research efforts. Jenkins et al., however, gave me the clues I needed to deal with the behavior one would expect from exceptional students. When they behaved like exceptional students, I acted accordingly, and I believe that helped overcome some frustrations involved in the project.

Arnold H. Lindblad, Jr. (1994) discusses many of the pitfalls awaiting instructors who would use cooperative learning models. Lindblad lists, describes, and compares

seven cooperative learning strategies and gives, for each one, possible problems and techniques effective for preventing the problems. Thanks to Lindblad's concise descriptions, I was able to identify two strategies that might lend themselves to grammar learning. Team-Assisted Individualization and Learning Together showed the only promise of adaptability with respect to grammar exercises and lessons. Both strategies had a common list of potential difficulties, but all of the difficulties are found in other literature, sometimes with more definitive remedies than given by Lindblad. His purpose in writing was to delineate the problems; for me, the most valuable information was the listing and description of the various strategies.

I have already alluded to the dearth of literature dealing specifically with cooperative learning and grammar instruction. While grammar instruction has seen a decline in the recent past, it is now in ascending mode, thanks, in part, to NCLB. However, the most meaningful recent literature that treats group tasking and grammar comes from the English as a Second Language (ESL) literature. ESL, and all things associated with it, have seen a rising importance in recent years. Many of the strategies useful for teaching students with mental or emotional deficits are also useful for teaching ESL students whose cognitive and emotional resources are good. Among the many strategies and tactics shared by ESL and special education, we find cooperative learning.

As I began to teach the students, I encountered linguistic difficulties such as I never would have imagined. The language spoken by some inner-city children is far enough from standard English that ESL strategies are called for at every turn. My first realization of the problem occurred when a student's response indicated he had no idea

that there are three types of “to.” His reading level is second grade, so his knowledge of English is from the spoken word. When people speak, they do not spell out or otherwise distinguish “two,” “too,” or “to,” so the student had no understanding of a grammar exercise aimed at teaching the appropriate “to” in writing. He began to understand when I went through a Total Physical Response (TPR) session using flashcards and plenty of gesturing. TPR is an ESL nugget that I would never have thought of using outside an ESL setting, but I shall in the future.

In a 1997 master’s thesis, Deborah Carolyn Joyce wrote extensively of the efficiency of cooperative learning when used with ESL students learning to edit. Joyce used group tasks to teach ESL students how to edit papers they had written. She used the group setting to teach peer editing, and she then used groups for teaching the same students how to edit their own papers. Joyce, in the end, taught the students three lessons: how to work together, how to find and correct errors in someone else’s writing, and how to find and correct errors in their own writing. Writing and speaking with proper grammar is a goal for both the ESL instructor and the inner-city instructor, and while Joyce did not refer to the linguistic needs of inner-city students who are English speakers, her thesis reads well throughout when one mentally substitutes “inner city” for “ESL.”

In 1997, the Michigan Adult Education Practitioner Inquiry Project (MAEPIP) published a compendium of eight articles. The eight papers, by different authors, were presented as The Best of ESL: Practical Strategy Guide for ESL. Of the eight papers, three of them indirectly relate ESL strategies’ relevance to inner city classrooms. Amy Sak Bosma wrote about the benefits of cooperative learning in adult ESL classrooms.

While Bosma was reaching out to adults, her methods are perfect for usage in the inner city language arts classes. One problem with inner city students is getting and keeping their attention; Bosma addresses the same problems from an ESL perspective. Bosma writes that the cooperative atmosphere of group tasks is crucial to giving ESL students a sense of belonging – the same is true of inner city students and special education students. Group tasking can put ESL students into scenarios in which communications is more possible – others have written the same about inner city and special education students. Bosma lists many benefits of cooperative learning for ESL and each one can be found in other literature as having applicability to special education or inner city students.

Another writer in the MAEPIP (1997) compendium is Ida Korzhenyak. She writes about grammar for pre-literates. Again, one could read "inner city" for ESL and Korzhenyak's paper would not have a different significance. The problems she describes ESL students wrestling with are the same problems that frustrate students with inner city dialects. For an instructor teaching grammar to pre-literate, adult, ESL students, Korzhenyak recommends spending about an equal amount of time with direct instruction, group tasking, and individualized instruction. Korzhenyak indicates that cooperative learning is effective for some, but not all, grammar instruction.

The third MAEPIP (1997) writer who seemed to have information useful for my parameters was Victoria Nikiforov. In her discussion of the joys and sorrows of teaching idioms to ESL students, the perils of idioms and homonyms sound as though she were writing about eighth-grade, inner-city students instead of adult ESL students. Nikiforov also recommends a mixture of direct teaching, individualized instruction, and group

work, in that order. Nikiforov indicates that her experience has been that students learn best when they have direct instruction to get them immersed into a topic. Then, as her students become comfortable with the directions and goals, she begins to shift the class into group tasks. As the students make the transition, she monitors individuals who seem to be confused or especially inept. Nikiforov spends individual time with the bewildered students until they can take a place in a group. Often, she has one of the high achieving students give the individual attention, especially if both students are from the same linguistic background. Substituting inner-city cultural parameters for ESL parameters in Nikiforov's paper does injustice to neither type of student.

Data Collections and Results

Planning the Lessons

My original intention was to see if cooperative learning provided a more effective means of teaching grammar than direct instruction. As I read the literature, I also began to wonder, if cooperative learning were the more effective methodology, then would the benefits be equally distributed throughout the class, or would one group benefit more than another would? Most literature that focused on exceptional children in the classroom seemed to indicate that low-level learners might benefit from cooperative learning more than their mainstream peers do; in fact, having low-level learners in a classroom often was the reason given for introducing group activities into the lesson.

As much as I could, I examined the three eighth-grade classes I would teach. All three classes had about the same number of students; all three had about the same mixture

of boys and girls, and blacks and whites; and grade averages were close for two of the classes. Only one class had any attribute that I could identify as anomalous: the second period class had a class grade average (73.6%) noticeably lower than the averages for the first period (82.7%) or the fifth period (83.3%) classes.

One problem referred to numerous times in the literature about cooperative learning is the difficulty in fairly assigning grades to individuals. When deciding which class to teach in one fashion or the other, I realized that if the grammar lesson I was planning to teach proved not to be conducive to cooperative learning, I could be doing an injustice to the class that received that strategy. I certainly did not want the class with the lowest average to suffer from my decision. If I had total confidence in my teaching abilities and in the efficacy of cooperative learning for that particular type of grammar lesson, I would, of course, choose to teach the second period class using group tasks. In the end, I decided to let chance decide for me, and using a random choice method to determine who received the cooperative learning strategy, the second period received the group strategy, after all.

Next, I decided on the particular group strategy to implement. From Lindblad's (1994) descriptions of group strategies, I was able to identify two that might lend themselves to grammar learning. Team-Assisted Individualization and Learning Together showed the only promise of adaptability with respect to grammar exercises and lessons.

Team-Assisted Individualization requires a mixing of students from various levels, ethnicity, sex, or other characteristics the teacher might consider important. The groups are put into place, physically, and the lesson is taught to the class as a whole. The

groups then determine whether all members of the group understand the assignment, and, if there are no questions, they continue to do the work. The work assignment for the group can be a writing product, a worksheet, a set of problems, or even a quiz, but each group is left to work out the distribution of tasks and the completion of the tasks. Other group members periodically check all work done by members of the group. The timing of the check periods is the instructor's responsibility. The instructor should check the work before it becomes the group product, and, if one or more individuals have contributed significantly, extra points can be added to the group grade. In the end, all members of each group should have the same product and receive the same grade. Obviously, this grade could be worse if the group has a very persuasive, but ill-informed, member. Constant monitoring by the instructor is required for all groups. If the group has a member whose level of understanding is quite low, this setting could be useful for its peer-teaching alone. The instructor needs to chart progress for each group, as often as possible, to insure no group engenders regression.

Learning Together is perhaps the simplest of all possible group activities. The group consists of three to five students who work together on a single activity. The single product becomes the grade for the whole group for that activity. Learning Together requires less record keeping during the group activity. Learning Together can be implemented after a whole-class, direct teaching session, or it can be used as a warm-up at the beginning of the class. Either way, Learning Together requires the students to have self-discipline and cooperative spirit to make the team successful.

I decided to use Team-Assisted Individualization as my model. My decision was based on several factors: the model has enough features to allow for modification, in case it appears necessary to do so; Team-Assisted Individualization allows for more monitoring by the instructor; and it has a record-keeping component that appealed to my research instincts.

Teaching the Lessons

When I began to teach the lesson to the three classes, I made no mention to any of them that there would be a difference in their classes. They knew that Mr. Allen was going to try to find out the best way to teach grammar, but I never discussed methodology with them. I did tell them that I wanted to see which class could make the most progress on the entire lesson. The students did eventually ask why second period was allowed to work in groups and the other two classes were not. The students indicated, by their tone and manner of questioning, that they preferred to work in groups.

In all three classes, I taught the lesson, “Commonly Misused Words,” over a period of 2 weeks. In each class, I began the lesson immediately after the students had completed the daily warm-up exercise. In each class, I kept the “Commonly Misused Words” lesson confined to the first half of the period – there were other lessons in progress at the same time, and I realized that an entire class devoted to word usage could bore them to distraction.

Proper word usage, in fact, is not entirely a grammar exercise. It involves a vocabulary component, a spelling component, a grammar component, and a reading

component. Choosing the right word at all times is rare, rarer in speech than in writing. My first task was to show the students the need for the lesson. After giving them some illustrations of incorrect usage from their own papers, anonymously, I proceeded to administer the pre-test on the first day of the lesson. No student took more than 9 minutes to complete the pre-test. I collected the tests and went on to the literature lesson for the day.

That evening, I copied the pre-tests and scored the copies. The next day, I distributed the original papers to the students, and, as a whole class, we discussed the answers. In periods one and five, I asked the students to correct their papers. In second period, I divided the class into groups and asked each group to quietly discuss their papers and correct them. In all three classes, I asked for the papers back so I might record their grades. When I indicated that I was going to record the grades of the corrected papers, several students in each class wanted their papers back to make some additional corrections. Some students had not made corrections; they did not even look at their mistakes. This was true of individual students who had apparently dozed off or zoned out, and of groups who had apparently socialized during the time they were to correct papers. Some had made no changes to their papers and just did not care.

On the third day, I began the instructional phase of the lessons in earnest, giving a brief lecture on a word or set of words. I then began an interactive discussion about the words, asking what their understanding of the words was beforehand, and whether they needed additional help. I asked the students to compose sentences aloud, and, in some cases, indicate which specific word they were using. I asked for any further questions,

and, after that, I asked the students to write two sentences for each word using each of the words correctly. In periods one and five, the students worked alone with me circulating to give assistance; in period two, I assigned groups to write the sentences and I circulated among them to give assistance and record their progress.

In all three classes, I gave extra credit for sentences using more than one of a problem set. Thus, “Sue gave two apples to Sam, and a peach, too,” would earn two extra points for having all three “to” words in the same sentence. Students or student groups getting all words correctly incorporated into two sentences each received a 100% for their daily grades. Some earned as much as 108% by way of extra credit. As some might expect, second period earned the greatest number of extra points. Several minds together can compose sentences using sets or groups of words. In the first and fifth periods, I often had to restrain students from working in groups without permission, especially when someone was trying to compose an extra-credit sentence. Over the next several days, the classes worked their way through the list of words given in Figure 1. At least two students in each class admitted having had difficulty with each word on the list, though some of them had mastered many of the words in earlier grades. In some respects, the entire lesson was a review, as well as a teaching session. There were quite a number of words or word sets that the students had not mastered, especially the finer points of “lie” and “lay.”

This list contains words and word groups commonly misused on papers written by the eighth-graders at Chattanooga Middle School. The textbook used in their classroom has a similar listing of such words: *Elements of Literature: Second Course* Kathleen Daniel Editor. Holt, Rinehart & Winston 2000. pp 816 – 820.

1. already and all ready

2. affect (v) and effect (n)
3. a lot – never one word
4. could have - never “could of”
5. ought - never “had ought”
6. why - never “how come” or “for why”
7. somewhat or rather - never “kind of”
8. then and than
9. these and those - never “them there”
10. this and that - never “that there” and not to be confused with “where” or “about”
11. a and an - not to be confused with “and”
12. except and accept
13. by, buy, and bye
14. sent, scent, and cent
15. two, too, and to
16. there, their, and they’re
17. hear and here
18. don’t (do not) and doesn’t (does not)
19. whole, hole, hold
20. it’s (it is) and its
21. lie and lay
22. meet and meat
23. passed and past - never “pasted”
24. principal and principle
25. capitol and capital
26. through and threw
27. weather and whether
28. who’s (who is) and whose
29. your and you’re (you are)
30. peace and piece
31. sun and son
32. lose and loose

Figure 1. Commonly misused word groups.

On Thursday of the second week, I had a review session with all three classes. In periods one and five, I asked the students to raise their hands to participate in a class-wide discussion of problem words. In second period, I asked the groups to quietly discuss the words that gave them problems, and for each group to come up with two words for the class to discuss as a whole.

On Friday of the second week, I administered the post-test to all three classes. I did not allow the second period to work on the test in groups, though I can see that could have been a valid tactic.

Analysis of the Data

When I administered the pre-test, I made copies and scored the copies. At that time, I assigned an alpha-numeric name to each student. If, in Table 1, a student number begins with “A,” that student is from the first period, “B” indicates the second period, and “C” indicates the fifth period. The numbers were assigned randomly within each class; there is no correlation between the alphabetically arranged class roster and the number of a student within the class. Upon scoring the post-tests, I wrote the post-test scores under the pre-test scores for each student. If a student was not present for both pre- and post-tests, I eliminated their data. That eliminated 10 of the students. I then checked the list of students for whom I had permission and assent, and I eliminated those who were not on the list. That eliminated two more students. Of interest to me, at the time, was the fact that of the 10 students who were eliminated for absence, only 1 of them had been given permission to participate. Had I done the elimination process the other way round, I would have eliminated 11 students for lack of permission and 1 student for absence. Perhaps there is a research paper waiting to be done about the correlation between student attendance and parental involvement with the school’s activities.

My next step in analysis was to determine whether there was evidence of regression. There were four students who did worse on the post-test than on the pre-test, and there was one student whose score did not change. I sought ideas to explain the regression and found only one; on the day of the post-test, one of the students had a very traumatic day. But that student was the one with the least regression; she missed one more item on the post-test than on the pre-test (-2.70%). Knowing that the pre-test and post-test scores are not a fair representation of that student's abilities, I was tempted to discard data for that student. However, since I wish to avoid all appearance of "cooking the books," I left that student's data in the set. As for the others who regressed, I have no explanation, but it could be significant that all three of the others, and the one who did not change, were in the same class – second period.

Please refer to Figure 2, a three-page spreadsheet, for the following discussion.

ClassA	Student Number	Total Correct	Total Missed	Percent Score	% Improvement	
Pre Test	A1	19	18	51.35%	2.70%	71.62%
Post Test	A1	20	17	54.05%		81.76%
Pre Test	A2	25	12	67.57%	27.03%	10.14%

Post Test	A2	35	2	94.59%		27.03%
						-2.70%
Pre Test	A4	34	3	91.89%	-2.70%	
Post Test	A4	33	4	89.19%		
Pre Test	A6	28	9	75.68%	10.81%	91.89%
Post Test	A6	32	5	86.49%		94.59%
Pre Test	A7	26	11	70.27%	10.81%	51.35%
Post Test	A7	30	7	81.08%		54.05%
Pre Test	A9	28	9	75.68%	13.51%	
Post Test	A9	33	4	89.19%		
Pre Test	A10	24	13	64.86%	16.22%	

Post Test	A10	30	7	81.08%		
Pre Test	A12	29	8	78.38%	13.51%	
Post Test	A12	34	3	91.89%		
Pre Test	A14	27	10	72.97%	8.11%	
Post Test	A14	30	7	81.08%		
Pre Test	A15	29	8	78.38%	8.11%	
Post Test	A15	32	5	86.49%		
Pre Test	A16	24	13	64.86%	10.81%	
Post Test	A16	28	9	75.68%		
Pre Test	A17	25	12	67.57%	2.70%	
Post Test	A17	26	11	70.27%		
Class B	Student Number	Total Correct	Total Missed	Percent Score	% Improvement	
Pre Test	B1	30	7	81.08%	2.70%	68.24%

Post Test	B1	31	6	83.78%		73.87%
Pre Test	B2	27	10	72.97%	18.92%	5.63%
Post Test	B2	34	3	91.89%		18.92%
						-10.81%
Pre Test	B3	25	12	67.57%	16.22%	
Post Test	B3	31	6	83.78%		
Pre Test	B4	31	6	83.78%	-5.41%	91.89%
Post Test	B4	29	8	78.38%		91.89%
Pre Test	B6	29	8	78.38%	-5.41%	35.14%
Post Test	B6	27	10	72.97%		51.35%

Pre Test	B7	16	21	43.24%	8.11%	
Post Test	B7	19	18	51.35%		
Pre Test	B8	27	10	72.97%	0.00%	
Post Test	B8	27	10	72.97%		
Pre Test	B9	17	20	45.95%	13.51%	
Post Test	B9	22	15	59.46%		
Pre Test	B10	13	24	35.14%	16.22%	
Post Test	B10	19	18	51.35%		
Pre Test	B11	27	10	72.97%	8.11%	
Post Test	B11	30	7	81.08%		
Pre Test	B12	27	10	72.97%	5.41%	
Post Test	B12	29	8	78.38%		
Pre Test	B13	34	3	91.89%	-10.81%	
Post Test	B13	30	7	81.08%		

Class C	Student Number	Total Correct	Total Missed	Percent Score	% Improvement	
Pre Test	C2	30	7	81.08%	10.81%	71.93%
Post Test	C2	34	3	91.89%		83.37%
Pre Test	C3	34	3	91.89%	5.41%	11.43%
Post Test	C3	36	1	97.30%		24.32%
						2.70%
Pre Test	C4	22	15	59.46%	24.32%	
Post Test	C4	31	6	83.78%		
Pre Test	C5	28	9	75.68%	8.11%	91.89%
Post Test	C5	31	6	83.78%		97.30%

Pre Test	C6	20	17	54.05%	13.51%	54.05%
Post Test	C6	25	12	67.57%		67.57%
Pre Test	C8	29	8	78.38%	13.51%	
Post Test	C8	34	3	91.89%		
Pre Test	C10	26	11	70.27%	10.81%	
Post Test	C10	30	7	81.08%		
Pre Test	C11	27	10	72.97%	16.22%	
Post Test	C11	33	4	89.19%		
Pre Test	C12	20	17	54.05%	18.92%	
Post Test	C12	27	10	72.97%		
Pre Test	C13	30	7	81.08%	2.70%	
Post Test	C13	31	6	83.78%		

Pre Test	C14	26	11	70.27%	16.22%	
Post Test	C14	32	5	86.49%		
Pre Test	C15	30	7	81.08%	2.70%	
Post Test	C15	31	6	83.78%		
Pre Test	C16	24	13	64.86%	5.41%	
Post Test	C16	26	11	70.27%		
						70.64%
						79.77%
						9.13%
						27.03%
						-10.81%

For the highest individual score on the pre-test, all three classes had an identical individual maximum score, 91.89%. This could lead one to believe that all three classes started out on an equal footing. However, in almost all other respects, the second period class performed less well than the first and fifth periods. The first and fifth periods had pre-test class averages of 71.62% and 71.93%, respectively, and the second period class had a pre-test average of 68.24%. The second period also had the greatest range of pre-test scores, from 35.14% to 91.89%. The first and fifth period classes' pre-test scores ranged from lows of 54.05% and 67.57%, respectively, to the same 91.89% high score.

As for the post-test scores, the fifth period had the highest class average of 83.37%, as well as the highest post-test individual score, 97.30%. The first period had an average of 81.76% for the post-test, and the second period had a post-test class average of 73.87%. The maximum individual test score in the first period was 94.59%, and for the second period, it was 91.89%. In the second period, the individual who had the highest pre-test score of 91.89% also had the greatest regression of all at -10.81%.

In looking for something positive to say about the data for the second period, I can only say that the students who regressed did not fall into the failing range, and second period brought up their lowest scores by the greatest amount. Second period's lowest pre-test score of 35.14% was brought up to 51.35% on post-test, and their second lowest pre-test score went from 43.24% to 51.35%, increases of 16.22% and 8.11% respectively.

The data does not show the second period as having done significantly better than the other two classes; it would seem that cooperative learning was not as effective for them as direct instruction was for the others.

Conclusions and Recommendations

Reflecting on the Project

I am really quite happy that all of my classes showed average gains, and I am sure there are ways to explain the regressions of four students. I was not happy that the data did not show a conclusive result, either way, regarding the efficacy of cooperative learning versus direct instruction. If there is a conclusion to be had from the data, it is that cooperative learning might not be the best tactic for teaching grammar lessons to eighth graders. I suppose some of my disappointment showed because my cooperating teacher asked me why I seemed so quiet the day after I examined the data. When I showed her the spreadsheets, she asked for the key to the names. Fortunately, I still had a list that had names associated with name codes, and when I showed it to her, she was rather happy. Without allowing me to view personal records for the students, she assured me that all the students with IEPs had shown signs of learning, especially in the second period. She told me that I needed much more practice with cooperative learning tactics and strategies, and that she would have been concerned had I not used the second period for experimenting with group assignments. She thought I had chosen the second period purposely for cooperative learning; it would have been her choice. She told me that because of the implementation choices I made, the data from the three classes indicates that cooperative learning is less effective than direct instruction, but if I had done the cooperative learning in the first and fifth periods and direct teaching in second period, my data might have showed the result I expected. Furthermore, if I had done the research the other way

round, the special needs students in second period might have been devastated. If her classes had a more evenly distributed population of special needs students, the research might have produced the expected results, but having a relatively larger percentage of special needs students in the second period skewed the results of the testing.

On the positive side, I have experiences from life that help me teach inner-city students better language skills. I have seen the results of uneducated and undereducated citizens in the workplace, and at every opportunity, I give the students reasons why the lessons have relevance. Some of the relevance might be more in their futures than in their present, but language arts skills are more necessary than ever.

Some of my lessons were more successful than they might otherwise have been because of my ESL training. I realize the importance of ESL training for teachers, even if they do not have ESL students in their classes. In all schools, inner city, rural, or suburban, we will have students who come from poorly educated families. For those students, standard English is almost like a foreign language. ESL skills are an enhancement for any teaching discipline, and I am constantly amazed at the people, educators and otherwise, who believe one must speak one or more foreign languages to be an ESL teacher.

At some time in the near future, I plan to try cooperative learning strategies once again with a grammar lesson. I might not research the experiment as thoroughly as this one, but with my own class, full information about the students, better management skills, more confidence, and more time, I believe the experiment will be more meaningful for all concerned. In the end, I am quite sure that this particular project was more

significant in what it taught me about myself than in what it added to the overall knowledge of the education community.

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The Loss of Instruction Time Due To Behavior

Case Study

Larry Bullington

Culminating Experience EDUC590

Dr. McAllister

Fall 2005

The Institutional Review Board of the University of Tennessee at Chattanooga (FWA00004149) has approved this research project 05-260.

Introduction to the Problem

True instruction time in the classroom has found itself compromised by such a diverse range of interruptions that occur with such frequency that anyone in the field of education will admit that it is an important issue. Teacher preparation academies train student teachers to be prepared to deal with not only discipline problems but to be able to produce lesson plans that are designed to plan each minute of each day. Naturally, all types of interruptions need to be addressed and reduced on national, state, and local levels but the loss of instruction time due to behavioral issues will be an issue whose impact must be measured from school to school. My hypothesis is less time lost will result in an increase in true instruction time. If professional lesson plans are compromised by any loss of instruction time, then this would justify a study of the reasons why instruction time was lost.

Review of Literature

It must be admitted that no student body is perfect and troubled children will be found in all classes (Caspari, 1976), but when it becomes chronic and affects instruction time, a plan of action is needed. For the school or the teacher who must exist in an atmosphere where discipline issues constantly interfere with quality instruction, steps must be taken to reduce the impact that behavioral problems have on the classroom. Research and studies on any topic that compromises true instruction time would be a beneficial investment.

Data Collection and Results

Methodology

Therefore, the issue will be explored in this report through a survey of one group of teachers at an elementary school in Chattanooga, Tennessee during the 2005-2006 school year. This will limit the subject population to adult teachers only with a total number of possible returned surveys up to 42.

A methodology that consists of a survey will be the primary instrument of this research. This survey will provide an assessment based upon returns from teachers who are actively engaged in full time teaching.

Results

A survey of 10 questions was offered to 42 staff members over a 5-day period (see Appendix A). A box was placed in the conference room and all voluntary participants were notified that their effort would be confidential. The participants could have been regular classroom teachers or related arts teachers. The survey form included "fill in the blank" sections, as well as a "circle yes or no" section. A total of 11orms were completed and returned.

Four teachers indicated that they lost 5 minutes per class to discipline or behavior issues while two teachers indicated 10 minutes and three teachers indicated 15 minutes Two teachers stated that they lost 30 minutes of instruction time per classroom period to behavior issues.

During an average day, three teachers said that they lost 15 minutes, four lost 30 minutes, one lost 45 minutes, and three teachers claimed that they lost 60 minutes. Ten of the eleven teachers indicated that a special location existed within their classroom for the isolation of disruptive students while one teacher indicated that space did not allow for this action.

Teachers were surveyed as to whether or not a student who was placed in time out isolation within the classroom for behavior problems were required to do regular classroom work while in that state. Seven answered yes, two said no, while two others indicated that some did and some did not.

Ten out of 11 teachers indicated that, if a student was removed from the classroom for behavior problems, that student was required to make up the work missed. One teacher indicated that they did not feel that it was their responsibility to provide make-up work. If a student was suspended from school, nine teachers required the student to make up the work missed while two did not. Ten teachers supported the requirement that instruction time missed due to behavior problems should be made up while one did not.

When a student is suspended from school, four teachers indicated that they sent homework assignments with the child, in some fashion, while six indicated that they did not and one teacher indicated that they sometimes did.

All teachers surveyed indicated that they considered loss of instruction time due to behavior a serious issue. All teachers surveyed indicated that they felt their lesson plans were affected in a negative way by behavior problems in the classroom. It might also be noted that none of the surveys returned indicated that the regular classroom

teachers felt loss of instruction time due to behavior was an issue unworthy of discussion.

Conclusions and Recommendations

There are several general conclusions that can be arrived at from this survey. Based on the replies it would be fair to conclude:

- Teachers consider the loss of instruction time due to behavior a serious issue.
- Teachers feel that their lesson plans are affected in a negative way by behavior.
- Teachers feel that a student should be required to make up lost instruction time due to behavior.
- Most teachers feel that students should be required to make up assignments missed due to behavior.
- Most teachers felt that, if a child was placed in "time-out" within the classroom, they should keep up with the class as it worked on the assignments.
- All teachers reported some amount of instruction time was lost due to behavior issues.

Many believe that behavior problems are "learned" by a student. Many also believe that with the correct approach, these behaviors can be "unlearned" or "relearned" (Sloane, 1998, p. 10). Therefore, it seems reasonable for any educator to consider "educating" the child about the realities of unacceptable behavior in their classroom. Most would agree that this seems like a common sense statement but just how do you go about this "education?" While the merits of approaches like "reward

and punishment" have supporters and detractors, many within the educational community embrace the consensus of most professionals that we have to move beyond the simple viewpoint of negative and positive responses that seemed the answer in the past. One is almost tempted to adopt the old Chinese proverb that claimed you should "Beat your child once a day; if you don't know why, the child does" (Tuttle, 1963, p.30).

Major conclusions and recommendations of this report are to note that (a) students must be held accountable for work missed due to their own behavior, and (b) the educator must "re-educate" the problem students while setting an achievable behavior standard for the entire class.

Beyond any doubt, grant monies can be found to help support further research in this area, should one be willing to pursue the goal of seeking such aid. Also, although many avenues of aid might be tapped into through the use of technology, it might be the simple act of research that would prove the most beneficial for the regular classroom teacher. One should remember that education has the capacity for serving either as an agent of alienation or of socialization and positive development (Sabatino, Sarri, & Johnson, 1979, p.35). In the final analysis, it is the job of the reflective practitioner to apply this to behavior issues, as well as to the approach to the regular classroom curriculum.

It would be my recommendation to any educator to consider that discipline in a democracy should spring from internal controls, not from fear of punishment, and that

successful approaches to discipline in the schools enhance individual self-esteem and encourage cooperation.(Carter, 1987, p. 8).

It is disconcerting to this researcher that, in the field, the consensus of teachers seems to be that lost instruction time due to behavior problems on a daily (if not hourly) basis is the norm. In fact, it is odd, indeed, that many regular classroom teachers leave the profession because they feel “unable” to teach because they have become “police” instead of teachers. It is my personal opinion that anyone who denies that behavior is the major problem in America’s schools needs to get back in touch with the realities of the day-to-day classroom environment.

In conclusion, it should be noted that a loss of only 5 minutes of instruction time per day due to behavior can result in 15 lost hours per year. If the “worst-case” scenario of 5 minutes lost per hour was studied you will suddenly realize that the loss of 112 hours per year due to behavior issues is not only serious, but it compromises many of the Hamilton County Department of Education Standards.

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Appendix A

Larry G. Bullington
590 Culminating Experience
Action Research Project

Circle one. I am a: (classroom teacher, related arts teacher, special education teacher.)

THE LOSS OF INSTRUCTION TIME DUE TO BEHAVIOR

1. **How many minutes of an average classroom period would you say is lost due to behavior issues?_____. (number of minutes).**

2. **How many minutes of an average classroom day would you say is lost due to behavior issues? _____. (number of minutes)**

3. **Do you have a location within your classroom where disruptive students are sent to be isolated from the class (time out) ? (yes / no).**

4. **Do students in "time out" continue to work along with the rest of the class ? (yes / no).**

5. **If a student is removed from your classroom for being disruptive, is that student expected to turn in all work that the other students completed during the time that was missed? (yes / no).**

6. **If a student is suspended from school, is that student responsible for completion of all assignments done by the class while they were out? (yes / no).**

7. **Would you support a system that required missed instruction time to be made up by any student who missed instruction time due to behavior issues ? (yes / no).**

8. **When a student is suspended from school do you send homework with them to require them to keep up with the pace of the class? (yes / no).**

9. **Would you say that the loss of instruction time due to behavior is a serious issue? (yes / no).**

10. **Does behavior in the classroom have a negative impact on your lesson plans? (yes / no).**

THIS PROJECT HAS BEEN REVIEWED BY THE INSTITUTIONAL REVIEW BOARD FOR THE PROTECTION OF HUMAN SUBJECTS AT THE UNIVERSITY OF TENNESSEE AT CHATTANOOGA.

DO NOT PLACE YOUR NAME ANYPLACE ON THIS FORM.

This form has been reviewed and approved by the UTC IRB committee. Participation is voluntary, and the results will be totally [illegible]. There is no identifying information on the survey, and it will not be possible to link individuals with the

Toward a Pedagogical Approach to Using PLATO Learning©
in Sixth Grade Math:
Determining Effectiveness between Teaching Methods

Tim Childers
EDUC 590
Dr. McAllister
December 2005

The Institutional Review Board of the University of Tennessee at Chattanooga

(FWA004149) has approved this research project 05-227

Introduction to the Problem

This project is an evaluation of instructional techniques using PLATO Learning© (PLATO) in a lab environment for the teaching of math. The study took place in one sixth grade team at Cleveland, TN middle school. Approximately one half of the students were not assigned to a PLATO lab. These students comprised the control group. Out of the remaining students, nearly two thirds were enrolled in a PLATO lab using a module titled *Fast Track Advantage Math* to determine what math lessons students would complete on a daily basis. The last group of students, approximately 22 individuals, was placed in a PLATO lab where the lab instructor and core math teacher worked in tandem to decide math instruction on a day-to-day basis. The purpose of this study was to determine if there were any differences between the two PLATO lab approaches. A pre-test and post-test on one unit of study were delivered to all students on the team to see if an appreciable difference in gains was noticeable between the two approaches.

Review of Literature

As a project, PLATO has been around since 1959. Donald Bitier put together a consortium of several thousand terminals across both elementary and higher education campuses through the University of Illinois. By 1963, the creation of tutorial software for math was a growing field. The idea was to allow a student to work at his or her own pace in an individualized environment. The software supplied immediate feedback to responses from the student. These early projects used the drill-and-practice approach so common in the 1960s and 1970s. (Wang & Swanson, 2001). The National Council of

Teachers of Mathematics has advocated for the use of computer software as a teaching tool since 1989 (NCTM, 1989).

Today, PLATO impacts over a half million students. The PLATO website (www.plato.com) details many of its success stories. Schools across the country have shown marked improvements in test scores, many in just one year, after implementing PLATO on their campuses (Bennett, 2001). These schools cover the gamut of elementary, middle, secondary, and higher education environments. Student demographics include at-risk and exceptional children.

All types of computer-assisted instruction provide some of the following characteristics to students(Cosmann, 1996):

- Material is presented on a number of screens and may include text, graphics, video, and voice input.
- The software tracks student progress and repeats information for slow learners.
- Links are provided to let faster learners jump ahead.
- Hyperlinks allow students to branch out to any available material.
- The software prints student progress reports in a number of formats.
- A “help” feature provides information on how the software functions.
- Some student progress material is password protected for teacher use only.

NTCM has suggested using computers in math instruction since 1989. It is felt that students will become more engaged in the curriculum in this way (NTCM, 1989).

Current research indicates the use of computer software in mathematics instruction leads to higher gains on assessments (Henry & DeSantolo, 2001).

Page (2002) found a significant difference in mathematics learning, personal self-esteem, and school self-esteem favoring an experimental group of low socio-economic elementary students. The experimental group received computer assisted instruction while the control group did not. In a meta-analysis of 42 studies, Bayraktar (2001) found a cumulative effect size of 0.273. This moved the typical science student from the 50th percentile to the 62nd percentile when computer-assisted instruction was used.

Foshay (2004) states, "Different ways of using PLATO will lead to different results" (p. 15). Bayraktar (2001) agrees, stating that characteristics such as student-to-computer ratios, the mode of computer-assisted instruction, and the duration of treatment were all factors in the success of computer-assisted instruction. There are three main categories of use for PLATO software in the learning environment. *Supplementary* methods use PLATO for review and reinforcement of what has been taught by other means. *Complementary* methods add material to the curriculum such as problem solving activities or remediation. *Primary* methods use PLATO for initial teaching of the curriculum (Foshay, 2004).

A Brief History of PLATO at this middle school

PLATO was established as a related arts class 4 years ago at this middle school. Four labs of 30 computers each were created using funds from a Continuing School Reform (CSR) grant. Students are randomly assigned to complete one semester in the lab. The labs are designed for sixth-, seventh-, and eighth-grade students.

Early on, it was decided that sixth and eighth graders would concentrate solely on math skills, while seventh graders worked on language arts. Typically, the sixth graders would take an introductory assessment titled *Fast Track Advantage Math* (Fast Track). This assessment is designed to provide more difficult questions as students get more answers correct, and less difficult questions if students begin to answer incorrectly. After a time, the assessment runs its course and assigns students a grade level of competency. In doing so, certain modules are exempted from the students' profiles. Through both individual computer work and teacher-led class instruction, students work their way through modules assigned by PLATO. As modules are completed successfully, Fast Track adjusts students' current grade level with a report showing grade level gains. Using PLATO in this fashion falls into the *primary instruction* method listed in the literature review.

Over time, problems with this methodology began to surface. For instance, the PLATO labs and the core math classes were not teaching the same material at the same time. As a result, it was believed to have the effect of students taking two separate math classes of completely different material. The same was true of those classes concentrating on language arts. In addition, the constant drill-and-practice routine can become less than exciting to some students. It was believed that students might not continue to do their best work throughout the entire semester.

After consulting with PLATO staff, the school made a decision to alter its plans for PLATO use in the labs. An experimental lab was established with the researcher as teacher. In this lab, all grade levels would work through all available subjects in PLATO.

The concentration is math and reading; however, time is also spent on grammar, social studies, and science. In addition to time spent in PLATO, students work through online material, play online games, watch video instruction, use PowerPoint tutorials, and complete handout sheets. Fast Track is used occasionally, but the lab instructor chooses most modules.

The main element that separates the two methods of instruction is that, in the experimental lab, the modules are chosen to teach the same concepts taught in the core math class. In this way, students will have 90 minutes of instruction covering the same concepts rather than two, 45-minute classes covering different material.

Purpose of This Study

This study has two goals. The first goal of this study is to determine the effectiveness of PLATO as a teaching tool in sixth-grade math. When given a pre- and post-test over a unit in the core math class, this study should show greater gains among the students who have PLATO over those who do not.

The second goal of this study is to determine the effectiveness of the experimental lab design. Using the same pre- and post-test results, this study should show greater gains among the students in the experimental lab over those in the traditional format.

Data Collection and Results

Data were collected in the form a pre-test prior to the core math teacher starting a unit on fractions and decimals. All students on the team completed the pre-test. The test consisted of nine multiple-choice questions and one word problem (see Appendix A). After the teacher completed the unit, students completed a post-test consisting of nine

multiple choice questions and one word problem (see Appendix B). Only those students who returned parental consent and student assent forms had their scores included in the study.

The team consisted of 106 sixth-grade students. A total of 97 students agreed to participate in the study and obtained parental consent to do so. Forty-four students in the study had not had a PLATO class during the semester in question. Thirty-seven students were enrolled in the PLATO lab that utilized Fast Track Advantage Math as the sole module of instruction throughout the semester. Sixteen students were in the experimental PLATO lab that combined math, grammar, and reading as the primary modules of instruction.

Prior to teaching the unit for this study, all students in the study completed a 10-question pre-test. The researcher utilized two separate forms of the same test in each math class. Every other student received form A while the remaining students received form B. An independent samples *t test* was performed using SPSS 11.0. The results for the pre-test were compared for those students enrolled in PLATO and those not enrolled in PLATO. The results are presented in Tables 1 and 2.

Table 1

Group Statistics for Comparison of Pre-Test Means

PLATO	N	Mean	Standard Deviation	Standard Error Mean
Pre-Test in PLATO	53	47.83	21.043	2.890
Pre-Test not in PLATO	42	45.24	17.354	2.678

Table 2

Independent Samples T Test Results for Pre-Test Scores

Independent Samples Test

		Levene's Test for Equality of Variances		T test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (two tailed	Mean Difference	Std. Error Difference	Lower	Upper
Pre-Test	Equal variances assumed	2.569	.112	.643	93	.522	2.59	4.029	-5.409	10.593
	Equal variances not assumed			.658	92.834	.512	2.59	3.940	-5.233	10.417

The sample populations that completed the pre-test contained a total of 53 students enrolled in PLATO classes and 42 students in the control group. The results of the independent samples *t test* indicate there was no significant difference between the two groups of students regarding the pre-test scores. The t value of .643 is not significant at the $p = .05$ level. In addition, the lower (-5.409) and upper (10.593) bands of the 95% confidence interval include zero. This indicates that there are no statistical differences between students enrolled in PLATO and those not enrolled in PLATO.

After the pre-test, the core math teacher gave direct instruction to all students for approximately 7 days. For students not enrolled in PLATO, this was the only math instruction received during the research period.

Students enrolled in the traditional PLATO class spent most of each day working through modules in the Fast Track Advantage Math section of PLATO. From time to time, the PLATO teacher included mini-lessons conducted in a standard lecture format and used some manipulatives for students.

Students enrolled in the experimental PLATO class worked through sample problems at the beginning of each class. They also utilized the website hosted by the math textbook publisher to do self-check quizzes online. Handout sheets were completed in class and taken home for homework. In addition, students worked through tutorials, practice drills, and mastery tests in specific PLATO modules linked directly to the curriculum standards found in the math textbook chapter. The last 10 minutes of the 45-minute class allowed students to play online games. If students finished the assigned math modules prior to game time, they worked in grammar or reading modules for the remainder of the instruction time in class.

At the end of the chapter, students completed a 10-question post-test. Again, the researcher used two forms of the test. A total of 88 students completed the post-test. An independent samples t test was conducted to see if significant differences were present between the students receiving PLATO and the control, or non-PLATO, students. The results are shown in Tables 3 and 4.

Table 3

Group Statistics for Comparison of Post-Test Means

Group Statistics

	PLATO	N	Mean	Std. Deviation	Std. Error Mean
Post-Test	>= 1	50	65.10	23.046	3.259
	< 1	38	53.82	21.854	3.545

Table 4

Independent Samples t Test Results for Post-Test Scores

Independent Samples Test

		Levene's Test for Equality of Variances		t test for Equality of Means						
		F	Sig.	t	df	Sig. (two-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Post-Test	Equal variances assumed	.018	.895	2.326	86	.022	11.28	4.851	1.641	20.928
	Equal variances not assumed			2.343	81.83	.022	11.28	4.816	1.704	20.864

A total of 50 students currently enrolled in PLATO completed the post-test. Thirty-eight students from the control group completed the post-test. The mean score for PLATO students was 65.1, and the mean for the control group was 53.82. Again, the t test shows no significant difference between the control group and the PLATO classes. The t value is greater than .05 at 2.326.

As a result of these results, a one-way ANOVA was conducted. The one-way ANOVA is a stronger test when the samples sizes are small (see Tables 5 and 6).

Table 5

A Comparison of Mean Scores Between the Control Group (0) and the Experimental PLATO Class (1)

Descriptives

Post-Test

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
0	38	53.82	21.854	3.545	46.63	61.00	10	90
1	15	64.33	24.775	6.397	50.61	78.05	20	100
Total	53	56.79	22.978	3.156	50.46	63.13	10	100

ANOVA

Post-Test

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1189.673	1	1189.673	2.310	.135
Within Groups	26265.044	51	515.001		
Total	27454.717	52			

Table 5 shows a higher mean score in the experimental PLATO group. However, the significance of .135 is too high for the mean score difference to be significant at the .05 level. This result appears to invalidate the hypothesis that the experimental PLATO class was effective in helping improve students' math scores.

Table 6

A Comparison of Mean Scores Between the Control Group (0) and the Traditional PLATO Class (2)

Descriptives

Post-Test

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
0	38	53.82	21.854	3.545	46.63	61.00	10	90
2	35	65.43	22.634	3.826	57.65	73.20	10	100
Total	73	59.38	22.836	2.673	54.06	64.71	10	100

ANOVA

Post-Test

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2456.978	1	2456.978	4.971	.029
Within Groups	35090.282	71	494.229		
Total	37547.260	72			

Again, the PLATO class has a higher mean score (65.43) than the control group (53.82). However, this time the significance level of .029 is significant at the .05 level. The one-way ANOVA appears to demonstrate that the traditional class did show a significant increase in math scores when compared to the control group.

Conclusions and Recommendations

This study demonstrates that participation in a PLATO class can increase student scores in math at the sixth-grade level. In addition, it appears that the method of instruction in the PLATO class is a determining factor in its effectiveness. However, contrary to the hypothesis of this study, the use of Fast Track Advantage Math modules

appears to bring a significant increase in post-test scores whereas the experimental group appears to be less effective.

It may be that the sixth graders need to complete the Fast Track Advantage Math modules to bring them up to grade level before a new model can be effectively utilized. In the future, the experimental model should be tried with seventh graders in an attempt to keep their math skills current. This may open the door to further study at higher grade levels.

There are several limitations to this study that should be addressed in the future. This study only looked at the results of approximately one third of the students at the middle school. In addition, it may not be realistic to look at the results of 7 days of instruction when students were involved in PLATO for an entire semester. Also, this study took place at the end of the semester. It would be interesting to see how effective the instruction differences are at the beginning of the semester.

It is recommended that the study be expanded to cover all sixth-grade students over the period of one semester. It is further recommended that the school look at the effectiveness of the instructional methods used for seventh and eighth graders in PLATO, as well.

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Appendix A

Pre-Test

Name: _____ **Class:** _____ **Date:** _____ **ID: A**

6th Grade Math CHapter 5 Pre-Test

Multiple Choice
Identify the letter of the choice that best completes the statement or answers the question.

Find the GCF of each set of numbers.

____ 1. 30 and 38
a. 19 b. 6 c. 15 d. 2

Write each fraction in simplest form.

____ 2. $\frac{2}{16}$
a. $\frac{1}{4}$ b. $\frac{1}{8}$ c. $\frac{1}{16}$ d. $\frac{2}{16}$

Write each mixed number as an improper fraction.

____ 3. $3\frac{1}{8}$
a. $\frac{17}{8}$ b. $\frac{4}{8}$ c. $\frac{25}{8}$ d. $\frac{8}{25}$

Write each improper fraction as a mixed number.

____ 4. $\frac{18}{7}$
a. $3\frac{2}{7}$ b. $3\frac{4}{7}$ c. $1\frac{6}{7}$ d. $2\frac{4}{7}$

Find the LCM of each set of numbers.

____ 5. 15 and 18
a. 90 b. 30 c. 3 d. 540

Replace each ◯ with <, >, or = to make a true statement.

____ 6. $\frac{2}{4}$ ◯ $\frac{6}{10}$
a. = b. > c. <

Order the fractions from least to greatest.

____ 7. $\frac{1}{6}, \frac{1}{2}, \frac{7}{8}, \frac{1}{4}$

a. $\frac{1}{4}, \frac{1}{6}, \frac{7}{8}, \frac{1}{2}$

b. $\frac{1}{6}, \frac{1}{2}, \frac{1}{4}, \frac{7}{8}$

c. $\frac{1}{6}, \frac{1}{4}, \frac{1}{2}, \frac{7}{8}$

d. $\frac{1}{4}, \frac{1}{2}, \frac{1}{6}, \frac{7}{8}$

Write each decimal as a fraction or mixed number in simplest form.

____ 8. 0.9

a. $\frac{10}{11}$

b. $1\frac{5}{6}$

c. $\frac{9}{10}$

d. $\frac{7}{10}$

Write each fraction or mixed number as a decimal.

____ 9. $\frac{3}{5}$

a. 0.6

b. $1.\overline{6}$

c. 0.2

d. 0.05

Essay

10. A jar contains 40 pieces of candy. Ahmad is told he can either have $\frac{1}{6}$ of the candy or 0.15 of the total candy.

a. Write $\frac{1}{6}$ as a decimal.

b. Which option would give Ahmad more candy? Explain.

Appendix B

Post-Test

6th Grade Math Chapter 5 Post-Test

Multiple Choice
Identify the letter of the choice that best completes the statement or answers the question.

Find the GCF of each set of numbers.

____ 1. 78, 42, 48
a. 13 b. 8 c. 7 d. 6

Write each fraction in simplest form.

____ 2. $\frac{16}{64}$
a. $\frac{1}{32}$ b. $\frac{16}{64}$ c. $\frac{1}{4}$ d. 2

Write each mixed number as an improper fraction.

____ 3. $3\frac{5}{6}$
a. $\frac{8}{6}$ b. $\frac{17}{6}$ c. $\frac{6}{23}$ d. $\frac{23}{6}$

Write each improper fraction as a mixed number.

____ 4. $\frac{22}{7}$
a. $4\frac{2}{7}$ b. $2\frac{2}{7}$ c. $4\frac{1}{7}$ d. $3\frac{1}{7}$

Find the LCM of each set of numbers.

____ 5. 22, 3, and 9
a. 66 b. 198 c. 9 d. 1

Replace each ◯ with <, >, or = to make a true statement.

____ 6. $\frac{6}{8}$ ◯ $\frac{30}{40}$
a. = b. > c. <

Order the fractions from least to greatest.

____ 7. $\frac{4}{7}, \frac{5}{8}, \frac{3}{4}, \frac{11}{12}$
a. $\frac{5}{8}, \frac{4}{7}, \frac{11}{12}, \frac{3}{4}$
b. $\frac{4}{7}, \frac{5}{8}, \frac{3}{4}, \frac{11}{12}$
c. $\frac{5}{8}, \frac{3}{4}, \frac{4}{7}, \frac{11}{12}$
d. $\frac{4}{7}, \frac{3}{4}, \frac{5}{8}, \frac{11}{12}$

Write each decimal as a fraction or mixed number in simplest form.

____ 8. 48.8

a. $48\frac{4}{5}$ b. $48\frac{7}{10}$ c. $46\frac{8}{11}$ d. $\frac{2}{3}$

Write each fraction or mixed number as a decimal.

____ 9. $19\frac{5}{6}$

a. $19.08\overline{3}$ b. $19.8\overline{3}$ c. 4.78947368421 d. 21.12

Essay

10. A rectangle and a parallelogram both have an area of 15 cm^2.

a. If Hana shades $\frac{2}{3}$ of the parallelogram and 0.7 of the rectangle, which figure will have the greater shaded area?

b. If she shades $\frac{2}{5}$ of the rectangle and 0.45 of the parallelogram, which figure will have the greater shaded area?

Using Accelerated Reading as a Motivator in the Classroom

Jon Franks
The University of Tennessee at Chattanooga
Fall 2005

The Institutional Review Board of the University of Tennessee at Chattanooga (FWA00004149) has approved this research project 05-030.

Introduction to the Problem

I have been an elementary and middle school teacher for 2 years. In that time, I have taught sixth, seventh, and eighth grades. Currently, I am teaching sixth grade reading in a Bradley County middle school, where I have been for a year and a half. I have 124 students, 68 boys and 56 girls. Three of the students are African-American, and two of the students are Hispanic; and one is White. The rest of the students are White. Two of my students speak English as a second language. Nine of my students are served in the special education program in reading, mathematics, and English. My school serves students from grades six through eight, with approximately 1,200 students. The school is a part of a large, growing community that has two middle schools.

The purpose of this study is to find out how I can motivate my students to read. The project is the result of my current Accelerated Reading Program. Accelerated Reading is highly encouraged by the school administration. The school receives a large amount of money, depending on how many points are earned by AR students. While I think the program is good for most of my students, many students dread AR time, and, sometimes so do I. Students stare at pictures, look around the room, and try to work on homework. I spend my time fussing and telling them to read! In fact, for the first 6 weeks of school, of my 124 students, only 5 students took an AR test. My objective is to find ways that will encourage them to read AR books and meet the goal that I have set for them. After reaching the goal, I will allow the student to read anything of their choice-AR or not. I

need to find strategies that will enable me to teach my students how to find appropriate material for them to read.

The literature that I researched was about how to motivate students to choose appropriate books and read independently. Many researchers were classroom teachers trying to engage their students in reading for pleasure. Several of the researchers were elementary and middle school teachers trying to help make the Accelerated Reading Program more enjoyable for students. A variety of strategies were displayed in their research projects that I found to be helpful in my own classroom. The articles also recommended setting goals for the students that can actually be reached, and to support the students. I have used many strategies from the articles. For example, one article mentioned teachers need to be organized, and to let students know of your expectations. I organized my bookshelves and, after talking with my students, we developed a reward system that I felt would motivate my students. I also learned about the "five finger rule." This rule is used to help students independently select a book to read for them. I have now explained my expectations to my students, and made them aware of what I expect them to do. I used student opinions of what kinds of reward for which they want to read. I introduce books to my students in order to capture their attention and leave them hanging so they want to read the book. The literature also showed the importance to set privileges and rewards. When a teacher sets up reward systems, students need to be rewarded immediately to show pride and satisfaction for achieving the goal. To ensure which students are available for rewards, I will run AR diagnostic reports to see each student's progress.

Review of Literature

Literature Review 1

I. Guthrie, J.T., & Wigfield, A. (2000). Engagement and motivation in reading. M. Kamil, P. Mosenthal, P. Pearson, & R. Barr (Eds.), *Handbook of Reading Research* (pp. 403-422). New Jersey: Lawrence Erlbaum Associates.

II. Summary

The authors, Guthrie and Wigfield, discuss how to engage and motivate readers. They exhibit evidence of students who are engaged and interested in what they are reading and how they have a higher level of achievement than those who do not. In order for students to become engaged or interested in reading, students must become motivated. Every student is different; therefore, every student needs to be motivated in a way that is successful. Teachers need to set goals that students can achieve, and provide incentives so that students can feel successful. The authors also expressed the importance to explain their expectations, and to evaluate the students' progress. They also suggest that teachers need to connect the curriculum to the students. If students are able to see the importance of a topic, they will be more involved and participate.

III. Relationship to Project

I appreciated Guthrie and Wigfield's "Engagement and Motivation in Reading" because it offers many strategies that I can incorporate into my classroom. They focus on easy ways to get students interested in the current reading program, Accelerated Reading. I realized that my students were not reading because they were not interested in books.

Using several strategies, I have now created a reward system that all of my students can achieve. For example, each student has an individual goal to reach each 6 weeks. When the student has met 25%, 50%, 75%, and 100% of their goal, I have privileges that they earn. I discussed the privileges with the students and learned towards what they would like to work. I have also set aside time to conference with several students about the book they are reading. This lets the students know, up front, what I expect from them. My students realized that I am asking specific questions about the book that they are reading, so they are more apt to actually read the book.

Literature Review 2

I. Davis, B. G. (1999). *Motivating students*. Retrieved September 15, 2005, from http://www.hcc.hawaii.edu/intranet/committee/FacDevCom/guidebk/teachtip/motiv.htm.

II. Summary

Barbara Davis displays general strategies to motivate students in the classroom. The article explains that teachers need to capitalize on the existing needs of students before doing anything else. For example, find out what the students like and incorporate it into the assignment and curriculum. Students are also more apt to be motivated based on the attitude and actions of the teacher. If the teacher has enthusiasm about the lesson, and shows the relevance of the material, students will become interested, as well. Davis also writes that the material needs to be instructionally appropriate with a variety of choices. The lesson or project needs to be organized to show the students that everything is prepared. The author also suggests not placing so much emphasis on grades, but more

emphasis on the love of learning. The article goes on to offer suggestions on how to get students to respond to their work. Students need to be motivated to write about what they have learned as a way to reflect.

III. Relationship to Project

The Davis article relates to my project because of the organizational strategies that were mentioned. Davis inspired me to create a better system to organize my bookshelves. Currently, my books are either labeled AR or not AR. Books with a red sticker are books that my students can read and take a test on for AR. There is no format on which book is appropriate for each student. Using the Star Reading test, I tested each student to find out the level at which they were reading. Next, I labeled each book that I had on my bookshelf according to the reading level. I organized my books by the labels and placed them on my bookshelf. The books that are not AR books are also on the bookshelf, unlabeled. I feel this is important for all of my students to be successful. I have made it very simple for students to choose a book from my bookshelf.

Literature Review 3

I. Brophy, J. (1998). Stimulating students' motivation to learn. *Motivating students to learn* (pp. 162-202). Boston: The McGraw-Hill Companies, Inc.

II. Summary

Brophy explains how students are motivated, based on a variety of variables outside the classroom. Non instructional factors or issues happen outside of the classroom that the students deal with each day. What goes on at home affects what happens at school. This is why Brophy stated that some students do not learn because

they are not engaged in the lessons. The students are thinking about what is going on at home, rather than at school. Teachers must try harder to motivate these students. Several strategies are mentioned to encourage students, which include opportunities to learn, get students thinking, support the students, and evaluate students in a successful and precise manner. Teachers need to exhibit expectations and minimize anxiety in students who may have it. He also states that teachers need to be enthusiastic on a regular basis, create curiosity in the students, create personal connections, take an interest in the topics, and encourage the students to motivate themselves.

III. Relationship to Project

This relates to my research project extremely well. Even though Brophy's strategies are more related to motivating students to learn, I feel these strategies are very helpful in my project. Brophy explains how to motivate students by paying attention to where they are coming from. Every child does not come from the same home and living conditions, and does not have the same interests, either. That is vital for me. I need to know how to reach all of my students—not just most of them. Brophy also encourages teachers to become involved with students. Teachers need to show students that they care about what they are doing and in what they are interested. In order to motivate my students, I now use the strategies offered by Brophy. For example, I use suspense. I will explain a book, leaving out important parts and the ending, and will dip into very suspenseful parts of the book.

Literature Review 4

I. Brophy, J. (1998). Stimulating students' motivation to learn.

Motivating students to learn (pp. 104-125).
Boston: The McGraw-Hill Companies, Inc.

II. Summary

Brophy offers many ways to reward students who reach their goals. Material rewards, activity rewards, special privileges, grades, recognitions, praise, and teacher rewards are found throughout his writing. Rewards or awards motivate many students, and it is important to have a variety of rewards available. Brophy also explains when to give the awards to students. As students achieve their goals, the rewards need to be consistent and prompt. Once a student does something that deserves an award, the teacher must not overlook the student. The teacher must praise the student in an efficient way. Even though this writing is very positive and helpful, Brophy cautions that rewards do not work for all students. Some students may not see the value in the reward system. Therefore, the teacher must find an alternative reward system that is valuable to the student.

III. Relationship to Project

Brophy explains many types of rewards for students who are interested and motivated in a reward system. The school currently has a reward system through the library. The rewards include candy, books, homework passes, zero zappers, movies, and an end of the year field trip to celebration station. In conjunction with these, I can set and give rewards on my own. More critical, Brophy also states that not all students would be award and reward motivated. After reading this, I reflected back on my students who are not reward motivated. I realize that several of my students do not care if they reach goals

in order to receive a prize or award. Therefore, I asked my students, particularly those students who do not value rewards, what privileges they would like to earn throughout the 6 weeks. After much conversation, I agreed to their suggestions. Several privileges are awarded throughout the process of meeting their goal. When students reach 25% of their AR goal, they may sit anywhere in the room, including the couch. At 50% of their goal, they may bring a drink and a snack to class. When the students reach 75% of their goal, they may have a "free" period of class. When 100% of the goal is completed, students will be invited to a dance, movie, or party. Unfortunately, a few of my students still refused to read.

Literature Review 5

I. Allington, R. L. (2002). You can't learn much from books you can't read. *Educational Leadership, 60,* 16-19.

II. Summary

Allington's article expresses how students need choices in order to be motivated and succeed. Instead of just assigning one choice, offer several choices. Teachers need to have multiple levels of instructional resources. Students may then choose a topic or goal from a "managed list." Students will feel better about their choice if they take ownership in it. The teacher can have a variety of alternative activities, or reading material, but they may all meet the same goals and objectives. Allington also mentions that teachers need to tailor their teaching styles to each student. All students are not on the same instructional level. Therefore, in order to motivate a student to learn, individualized instruction needs to be met for every student.

III. Relationship to Project

This article is beneficial to me because is shows how my research project must be set up. Allington states that a teacher must have a wide selection of instructional resources. Fortunately, I have a rather large classroom library. My students have a wide selection to choose from, but the books are not organized in any way. I have now labeled all of my AR books in my classroom. A sticker is on the side that indicates whether or not the book is an AR book. I also have an AR manual beside my bookcase that lists whether or not a book is approved for AR. This provides a good backup in case I missed a book. With my books labeled, each student can now set a goal, with me approving of the goal. This particular process is very important, because, if I do not have a student reading on the appropriate instructional level, then that student will not succeed because the comprehension will not be there. Each student is aware of his/her own reading level. They may choose whatever book they wish to read from the appropriate reading level. After reaching their goal for the 6 weeks, students may read any other book that interests them. That book does not have to be AR. I confer with students as much as possible, about the books that they are reading. This is sometimes hectic and difficult as I have 124 students. This helps me monitor who actually comprehends what they are reading. If a student is struggling with a book, I may need to adjust the reading level or change their AR goal. It also helps me to monitor students who read books that are too easy. I

do not want my students to fly through a book just to take a test on the computer. I want them to choose a book that is challenging for them as well as interesting to them.

Literature Review 6

I. McGill-Franzen, A., & Allington, R. (2001). Lost Summers for some children, few books and few opportunities to read. *Classroom Leadership On-Line, 4*. Retrieved September 20, 2005, from http://www.ascd.org/readingroom/classlead/0108.1August01.html.

II. Summary

This online article discusses the problem about student reading during the summer. Therefore, McGill-Franzen and Allington offer suggestions about how to encourage students to read independently on their own time. Three strategies are offered to help students read over the summer. The first step deals with putting books in the hands of students. Let the students check out books from your classroom library and read them at home. Also, talk about what kinds of books you have on the shelves and get students curious about reading. The second strategy includes sponsoring school book fairs. Have the book fairs come several weeks before school lets out for the summer, and buy books for students who do not have books at home. The last strategy suggests getting unwanted paperback books from libraries. Get these books and put them in your classroom library for students to take home over the summer.

III. Relationship to Project

The reason this article relates to my research project is because the

strategies suggested are the same things I do to get my students interested in reading independently. I try to explain, in a couple of sentences, what a book is about. I tell a part of the book, but conveniently leave out missing pieces so that my students will want to read the book to find out what happens. Many students can't wait to read the book that I am talking about. I also have Scholastic Book Club orders every month. Many students take advantage of this. I feel that each student has an opportunity to order something, as many books are as low in cost as 95 cents. After the students complete the book, they may donate it to my classroom library, if they would like.

Literature Review 7

I. Poole, B., & Smith, K. Finding links to independent reading. Retrieved September 20, 2005, from http://www.fcps.k12.va.us/DeerParkES /TR/poolesmith/athome.htm.

II. Summary

In this action research project, Poole and Smith taught their fourth-grade students to select books on their appropriate reading level. They explained about looking at the title and cover of the book, as well as the print size of the text. Poole and Smith also encouraged the fourth graders to read the book summary. If the summary did not sound interesting to students, then it may not be a book they would enjoy. They also showed students how to use the "five finger rule" when choosing a book. The students needed to turn to a page in the book with a lot of words and begin reading that page. Each time they came across a word they did not know they needed to put up a finger. After reaching the bottom of the page, if all five fingers were up, then it was a book that they

would probably not enjoy; however, if a student had four or fewer fingers up, then it would be a safe book to choose.

III. Relationship to Project

Poole and Smith's research project relates to my project because I have taught my students the same "five finger rule." I attended a reading conference in Nashville in the fall of 2004. This conference taught me several strategies to teach students how to choose appropriate books. When I introduce a book to the class, I make a big issue of reading the title, author, and summary from the back cover. I not only get the interest of the students, I am also modeling for how to choose a book. It is very rewarding to see a student actually read the back cover of a book. They are more aware of what to do in order to choose a book that they would enjoy. My students also use the "five finger rule" in the library, as well as in my classroom. They have become independent in choosing a book for themselves. I also wanted my students to use the "five finger rule" even when they check out AR books. I have found that, many times, AR books may not have the correct level. When students just "pick a book" that has a 6.5 reading level on it, I have found it may, very well, be too easy or too difficult. Therefore, it's important that the students use the "five finger rule." This rule is a safe way to help students achieve their goal and keep students engaged in reading.

Data Collection and Results

Method

I began by testing each of my students via the Star Testing Program (see Appendix C) to find the reading level of each student. Then I gave each student a number goal. This goal will be achieved when students take a comprehensive Accelerated Reading test after reading AR books. I did not choose goals that would be too difficult to achieve, because I want all of my students to be successful with this project. For example, if a student's reading level was on grade level, I gave them a 20 point goal; if it was lower, I assigned a goal between 5 and 10; if it was higher, I assigned a goal between 30 and 40. After assigning a goal to 10 of my students, I then assigned a reading level to my books in conjunction with the library's system of leveling books. Each AR book is labeled with a particular color: Red is AR. Green is non-AR. (The colors stand for different reading levels.) Next, I classified each AR book on my bookshelf based on the sticker color. The remaining books that I had were categorized by genre. After I organized my bookshelf, I then began to teach my students strategies by which to choose a book to read. I first explained the importance of reading the title, author, back cover, and I taught the "five finger rule." Once the students chose a book, they needed to turn to a full page of text and begin to read. Each time they came to a word they did not know, they had to put a finger on their chin. This process is followed until the students completed reading the page. If all five fingers were on their chin, then it would probably be a book that they would not enjoy. If they did not have all of their fingers on their chin, then it would probably be a book that they would enjoy. I used the word enjoy because I did not want to tell my students that it was not their appropriate reading level. I chose my wording carefully because of the sensitive nature of several of

my students. I also told my students to use this strategy when checking out AR books in the library. Next, I created a reading conference form. The form contains reading criteria that the students are expected to know by the end of the year. I arranged my schedule to conference with students frequently. I listened to students read and then I conferred with them about the book. The form lists many attributes that the students need to know in order to comprehend the book. Once the students know my expectations, the class discussed what types of rewards for which they would like to work. The students took part in this system and I simply called it their "reward system." I invited the students who met their goals for a movie and popcorn, a game day, or free time in or out of class. I also offered extra credit to be added to their final average. The students were able to read whatever they chose after completing their AR goal.

The following is a list of the data that was used.

Classroom Discussions

I used class discussions throughout the project. The students discussed and decided on the rules and the reward system. I asked them questions about the program in order to get them thinking about things about which to write. I also asked if any student had suggestions to write them down in their reflections. Each Friday, we discussed similar things to get them thinking. I wanted them to feel like they were a part of this project so they would want to succeed.

Reading Conference Form

The form was a way to assess the students. I asked questions about the book they were reading during their conference times. This was a way to keep up with what they

were reading and if it was on their appropriate level. This form also allowed me to give students help if they did not understand a particular part of the story. I was able to tell if they actually read the book, as well.

Report of AR Progress (Diagnostic Report and Student Record Reports)

This report shows how the students met their specific goals. This report also allowed me to see a record of reach test that they took throughout the project. I was able to access whether students were reading above or below their reading level. I also used this to move students into their award clubs. Many times students asked me to check their progress because they were aware of the points they were earning. Therefore, many times, I, along with the help of their English teacher, would check the progress every day in order for my students to feel the effects of their progress.

Student Reflections

I required each student to write a reflection several times during the study. They were allowed to express whatever feelings they wanted without criticism from me. I wanted to know their honest feelings on what I was doing. I wanted to see if they thought it was working from their point of view, and if they liked the program better than the previous one. Several students reflected in a way that they thought I wanted them to; however, many students did reveal their true feelings. I learned things from them that I would not have known about if they had not reflected on their readings.

Teacher Reflections and Observations

Each Friday, I also reflected about what went on during my reading time. I used this time to see if there were any problems that I had to deal with and why I had

problems. Many times, I saw students using the “five finger rule” in order to select a book. Other times, I witnessed many students actually reading without the usual argument of being bored, tired, etc. Even on the first day of this project’s implementation, I noticed a more relaxed climate in my classroom.

Analysis/Interpretation

Each Friday, I collected student reflections and read them to see what opinions and ideas the students had about the new reading program. I also wrote my reflection before I collected the student reflections. After I read all of the reflections, I wrote a brief statement about what the majority of students thought. I also ran an AR diagnostic report to see who began achieving their goal and moving towards the rewards. I was amazed at the results in such a small amount of time.

After I collected all of my data, I first chose four students at random. Then I proceeded to pick through all of the student reflections to make sure that all four students contributed in all reflections. I began to read them again to analyze those four in greater detail. The four reflections contained a variety of opinions. However, through the course, the reflections all four students hit the same major points. After the first reflection, the students wrote about me talking when they were reading quietly. They could not concentrate on their reading. I became aware of this and began to use another part of my classroom to conduct my conferences. When they students became comfortable about writing reflections, they began to voice their opinions. In the AR program, the rule is, that to earn a reward, the student must score a certain amount. The average grade of all tests taken throughout the 6 weeks must be at 85% or higher. Out of the four students

selected, two of them did not agree with the percentage. Several of the students even offered suggestions for me to improve the project to make it better. To my amazement, three of the four students have compared what they have achieved in the 6 weeks of the project to what they accomplished previously throughout the entire semester. The following is a list of what the four students reflected throughout the course of the 6-week time period:

- They now have to read the book because I will be asking questions about it.
- The conferences will help them be successful when they take an AR test.
- They do not agree with the 85% average.
- They enjoy the rewards, especially the party, and they get to read whatever they choose after reaching their goal.
- They concentrate better in the hallway because they enjoy the quietness from the conferences.
- I could talk about the questions that most students are having trouble with, for example, point-of-view and author's style.
- They enjoy reading to me because I help them with unknown words and phrases.
- They have made connections between what they did previously and what they are doing now after the project ended.
- They are proud of themselves.

The next piece of data that I analyzed was the AR diagnostic reports. Each Friday, I would review the reports. On Mondays, I would also look at the list of each test that was taken. I would also walk around during independent reading time to see what book each student was reading. This is when I discovered who was reading out of their assigned reading range. Several students were reading second and third grade level books when their reading range was set at a fifth or sixth grade level. Others read above their level and had a difficult time comprehending what the book was about. This was what I wanted to avoid because I did not want them to feel discouraged. I spoke privately with these students and encouraged them to read on level. I have graphed the following progress of four selected students in order to show that progress was achieved (see Figure 1). The students were chosen based on various reading levels. The vertical scale represents AR points and the horizontal line represents time in weeks.

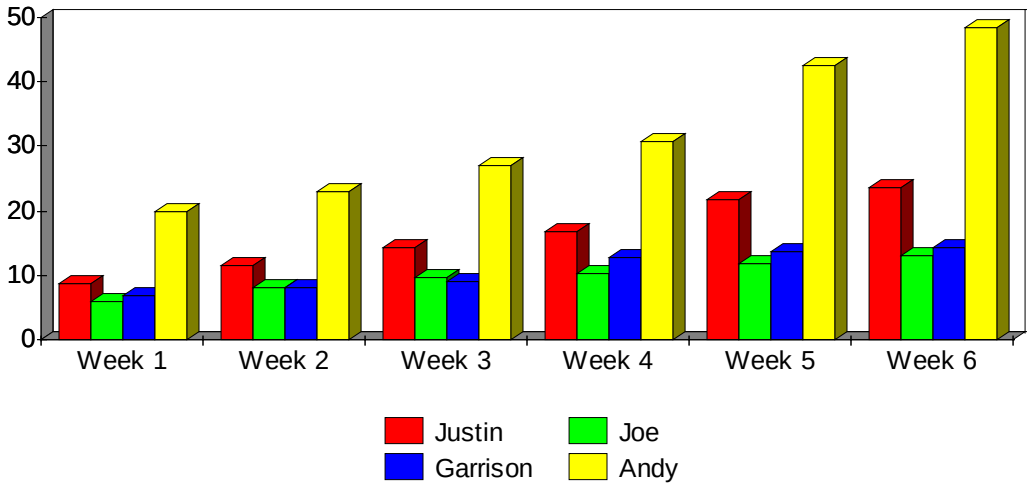

Figure 1. The progress of four randomly selected students over the period of 6 weeks.

During the first week the students began earning points. I was a little worried because I had observed students reading and I felt like the students would not take this seriously. I also had concerns because of the first six weeks AR data. By the second week, students began gaining more points. Throughout the six weeks, the AR points increased. I also was able to view a list of the books that my students were reading. This also let me know if my students were reading on the correct reading level. In the second week, student 1 read five books and took a test on each of them. The book levels ranged from 2.9 – 4.0. According to his Star test results, his reading level is 5.5 – 7.0. I was able to explain that he was not on the correct reading level. I explained to each of my students the importance of reading on their appropriate levels.

The next piece of data that I had to analyze was the Reading Conference Forms. I listened to an individual student read for about 5 minutes. After that time, I then asked questions about the book. If the student answered the questions correctly, I would place a check mark in the appropriate column. If the students had some trouble answering the questions, I would place a check minus in the column. Several times, I had to place a minus sign in the column because the student did not have any idea what I was asking. For example, student 2 had trouble with point-of-view. I had to explain what point-of-view meant and the three types. Student 2 still had trouble identifying what point-of-view was used in his novel. I felt like he did not grasp the concept of point-of-view so I placed a minus sign under the appropriate column. That same week, student 2 wrote in his reflection and suggested that I explain to the whole class what point-of-view meant.

Therefore, I took the time to explain the concept to all of my classes. Several days later, when I spoke to student 2 again, I asked him about point-of-view and he understood it. Therefore, I placed a check in the column. I tried to ask about two concepts each time I conferred with my students. Doing this allowed me to cover more material with my students. It also gave me a good idea what their book was about and an opportunity to identify whether or not the student truly read the book.

After I completed my last reflection about my observations, I read my previous reflections. It was interesting to see the different stages through which my class progressed. During the first week I was worried about the students not taking many AR tests. After reading the student reflections, I realized my assumptions were correct. Most of my students were not reading before I began this project. Many admitted in their reflections that they now have to read the book because they know I will ask questions about it—which means that many of them just rushed through reading books, or did not even read at all. I also noticed that several students seemed nervous about talking to me one-on-one. I could tell because some students would breathe unevenly, take deep breaths as if to try and calm themselves, and stutter. I had to assure my students that it was not difficult—I just wanted to see what they were reading. The students seemed to be following the rules and procedures correctly. They were responsive and attentive to me when I was talking to them. I was also amazed that I did not have to tell one student to read. They were reading and it was very quiet in the room. I felt like I had a different class. My students became their normal selves during the third and fourth weeks of the project. The students were trying to find loopholes in the system. Many students wanted

to achieve their AR goal so badly that they would either read books above or below their reading level. After I explained to them that I check their books and scores on the computer, they began to check out and read more appropriate books. The students thought that they could achieve more points by reading higher books that were worth more points. Some students also forgot that they must score at least an 85% on the AR test to get credit. I showed them their average and how the grade that they receive brings their average either up or down. It took several days in order to get through to some students. Still, others wanted to read easy books to reach their goal to go to the AR party. Again, I explained to them that they needed to read on their level because reading books that were too easy would not help them later in school. By the sixth week, I had most of my students reading where they should be and wanting to achieve their goal. Many were in the 50% and 75% clubs. For the first time in the year, when students finished their tests or assignments early, they were eager to begin reading.

Conclusion

I have previously mentioned several conclusions concerning data. However, there were so many other things that I learned from my data. Perhaps the biggest and most important, was finding out how my students can be motivated to read. The graph and raw numbers show that the students are reading. The students are achieving their rewards and earning their privileges. Many are writing in their reflections how much they have improved from the first 6 weeks of school. They are wanting to do two things: go to the AR party and have the privilege to read whatever they want. Some students were not reading in their reading range, but with the student record reports, the students learned

that I would talk with them about what they were doing. I was able to motivate them by showing interest in what they were reading, as well as letting the students take part in the procedures and privileges.

My students are succeeding. They are always quiet and the students appear honestly to be focused on their reading. When I observed to see if anyone was staring at the wall or talking to anyone else, rarely did I have to call anyone down. Many students complained that they did not get to read enough or that they were at a really good place and did not want to stop reading. This was a bit of a shock to me. Before, silent reading ended with sighs of relief from the students. By the end of the sixth week, my students were taking AR tests almost daily. After they tested, they would immediately check out another book from my bookshelf or write a pass to the library.

I made sure the reward system included what the students wanted. They felt they had ownership in the rewards and privileges. I also realized that I had to support each and every student. If their reflections offered a suggestion, I conferred with them in more detail to see if we could implement it. I tried to make it clear that I wanted their help. The reports from the computer showed that they students were, in fact, reading books. I was able to pinpoint students who were having trouble, and students who were not reading in their appropriate range. I was able to see that students actually understood reading concepts through the reading conference forms. I was able to help those who needed help in certain areas. Just by looking on the graph in the previous section allowed me to see that my students were making progress.

I only displayed four of my students on the bar graph, but I need to mention that all of my classes benefited from this reading program. This evidence is seen in the pre and post AR results, presented in Appendices A and B. My main goal in the project was to get my students to read on their own. Because my students are reading during their free time and are succeeding on their AR tests, I consider this project to be successful. Through my student reflections, I have taken their suggestions and I have incorporated them into the project, which I plan to continue.

Final Reflection and Recommendations

One thing that I learned about myself was that I could conduct research in my classroom. With a little organization, I was able to collect and analyze my data fairly easy. Organization was also a big part of this project—for my classroom, as well as my project. I have always thought of myself as an organized teacher, but when it came to my bookshelves, I just placed the books on the shelves in no particular order and with no organization style. I did not realize until I began this project that I needed to organize my books. It took a lot of time to get them in shape, but it made my books so much more accessible to my students. I also became more patient with my students during silent reading time. I did not spend 50 minutes pleading and fussing at my students. My students seemed to benefit from the structure of the time.

I felt that my students learned an important part of reading. The questions I asked were available for them to think about as they read. If it was a book that I had not read, I searched the Internet to find summaries and questions about the book. With questions, students seem to pay more attention to characters, settings, problems, solutions, etc.

They began to analyze things in their minds while they read. Many times, students would confer with me and they would just start talking about certain concepts without me asking them. I felt like I accomplished something that I did not even set out to do. I also liked the way my students reflected. They compared their points with previous points earned in the past 6 weeks. Students also offered suggestions about how to improve the noise in the room when I was talking with other students. I was proud that my students were able to make reasonable suggestions. This was important because I feel that it showed my class that I was interested in what they had to say. I think it made them feel important.

One thing that I feel about this project is that these procedures may not work for all students. I will allow my students to choose their own rewards next year. The rewards that I have this year are based on what my students wanted this year. I need to be flexible with my students and understand that interests change. I want to incorporate this project at the beginning of next year so that I won't have bad AR results for the first 6 weeks like I did this year.

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Appendix A

Pre-Project Data

1st SIX WEEKS AR

Tests taken: 5

Tests passed: 4

Tests failed: 1

Males: 4

Females: 1

	MEAN	MEDIUM	MODE	
Points earned:	40.7	8.14	5.4	None
Test average		84.85	90	90
Book reading level		4.9	4.9	None

Appendix B
Post-Project Data

2nd SIX WEEKS AR

Tests taken: 233

Tests passed: 206

Tests failed: 27

Males: 49

Females: 41

	MEAN	MEDIAN	MODE
Points earned: 796.2	8.846	4.4	.9
Test average	79.6	78.35	90
Book reading level	4.62	4.71	2.6

Appendix C

STAR TEST to diagnosis reading level.

1. Our town is governed by a _____.

a. president
b. mayor
c. governor
d. police man

2. The horse ate oats in the _____.

a. kitchen
b. road
c. trail
d. barn

3. The loud _____ shook the house.

a. thunder
b. scream
c. noise
d. rain

4. The football player ran the ball into the _____ to score the points.

a. sidelines
b. bench
c. coach
d. endzone

5. After reeling in his rod, Dad held up a big _____ that he had caught.

a. bird
b. fish
c. dog
d. mule

6. The rain beat gently upon the tin _____.

a. floor
b. car
c. mat
d. roof

Effects of Preschool on Students' Performance in Kindergarten

Christina Lawson
The University of Tennessee Chattanooga
Fall 2005

The Institutional Review Board of the University of Tennessee at Chattanooga (FWA00004149) has approved this research project 05-255

Introduction

Should preschool be mandatory? Do children who attended preschool outperform those who did not? If so, by how much? These are all questions I would like to answer. I may not find rock-solid answers but I would like to able to discuss theses issues intellectually. I plan to use my time student teaching to get a better understanding of the benefits and advantages of preschool.

Review of Literature

Below is a review of the *Head Start program performance measures second progress report* conducted by the U.S. Health and Human Services Administration on Children, Youth and Families. This progress report was issued on November 24, 1998. Everything in the following section has been taken from the mentioned progress report.

Early Head Start is a national program that works with low-income, pregnant parents, and families with children under the age of three. This program uses center-based, home-based, and combination programs to provide the families and children with developmental services.

One of the goals of Head Start is to get the children ready for school. School readiness is defined by Head Start as the child's acquisition of the skills, understandings, and behaviors required to perform successfully in kindergarten. To determine if a child is ready for school, Head Start looks at the five following components:

- Physical well-being and motor development.
- Social and emotional development.
- Approaches to leaning.
- Language usage and emerging literacy.
- Cognition and general knowledge.

In 1997, Head Start conducted a survey called Family and Child Experiences Survey (FACES). This survey had several goals including finding out if the children enrolled in Head Start were ready to enter kindergarten and be successful. The group of children surveyed was very diverse and included children from different areas of the United States, children living in rural and urban communities and children of diverse races. About one-third of the children were African-America, one-third of the children were White, and the other one-third of the children were mainly Hispanic, but also included Native American and Asian.

The survey discovered that most children involved in Head Start had numerical and literacy skills that were developmentally appropriate for a child entering

kindergarten. Below is a list of a few things that surveyed four-year old children could do that proved they were ready to enter kindergarten and ready to learn:

- Tell his/her first name.
- Tell his/her age.
- Identify 10 basic colors by name.
- Identify basic shapes.
- Identify basic action words.
- Count four objects.
- Do basic addition and subtraction problems.
- Show the front cover of a book.
- Answer factual questions about a story read to him/her.

These four-year olds also behaved in a way that showed they were socially ready for kindergarten such as using free time in productive ways, cleaning and putting materials away, and following rules and directions.

Although many of the Head Start children could do the things listed above, many of them could not perform other basic skills that typical children entering kindergarten should be able to do. Some of those skills included, telling home address, recognizing most letters of the alphabet, knowing to move left to right and top to bottom when reading, accepting other children's ideas for play, inviting others to join activities, and not getting upset when teased by other children. None of these things are required to enter kindergarten, and many of these skills are learned in kindergarten, but many entering kindergarteners from middle-class families can perform these skills before entering kindergarten.

FACES used four national assessments to test and compare children in Head Start to the national norms, which include children from families of all income levels. The assessments showed the median of the Head Start children were within the average range

of the national norm (90) and while the top fourth of the Head Start children scored at the national mean of 100 with a standard deviation of 15. These results were compared with earlier research that showed that children from low-income families who had not attended an educational preschool program tended to perform lower than the national norms. Children from low-economic families who had not attended a center-based preschool program did perform lower than those who did, but not by much. They only scored a few points lower than the national norm or about one-quarter to one-half of a standard deviation. Although this is a very small difference, Head Start and other center-based programs were still considered meaningful to the education of children from low-income families.

The results from this survey showed that children who attended a top-quality, Head Start program perform at national norms on mathematics and literacy skills. Not all students enrolled in Head Start or other educational programs perform this well. Some of the Head Start programs are better than others, which affected the children's performance, along with other factors such as parental involvement, teacher-child relationship, and classroom resources. The results also show that Head Start programs may reduce the developmental gap between children from different socioeconomic backgrounds, but not eliminate the gap.

Below is a review of Dr. Lawrence Schweinhart's summary of *The high/Scope Perry preschool study through age 40* that was conducted by Dr. David Weikart.

Dr. David Weikart and his colleagues began a research project in 1962 to study the long term effects of quality preschool programs. The researches had a group of 123,

African- American, three- and four-year-old children from low-income families. Fifty-eight of these children were enrolled in quality preschool programs while the rest did not attend any educational training prior to kindergarten. The researchers monitored all students from ages 3 to 11, then again at ages 14, 15, 19, 27, and 40. The participants were monitored in the following areas: education, crime prevention, economic performance, family relationships, and health.

Sixty-five percent of he participants who attended preschool graduated from high school, while only 45% of the nonpreschool participants have a high school diploma. There was an even greater gap for the females who graduated. Eighty-four percent of the preschool females graduated from high school, compared to only 32% of the nonpreschoolers. Only 21% of the preschool females were retained in a grade, while 41% of the nonpreschool females repeated one or more grades. At ages 15 and 19, the participants were asked several questions to determine their attitude towards school. Research showed the participants who attended preschool had a much more positive attitude towards school than those who did not attend preschool.

When looking at the participants' economic performance at age 27, 69% of the preschool participants were employed, compared to 56% of the nonpreschool students. At age 40, 76% of the preschool participants had jobs, while only 62% of the nonpreschool students had jobs. The difference for women's employment was great; 80% of the females who attended preschool were employed while only 55% of the females who did not attend preschool were employed.

Figure 1. shows some of the results from the High/Scope Perry preschool study.

	Attended Pre-School	Did Not Attend Pre-School
Arrested 5+ times by age 40	36%	55%
Earned $20K+ at age 40	60%	40%
Graduated regular high school	65%	45%
Basic achievement at age 14	49%	14%
IQ 90+ at age 5	67%	28%

Figure 1. High/Scope Perry preschool study results.

At the end of this study, the researchers concluded that a quality preschool program has an enormous positive impact of the lives of those enrolled. These programs not only benefit the participants educationally, but also socially and economically.

In 1994, the Chicago Sun Times (cited in Anderson, 1994) surveyed teachers from inner city schools in the Chicago area and found that two-thirds of students who attended preschool, and were from low-income families, were prepared for kindergarten. On the other hand, only 47% of students who did not go to preschool, and were from low-income families, were prepared for kindergarten.

Below is a review of a 1991 research report studying the effects of preschool on mathematics and reading for students in grades 1 through 4. Bowlin and Clawson were the researchers and authors of this research. All the following information came from the mentioned report. Two hundred and eight White children from middle-class families in Kentucky were the participants. The experimental group was comprised of students who did attend preschool and the control group was made up of first, second, third, and fourth graders who did not attend preschool. All children took the Comprehensive Test of Basic Skills standardized test and the researchers assumed that the children who did attend

preschool would do much better on the reading and mathematics sections. In fact, the research showed that the students who attended preschool did not outperform those who did not attend preschool.

Peisner-Feinberg and Yazejian (2002) did a follow-up of the Cost, Quality and Child Outcomes in Children Care Centers Study that took place in 1993. The original study followed children starting at age 3 through the end of second grade. This study wanted to see the long-term effects preschool had on children.

The original study followed 828 students who were randomly selected from four different states. The follow-up study was able to locate 339 of the original 828 children. At the time of the follow-up study, the students had completed sixth grade, so all elementary records could be attained. Parents were asked to complete surveys about the academic success of the children. Parents were asked things about grade retention, academic letter grades, attitude towards school, behavior problems, and future educational expectations. Eighty-nine percent of the parents expect their children to go to college. Of those parents, 57% expect a bachelor's degree, while 32% expect master's or doctoral degrees. Eighty-one percent of the children receive As and Bs, and 35% percent of the students have been identified as gifted. Five percent of the students were retained sometime during elementary school, 14% were referred for academic behavior, and 6% were referred for behavior issues.

In my research, I used DIBELS scores so I used the official DIBELS Web site to make myself more knowledgeable about the test and the scores. All the information you

will read in this review came directly from the official DIBELS Web site n.d., (http://dibels.uoregon.edu/).

At the beginning of the kindergarten year, all students are given assessments to determine their abilities and skills. One of the tests is the Initial Sounds Fluency test which tries to determine the child's ability to recognize and produce the initial sound when listening to a word. For example, students will look at four pictures and the teacher will say the name of each item, like plate, bug, glove, and dog. After pointing to each picture and saying the name, the teacher may ask the child what picture begins with the sound /b/. The child is asked to point to, or say, the appropriate item. By the middle of the kindergarten year, students are expected to know 25-30 initial sounds. Kindergarteners who cannot name at least 10 initial sounds are in need of some serious, intensive work.

Another test assesses the students' ability in Letter Naming Fluency. This test helps to determine what lower case and capital letters the students recognize. During the test, the child looks at a sheet that is comprised of rows of randomly-ordered lower and upper case letters. The students have 1 minute to name as many of the letters they can. At the end of the minute, the score is the total number of correct letters named. During the test, if a child does not know a letter, the administrator tells the letter and the student goes on. If a student does not get one letter correct on the first row, then the test is over and the student receives a zero. There is no benchmark for this test; instead, the student's scores are compared with other students in the same school district. Student who score in

the lower 20% are consider at-risk, and students who score between 20%-40% are considered at some risk.

Word Use Fluency is another test that is administered in kindergarten. The student is given examples of using a word in a sentence. The student is then given a word and is asked to use the given word in a sentence. Here is an example: "Listen to me use this word, 'green.' (pause) The grass is green. Here is another word, 'jump' (pause) I like to jump rope. Your turn to use a word (pause) 'rabbit' see (http://dibels.uoregon.edu/measures/files/admin_and_scoring_6th_ed.pdf). If the student uses the word rabbit correctly, he/she receives a score of one; if he/she cannot use it correctly, the score recorded is a zero. This test is timed for 1 minute. This test does not have a benchmark; the scores are compared to others in the school district, like the Letter Naming Fluency test.

Research Questions

Before looking into this research, I assumed that students from low-income families who attended a preschool would outperform those who did not attend preschool. I thought that children from low-income families enter kindergarten already behind children from middle-class and upper-class families. Therefore, I thought that the children from low-income families would benefit enormously by attending a preschool.

The research studies I have reviewed have shown that preschool can get a child better prepared for kindergarten, but, often times, the gap between the students who attended preschool and those who did not attend preschool is not that great.

During my student teaching experience, I plan to answer the following questions:

- Do kindergarten students who attended preschool outperform the students who did not?
- If the answer to the first question is yes, then how big is the gap in performance of the students who attended preschool and those who did not?

Data Collection and Results

Participants

The participants will include 21 kindergarten students in an inner city school in Chattanooga, TN. This school is a center for children who do not speak English as their first language. The regular classroom teacher will help me gain understanding of the children's backgrounds and their abilities and skills in the classroom.

Instruments

I will have parental permission to have access to each child's cumulative record. These records will give me each child's background, including whether or not they attended preschool and what preschool they attended. The cumulative records will let me see if the preschool was a state-funded program, like Head Start, or a private institution. I will also be able to distinguish between daycare and an educational preschool program.

I will also use the students' DIBELS test scores. Kindergarteners are assessed using DIBELS upon entering kindergarten. They are tested on the following skills:

- Initial sound fluency.

- Letter naming fluency.
- Word usage fluency.

I will compare the scores of the students who attended preschool with the students did not attend preschool.

Procedures

As the researcher, I will first talk to the kindergarten teacher and discuss my plans to make sure she is comfortable with the research plan. Once the teacher approves, I will go to the school administration and explain the purpose of the project, procedures, and assessments. Once I get approval from the administration, I will write a permission form for the parents to return. This form will give me permission to view the children's cumulative records. I will get this form approved by the kindergarten teacher and school administration. This particular kindergarten class has 12 out of 22 students, or 55%, who either do not speak any English or have another language as their first language. Because of this, I will have the ESOL teacher translate the permission form and write it in Spanish.

I will first send the permission slip home for the parent's signature. Upon receipt of the permission slip, I will begin collecting data from each child's cumulative record and make observations in the classroom. I will observe and help administer DIBELS and have access to all participants' scores.

Data Analysis

All parents gave permission for me to have access to the students' records. I went through each child's cumulative record to find out who had attended a preschool and who had not. Once I gained access to this information, I began observing the students in the

classroom. Now that I knew the children's backgrounds I could pay attention to the differences between the two groups of students.

The cumulative records showed me that 10 out of the 22 students attended a preschool program while 10 did not. The other two students are repeating kindergarten.

First, I observed the students to see who could and could not write their name. Out of the 22 students, 10 students could write their own name. Out of those 10 students who could write their name, 6 students attended a preschool program. Out of 12 students who could not write their name, 3 students attended a preschool program. This shows that the students who attended preschool were able to write their name, whereas the students who did not attend preschool could not write their name. This shows that preschool had a positive effect in that particular skill. This observation is the only one that will include 22 participants because I did not want the scores of the repeaters to be influenced from knowledge gained the previous year in kindergarten. Figure 2 shows the data collected regarding students who could and could not write their name.

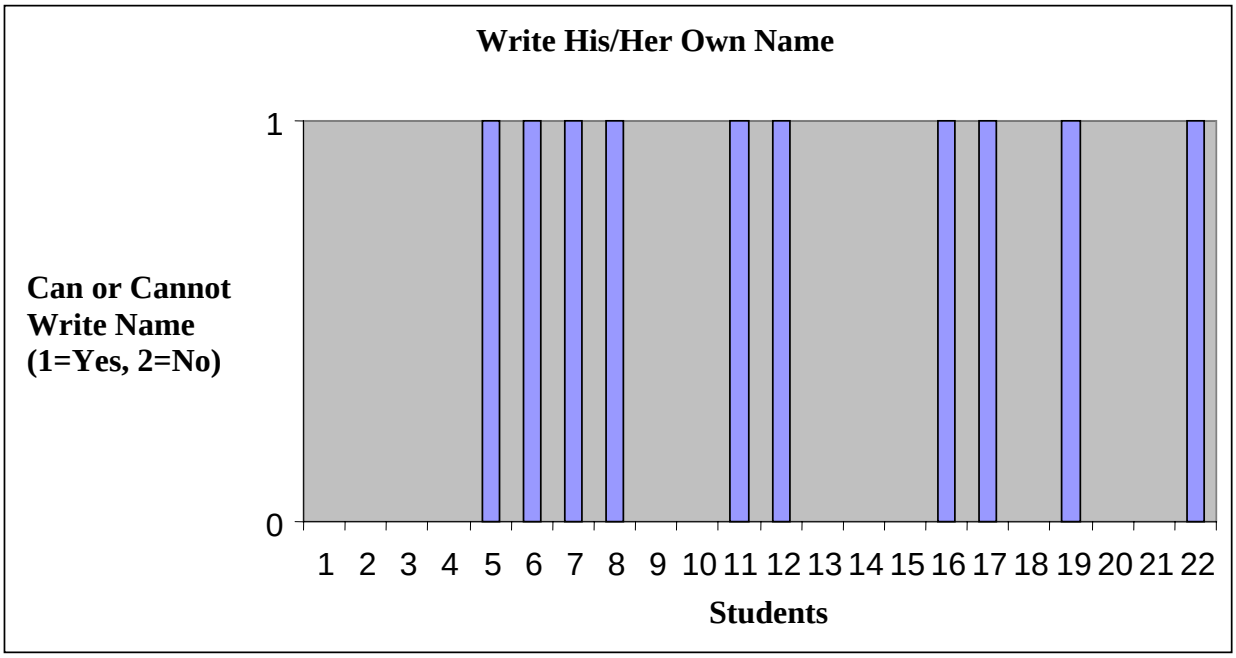

Figure 2. Students who were able to write their first name upon entering kindergarten. One equals yes and zero equals no.

Next, I helped administer the DIBELS tests. Entering kindergarteners take the following three tests: Initial sound fluency, Letter naming fluency, and Word use fluency. These tests and scores are explained in detail in the Review of Literature section.

By the middle of kindergarten, students are expected to score between 25 and 30. This test was administered at the beginning of the school year and none of the students scored above 25. Of the 20 students, 12 were able to identify one or more initial sounds. Of those 12 students, 7 attended preschool and 5 did not. Of the 20 students, 8 were not able to identify at least one initial sound. Of those 8 students, 3 attended preschool and 5 did not. These scores show that the majority of the students who did identify any sounds did attend preschool. Seven of the 10 students (70%) who attended preschool were able

to identify at least one initial sound while 3 of the 10 (30%) could not identify at least one initial sound. Five of the 10 students (50%) who attended preschool could identify at least one initial sound. The DIBELS Web site stating that students who cannot name at least 10 initial sounds are at-risk. According to this, and the scores, 100% of all students in this class are at risk. This shows that the preschoolers did perform better, but not well enough, to be taken out of the at-risk category. Figure 3 shows all students' scores on the three administered DIBELS tests. The Y represents students who attended preschool and the N represents students who did not go to preschool. Figure 4 shows only the scores of the students who attended preschool. Figure 5 shows only the scores of the students who did not attend preschool.

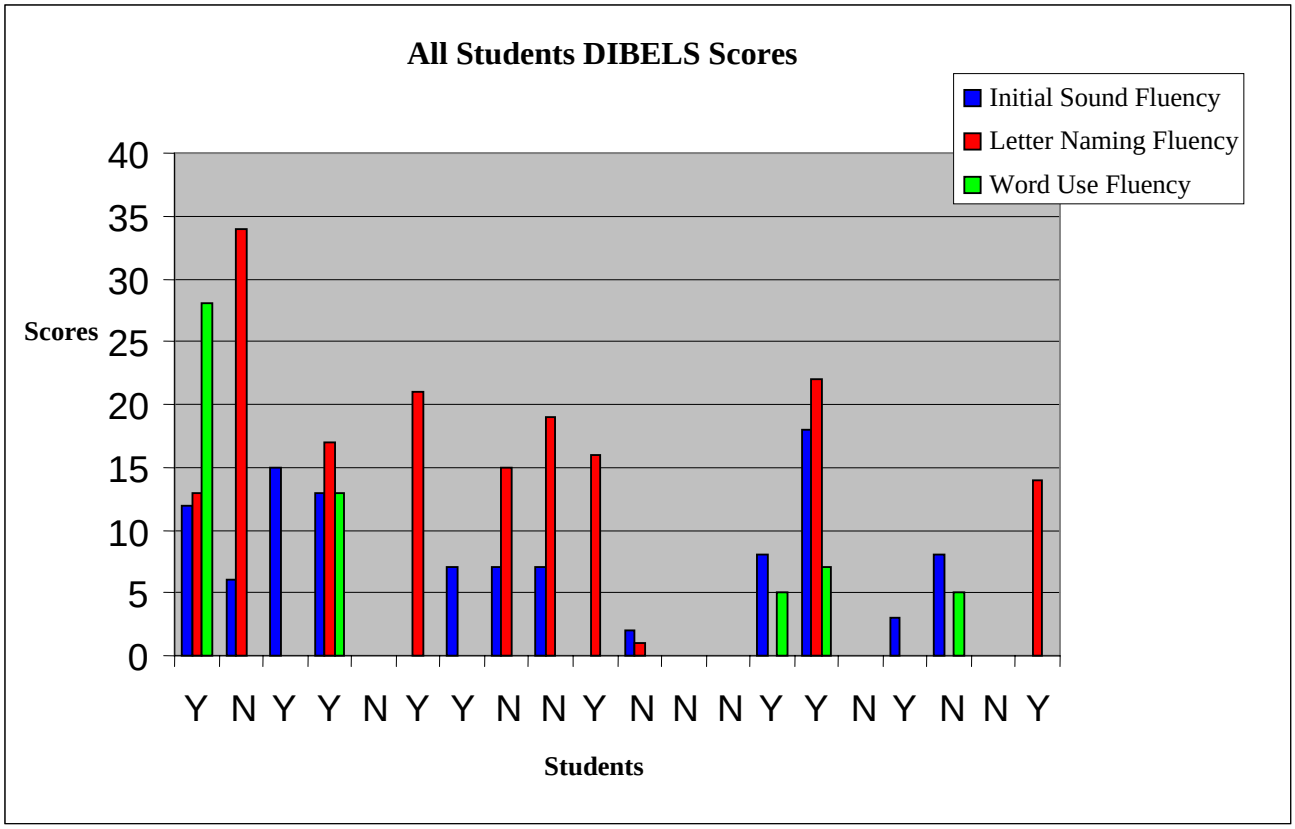

Figure 3. DIBELS scores for all students in the study group for the following three tests: Initial sound fluency, Letter naming fluency, Word use fluency. The Y represents the students who attended preschool and the N represents students who did not attend preschool.

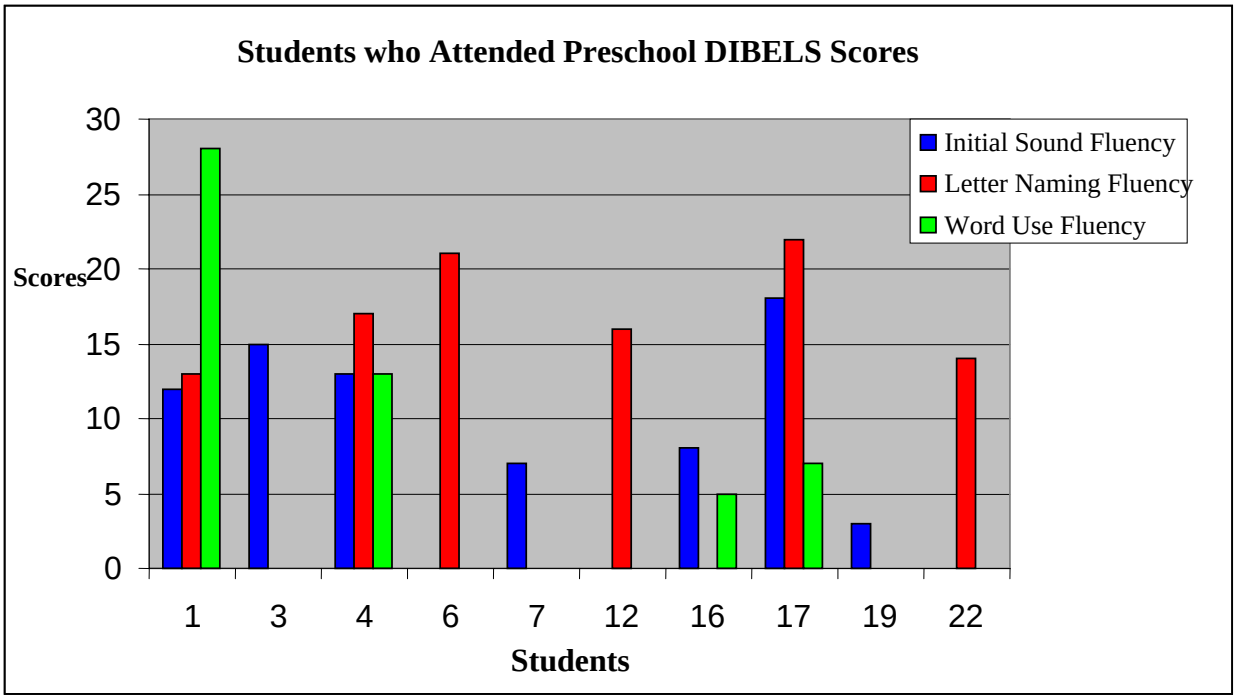

Figure 4. DIBELS scores only for the participating students who did attend preschool. The numbers on the x-axis represent the students.

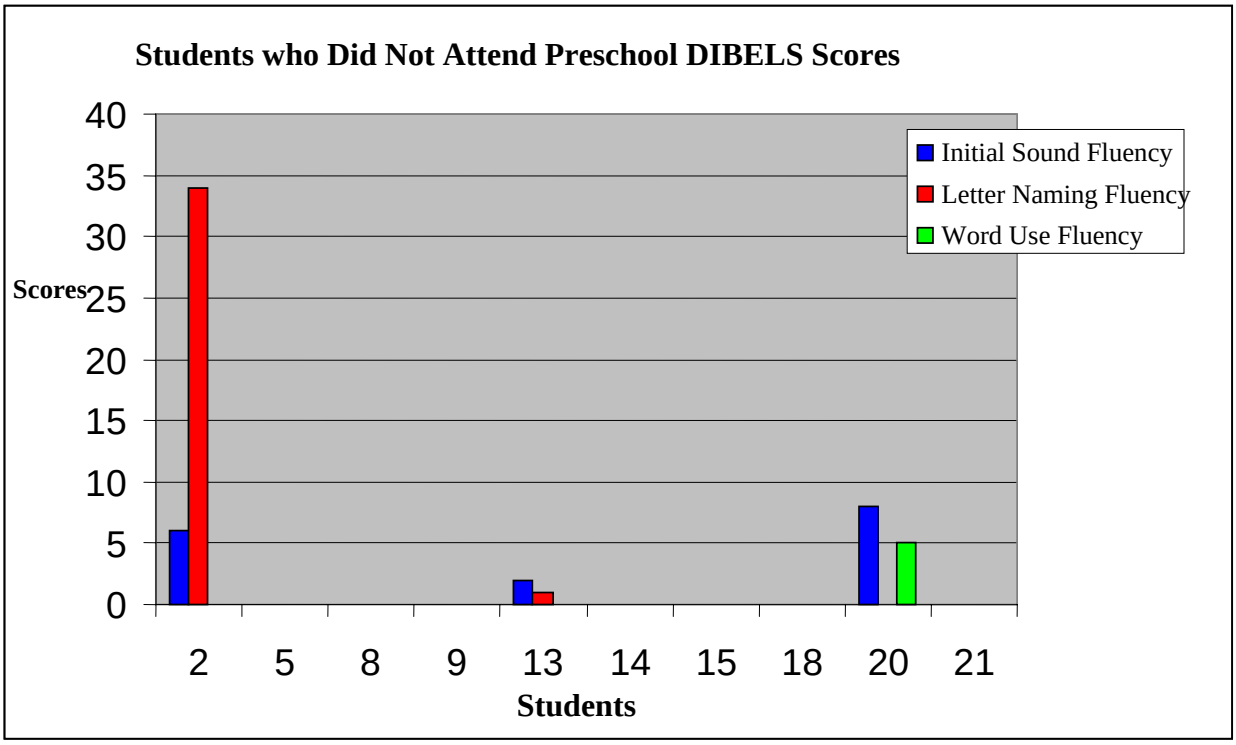

Figure 5. DIBELS scores only for the participating students who did not attend preschool. The numbers on the x-axis represent the students.

On the Letter Naming Fluency test, 10 students scored at least a one. Of those 10 students, 6 students went to preschool. This means that 60% of the preschoolers could recognize at least one letter while 40% could not. Of the students who did not attend preschool, 40% could recognize at least one letter while 60% could not. Again this is only a gap of 20% between the preschoolers and non-preschoolers. Unlike the Initial Sound Fluency test, there is no expected score on this test. Instead each student's score is compared with the other students in the school district and the bottom 20% are considered at risk and the students who scores are in the 20%-40% are considered to have some risk.

The Word Usage scores are also compared to others in the school district so there is no expected score. This test was administered at the beginning of the school year and 5 students scored at least a one. Therefore, of 20 students only 5 were able to use a word correctly in a sentence. Out of those five students, four attended preschool and one did not. Of the 20 students, 15 were not able to use a given word in a sentence correctly. Of those 15 students, 6 attended preschool and 9 did not. These scores show that the majority of the students who did use the given words correctly did attend preschool. Four out of the 10 students who attended preschool were able to use at least one of the given words correctly; 40% of students who attended preschool could use a given work in a sentence correctly. On the other hand, 6 of the 10 students or 60% of the students who attended preschool, could not use at least one word correctly in a sentence. The majority of the preschooler group could not use at least one given word in a sentence correctly. Only 10, or 10%, of the nonpreschooler group could use a word correctly. This is a gap of 30% between the preschooler and nonpreschooler groups who could use a word correctly in a sentence.

Students who attended preschool did out perform the students who did not attend preschool in all observed areas. Sixty percent of the preschoolers could write his/her own name while only 30% of the non-preschoolers could; this is a gap of 30%. On the Initial Sound Fluency test, 70% of preschoolers could identify at least one initial sound, while 50% of the nonpreschoolers could identify at least one initial sound. This is a gap of only 20%. Sixty percent of preschoolers could identify at least one letter, while 40% of nonpreschoolers could; again, this is a gap of 20%. Forty percent of students who

attended preschool could use a given word correctly in a sentence, while only 10% of the nonpreschoolers could; this is another gap of 30%.

Conclusions and Recommendations

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Teacher-centered versus student-centered:

Which Teaching Strategy is the Most Effective in a Middle School Science Classroom?

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The Institutional Review Board of the University of Tennessee at Chattanooga

(FWA004149) has approved this project 05-224

Introduction to the problem

Many times throughout a student's journey to become a teacher, people express a bias toward teacher-centered instruction, saying that it is the best way to teach student's core knowledge. Likewise, the student may hear from other people that a more student-centered instruction is best for a student's achievement. All of these different instructional methods make it hard on a teacher to decide on their own teaching philosophy or how they believe students learn better. The purpose of this study was to determine which teaching strategy is the most effective in a middle school science classroom. The two teaching strategies that were studied are the teacher-centered/traditional method versus the student-centered approach. The researcher taught one class with the teacher-centered method. Another class was taught the same topic using the student-centered method. The students were asked to fill out a questionnaire as a means of evaluating which teaching method motivates the students to learn science.

There are many limitations that could affect this study. One limitation of this study is that the two classes need to be comparable. If one class is more advanced than the other, the results may not be very accurate. The two classes need to have around the same amount of higher-level learners as well as lower-level learners. This was accomplished by looking at archival data of students' past grades. The researcher gave the students a pre-test to see where they stood on the subject matter being taught. The students were also given a questionnaire to see how the teaching strategy used affects the motivation of the students. The honesty of the students as they fill out the questionnaire could also be a

limitation that may affect this study in a negative way. During this study, some questions to be answered are:

1. How will the teaching strategy used affect the student's motivation to learn science?
2. How will the teaching strategy used affect the amount of subject matter covered in a given time period?
3. Which teaching strategy is the most effective to teach science, teacher-centered/traditional method or student centered/hands-on method?

Review of Literature

There have been many studies and debates over whether student-centered or teacher-centered instruction is the most effective in teaching students the science curriculum. Teacher-centered instruction is a more traditional classroom setting; the students all sit in rows and listen to the teacher speak. On some occasions, the students will also conduct various discussions over the subject matter. Teacher-centered instruction contains a bias toward teacher lecture as opposed to student, hands-on techniques. Sometimes there are group discussions and other types of group work, but the majority of the teaching medium is lecture from the teacher. The other method of educating being studied is student-centered instruction. Student-centered instruction may include hands-on activities, cooperative learning, the constructivist model, or many methods. Progressives believe in the student-centered approach to teaching in preference to the traditional teacher-centered methods.

Another debate that coincides with student-centered versus teacher-centered is traditionalist versus progressivism. There have been debates between progressive educators and traditionalists for more than a century. Traditionalists believe that teachers should not expend time doing activities that do not directly teach material. They believe that students should get as much information as possible and that teachers should teach the important topics directly. Most traditionalists believe that teacher-centered instruction is the most effective. On the other hand, progressives believe in student-centered instruction. Progressives believe that teachers should not try to make one standard fit all. Progressives deem that all children are different and should be taught in a way which deviates from the monotonous traditional teaching styles (Ackerman, 2003). Ackerman (2003) believes that the two teaching strategies should be combined in order to provide the best education. Ackerman says, “an outstanding school is akin to the double helix of DNA: both the progressive and the traditional strands intertwine, reinforcing and amplifying one another” (Ackerman, 2003, p. 6).

This study will be looking at student-centered versus teacher-centered in the science classroom. There are many ways to teach science using the student-centered theory. Some of these methods include constructivism, cooperative learning, active learning, and hands-on, as well as many others. Constructivism is sometimes defined as students constructing their own learning. “There is no instruction and students construct their own interpretations regardless of the instructional strategy” (Simpson, 2002, p. 351). Simpson believes that adhering to constructivism is incompatible with accepting the possibility of objective knowledge and absolute truth (Simpson, 2002). It is hard to teach

students science without teaching them objective knowledge. Simpson (2002) believes that instruction should consist of careful planning and should be chosen based on the nature of the content, students' needs, and teacher objectives (Simpson, 2002).

Patricia Burrowes is a college science professor who was impressed with some of the outcomes of past results of Lord's teaching techniques. She decided to conduct her own study to see if students learn science better through the Lord's constructivist model (2001). The objectives of her study were to provide evidence in favor of constructivist teaching over the traditional method in a collegiate science classroom. The control group was taught using primarily lecture, with no group work, and the experimental group was taught using the constructivist learning model, with the majority of the work being of the group variety. Group work is a way to teach using student-centered instruction. In Burrowes study (2003), she found that students' attitudes toward science were affected, as well as achievement. She also found that students that were taught using the constructivist way performed better on tests than the students that were taught using traditional methods (Burrowes, 2003). One negative aspect of the constructivist teaching method is that it requires more time and effort from the instructor. There have been numerous studies that show how the constructivist method improves student achievement, however, the method does contain some negative aspects.

Another way of teaching using student-centered instruction is cooperative learning. Cooperative learning is when small groups of students work together to solve problems and discuss their resolutions within their group. The students help each other understand the information better, which helps them retain it better (Lord, 2001). Lord

found that cooperative learning was the best-suited teaching method for his classes. Cooperative learning helps students in a plethora of ways. Lord found that cooperative learning enhanced the attitudes of biology students, as well as many other aspects of the classroom (Lord, 2001).

In this study, the students will be asked to fill out a questionnaire to determine what attitudes the students have toward the topic. Many students have bad attitudes about science because they do not understand why they are required to learn it. Students with more positive attitudes toward science are better-suited to learn more in the class. A study by McManus, a high school assistant principal, found that student-centered instruction brought on a better attitude about science (McManus, Dunn, & Denig, 2003). Teachers play an important role in promoting student's motivation. Therefore, teachers need to create learning environments that spark students' interest and will to learn (Tuan, Chin, & Tsai, 2003). Some studies have shown that students' motivation in learning science was enhanced if the teacher made science concepts related to daily life while creating opportunities for group discussion (Tuan, Chin, & Tsai, 2003). It will be interesting to see which teaching strategy will affect students' attitudes in a positive way.

Some people believe that it is hard to cover the entire required curriculum using student-centered instruction. With new reforms in place, there is not much time for teachers to teach other material outside of getting students ready for high stakes testing (Deboer, 2002). One of the best ways to teach students the most material is to use teacher-centered instruction.

There are a lot of positive results of student-centered instruction, however, there are some negatives results, as well. Some research has showed that highly-structured teaching is the best method for at-risk students (Nadler, 1998). Using progressive education has been shown to increase the achievement gap. It becomes more unequal when using progressive education because it causes working class students to fall further behind. Progressive education makes it more obvious that the at-risk students do not have parents at home helping them on their school work (Nadler, 1998). At-risk students need teachers to act as authority figures since they may not contain such a figure at home. From research conducted in the late 1970s by the U.S. Department of Education, it was observed that the best practice for minority or at-risk students is direct instruction (Nadler, 1998). This involves a teacher to engage students in highly-structured and content-rich curriculum. Direct instruction is also a way to use teacher-centered instruction. The student-centered instruction, also known as progressive education, has been known to lower the at-risk student's achievement (Nadler, 1998).

Many are skeptical of student-centered instruction because of their concerns about a lack of focus on standards and achievement (Bandlow, 2001). Student-centered instruction is used mainly in middle schools because it is thought of as a time to allow students to grow and discover themselves. This use of student-centered instruction has also brought a lot of worry concerning students not being ready for high school because they did not get all the necessary background knowledge. Some believe that middle school education should start to focus on a more challenging and rigorous curriculum (Bandlow, 2001).

The most common way to teach using teacher-centered instruction is by using the lecture method. There are many ways to lecture outside of the customary approach in which the teacher stands in front of the room, lecturing to the students while they copy everything down on paper. One alternative is the guided lecture. The guided lecture consists of the teacher lecturing for 20 minutes; after the teacher finishes lecturing, the students have about 10 minutes to write down any notes. The students are also allowed to work with a group to get all the information (Toole, 2000). This is just one example of the many alternative lecture techniques present in modern classrooms. Many believe that traditional instruction involves the teacher lecturing for the whole time but it also involves some group work. The teacher-centered method has been known to teach more knowledge because it does not take up as much time.

Numerous studies have been conducted to investigate which teaching strategy is the most effective. The goal of this study is to introduce a science classroom environment to two different teaching methodologies, student-centered and teacher-centered, in order to determine which teaching strategy the students are biased toward.

Data Collection and Results

Data Collection

This study was done in a middle school science class. The teacher compared student data from two different periods of science, and in order to make sure the two classes were comparable in skill levels, the teacher looked at archival data such as old test grades. This study was done during a unit over both waves and harmonic motion. After

the unit of study was determined, the teacher designed a pre-test to give to the students to see what they knew about this topic and to use later for comparison.

The teacher began teaching the two classes using different teaching strategies for each class. One class was taught using the teacher-centered method while the other class was taught using the student-centered method. The teacher-centered method consisted of the students sitting in rows and the teacher acting as sole authority; the students were taught primarily by lecture. The teacher used many different ways of lecturing, such as the guided lecture method, as well as other discussion promoting methods.

The class being taught using the student-centered method was taught by doing more hands-on activities. The student seating was adaptable, and students were moving around while working in groups. The teacher acted as the facilitator, or guide, for the students. These students were expected to draw conclusions independently or cooperatively.

During the teaching of the unit, the teacher kept a journal which shows what was taught every day in each class, and also provides a record of the time it took to cover each topic. This journal was used to see how the two teaching strategies affect the amount of subject matter covered in a given time period.

After the unit of study was covered in both classes, the teacher gave the students a post-test which was nearly the same as the pre-test. The post-test results were compared to the pre-test results in order to see if the students increased their knowledge of the topic. The class with the most improvement showed which of the teaching strategies was the most effective to use while teaching this topic.

The students were also given a questionnaire to see how they were motivated during this unit of study. This questionnaire contained Likert scale items, as well as certain open-ended questions. The questionnaire helped show which teaching strategy was the most effective in motivating the students.

There are both qualitative and quantitative data in this study. The quantitative data was recorded from the pre-test and post-test, as well as the teacher's journal reporting the time for each topic. The questionnaire contained both quantitative and qualitative items.

Results

The two classes that were taught were very similar in their past grades. The past 9 week grades were looked at to see which classes were the most comparable. From looking at the archival data, we were able to find two classes that contained the same level of students. After the two classes were found, the study was started. Instruction for one class was student-centered, and this involved more hand-on activities. This class was able to do more labs and was taught using demonstrations. The class that was taught using the teacher- centered method was taught using lectures. The students didn't get to do much work on their own or see many demonstrations. The teacher-centered class mostly received lecture and completed worksheets. The two classes took a pre-test over waves and harmonic motion. The teacher-centered class received a 30 average on the pre-test, and the student-centered class received a 31 average on the pre-test. After the instruction was given to the two classes, they were given a post-test to see how they improved on their understanding of the topic matter. The class that was taught with the student-centered method received a 71 average on the post-test. The teacher-centered

class received a 69 average on the post-test. The class that was taught using student-centered method had the highest average grades. (See figures 1 through 4.)

	Pre Test	**Post Test**
Teacher-Centered	30	69
Student-Centered	31	71

Figure 1. Pre-test and post-test analysis.

	Mean	**Median**	**Mode**
Teacher Centered	30	29	33
Student Centered	31	33	38

Figure 2. Pre-test results.

	Mean	**Median**	**Mode**
Teacher Centered	69	81	55
Student Centered	71	69	82

Figure 3. Post-test results.

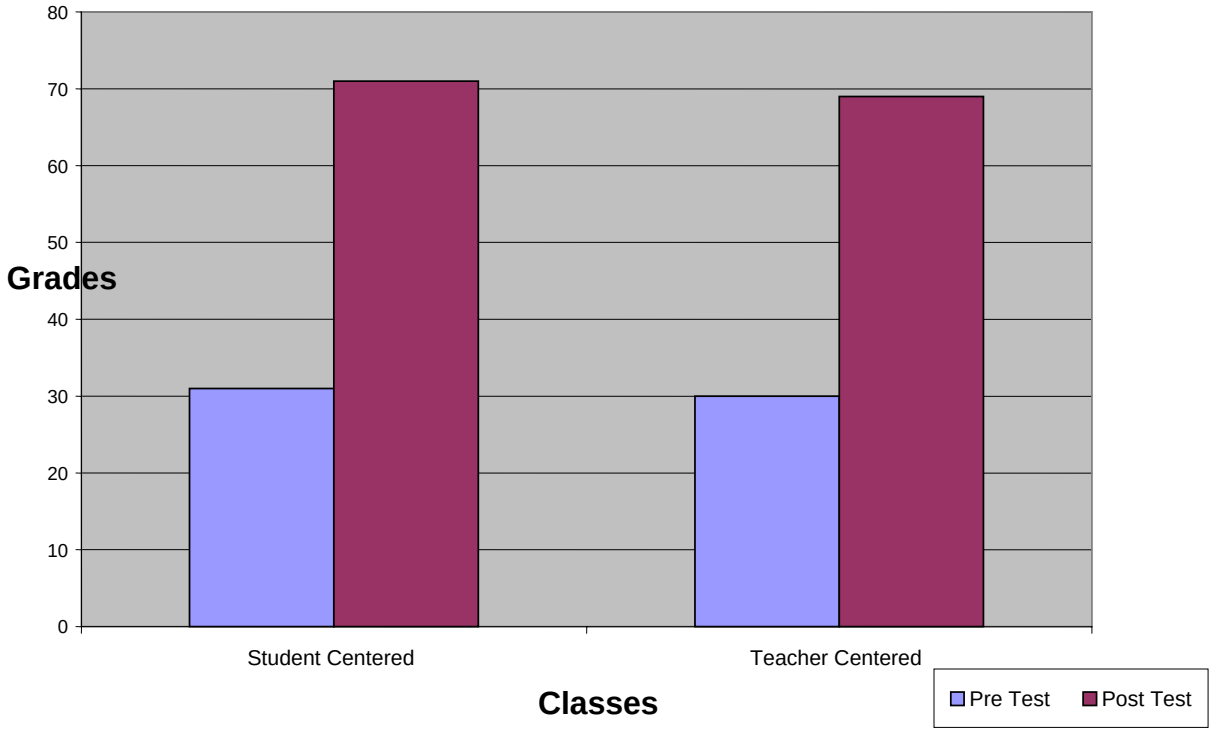

Figure 4. Pre-test, and post-test analysis.

Conclusions and Recommendations

Based on the results of the questionnaire that the students filled out, the student-centered teaching strategy is the most effective in motivating students to learn. When students are motivated to learn, they are more likely to learn more. About four out of five students stated that they preferred learning while doing group or hands-on activities. They said that they are more motivated when they are working in groups or doing hands-on activities such as labs. The only draw back about the student-centered instruction is that is takes more time. There were many times when the teacher didn't get as much

covered using student-centered instruction as she did using the teacher-centered method. Although not as much material was covered, it wasn't enough to really make any difference. The students were more motivated, which caused more learning to take place. The results from the pre-text and post-test comparison didn't show much evidence of either teaching strategy being more effective than the other. There was just a slightly higher increase in score with the student-centered instruction. There are numerous reasons why there wasn't much of a difference. It either could mean that the teacher didn't perform the teaching strategies the correct way. If this were the case, there should be more professional development for teachers, and this professional development could help teachers see the correct way to teach using that strategy. The results could also mean that neither teaching strategy is better than the other. In conclusion, from the test results and the questionnaire results, student- centered instruction was more effective in teaching the students about harmonic motion and waves, and motivating them, as well.

In order to research the effects of different teaching strategies, teachers will need to go through professional development about how to instruct in those different ways. This professional development could help teachers learn with alternative teaching strategies. After reviewing the results of the study, it has been found that student-centered method is more effective in teaching science. The school could provide a professional development session on the different teaching strategies to use. Teachers need to see the various ways to instruct students. Many veteran teachers get stuck in the traditional teacher-centered method, and they do nothing else because they don't know how. Ongoing professional development could help improve student achievement by showing

teachers the many different teaching strategies they could use to improve their effectiveness in the classroom.

There are many organizations that are willing to give grants in the subject of teaching strategies. One program that offers grant money is the Teacher Quality-Mathematics and Science Education Research program, CFDA# 84-305M. The purpose of this program is to identify effective strategies for improving performance of teachers in ways that lead to an increase in students' mathematics and science learning. Another program that offers money is the Mathematics and Science Education Research program, CFDA# 84-305K. This institute intends for the Mathematics and Science Education research program to develop and evaluate mathematics and science instructional approaches (U.S. Department of Education, n.d.).

There are many ways that technology could be used in this area of study. During instruction, the students could use technology on their own as a means of learning using student-centered instruction. Technology could also be used to help present the material or lectures more clearly for the class that is being taught using student-centered instruction.

In conclusion, the proposed study revealed that the student-centered method is best-suited for the subject matter that was covered. Both teaching strategies were examined in similar environments, and the results were acknowledged from both the teacher's perspective, as well as the students' viewpoint. From the proposed study, the teacher gained a better understanding as to the nature of which method helps make

students more comfortable and more motivated to learn the material, and therefore provide valuable insight into future teaching endeavors.

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Appendix A

Student Motivation Questionnaire

Circle the answer.

1. Working in groups with my fellow students helps me remember what I am learning.
    - Strongly Agree
    - Agree
    - Somewhat Agree
    - Somewhat Disagree
    - Disagree
    - Strongly Disagree

2. I feel that I have achieved more if the teacher covers more topic with lecturing than covering less doing group work.
    - Strongly Agree
    - Agree
    - Somewhat Agree
    - Somewhat Disagree
    - Disagree
    - Strongly Disagree

3. Individual recognition from the teacher for above standard work means a lot to students
    - Strongly Agree
    - Agree
    - Somewhat Agree
    - Somewhat Disagree
    - Disagree
    - Strongly Disagree

4. I believe that I remember more about science from labs over lecturing.
    - Strongly Agree
    - Agree
    - Somewhat Agree
    - Somewhat Disagree
    - Disagree
    - Strongly Disagree

5. I believe that individual studying is more productive than group studying.
    - Strongly Agree
    - Agree

Somewhat Agree
Somewhat Disagree
Disagree
Strongly Disagree

6. I prefer to learn when the teacher is lecturing in an effective manner and doing practice on my own.

Strongly Agree
Agree
Somewhat Agree
Somewhat Disagree
Disagree
Strongly Disagree

7. I am motivated to learn more when I am in groups working.

Strongly Agree
Agree
Somewhat Agree
Somewhat Disagree
Disagree
Strongly Disagree

8. I am motivated when the subject is interesting.

Strongly Agree
Agree
Somewhat Agree
Somewhat Disagree
Disagree
Strongly Disagree

9. What motivates you to learn Physical Science? What types of activities? Explain.

Grouping Strategy Effects on Literacy Achievement of Low Performing Elementary Students

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The Institutional Review Board of the University of Tennessee at Chattanooga

(FWA00004149) has approved this research project 05-028.

Introduction to the Problem

A frequent topic of conversation among educators and parents today is ability grouping. Parents of the early-elementary student placed in a low-ability group fear their child being labeled a *blackbird* for his/her entire school experience while educators say it is beneficial to group by ability levels. Students are often grouped by ability, or homogeneously, for reading or mathematics instruction. Even though previous studies have shown the effects of grouping depend on their features, it is common practice in schools today to use homogeneous grouping without modifying the curriculum for various ability groups. This study examined literacy growth of low-ability students placed in a heterogeneous group compared to literacy growth of low-ability students placed in a homogeneous group.

Research Questions

- What grouping strategy shows the most improvement for students with low ability?
- Will the low-ability student benefit from being a member of a mixed ability group?
- Will a mixed-ability group help to close the gap between low readers and high readers more quickly?
- Will the low-ability student benefit or be overwhelmed from being a member of a mixed-ability group?
- Which group, as a whole, will show greater improvement?

- Which grouping strategy benefits the low-ability students best?

Review of Literature

Traditionally, teachers have taught to the middle-ability student, gearing their instruction to what they perceive to be the average ability, average attention span, average personality, and average interest of students. From the beginning of public education, instruction was delivered in a whole class setting. Recent psychological research on cognitive development and multiple intelligences has forced educators to experiment with different teaching strategies, with more focus given to individual children's needs.

Immigration, during the late 1800s, brought with it a need to look at public education practices. As education became a focus for the fast growing population of the United States, grouping strategies began to emerge. In 1867, the first program to group students was implemented in the United States (Shields, 2002). It was one that grouped students by ability. Thus, grouping practices were born. The norm for grouping schemes in general education, elementary classrooms became *within-class homogeneous groups* based on reading ability (Barr & Dreeben, 1991). Classroom teachers typically organized students into one of three groups: low-ability, middle-ability, or high-ability. To this day, this is the norm in many schools.

In the 20th century, various grouping strategies began to appear in the pedagogy arena. Alternatives such as flexible grouping, multiage grouping, and heterogeneous grouping emerged. With more attention focusing on meeting the social and emotional

needs of students, grouping practices were studied, not only to determine academic success, but also the psychological effects on students.

Much of the research performed on grouping strategies deals with students on the far two extremes: special needs students and gifted students. Research has also been performed from two different perspectives. One perspective is that of the educational psychologists, focusing on academic achievement and self-esteem issues. The other perspective is that of sociologists focusing on opportunities and services offered to students in different groups and tracks (Glass, 2002). What does the research tell us about grouping arrangements?

Homogeneous and Heterogeneous Grouping

There is predominate evidence that ability grouping has few benefits and many risks. When an identical curriculum is used, both in homogeneous and heterogeneous groups, there appear to be few advantages in homogeneous grouping in terms of academic achievements (Glass, 2002). Glass examined the work of Kulik and Kulik (as cited in Glass, 2002) who performed a meta-analysis of 52 studies regarding the effect of ability grouping on achievement of secondary school students. Their findings showed no benefits in terms of academic achievements of ability grouping, with one exception. The exception was that high-ability students in gifted classes outperformed their counterparts in mixed-ability classes. When effects of ability grouping at the elementary level were analyzed, small, but positive, effects were found for ability grouping in reading and mathematics. Higher effects for the high-ability groups were again found.

Glass (2002) also discussed the findings from the meta-analysis study of Slavin (as cited in Glass, 2002). The Slavin analysis results showed only modest, but reliable, benefits of within-class ability grouping for mathematics and reading achievement. Reading groups were organized according to the Joplin plan where students are grouped across grades into ability groups for reading, but then return to their grade level for other studies.

In summary, "the research on academic progress shows nothing much more than small benefits to bright students of any of these forms of grouping per se, and large benefits from enriching and accelerating the curriculum for select students" (Glass, 2002, Conclusion section, ¶ 5). According to Glass, mixed or heterogeneous ability groups offer several advantages:

- Less able pupils are at reduced risk of being stigmatized and exposed to a "dumbed-down" curriculum.
- Teachers' expectations for all pupils are maintained at higher levels.
- Opportunities for more able students to assist less able peers in learning can be realized.
- Teachers asked to teach in a "de-tracked" system will require training, materials, and support that are largely lacking in today's schools.

According to an article by Holloway (2001), many studies show that special grouping schemes can bring about increased student learning. Is it the actual grouping strategy that produces increased learning or does the grouping strategy cause teachers to

teach in new ways? Holloway looked at studies of various grouping strategies to examine teaching strategies along with grouping strategies.

Full-time ability grouping studies were researched. One study by Lloyd (as cited in Holloway, 2001), found that "the overall achievement effect of homogeneous grouping was essentially zero at all grade levels from elementary through high school" (Holloway, 2001, p. 84). Another study by Nyberg, McMillin, O'Neill-Rood, and Florence (as cited in Holloway, 2001), showed that "placing midrange students into a more challenging academic program with higher achievers did not threaten the likelihood of midrange students' completion of high school or lower their grade point average" (Holloway, 2001 p. 84). His article again shows that only gifted students benefit from homogeneous grouping.

Sheppard & Kanevsky (1991) performed a study involving two different groups of gifted students. One group was placed in a homogeneous group of only gifted students. An equal number of gifted students was placed in a heterogeneous, mixed-ability class. The teacher asked each group to develop a machine analogy for their minds while solving a problem. The homogeneously grouped, gifted students proposed a larger number of functions for their machines. The heterogeneous grouped, gifted students were more conforming and hesitant in proposing functions for their machines.

Schumm, Moody, and Vaughn (2000), reported that the case against homogeneous grouping has been strong both on academic grounds and social grounds:

> First, extant research does not provide convincing evidence for or against ability grouping based on academic outcomes. Second, research has demonstrated that

> the quality of instruction provided to students in low reading groups is inferior and focuses on isolated skills rather than on reading purposeful, connected text. Third, research indicates that when students are placed in homogeneous reading groups, those groups tend to be stable, thus restricting friendship choices and contact with peers. Fourth, some have argued that homogeneous grouping frequently results in social stratification, with students of minority groups being overrepresented in low-ability groups. While homogeneous grouping may enhance the motivation and self-esteem of high-achieving students, it simultaneously lowers the motivation and self-esteem of low-achieving students. (p. 477)

Loveless (1998) found similar results to Schumm, Moody, and Vaughn in a study he performed for the Fordham Foundation. The debate was over ability grouping. Does it boost achievement and does it foster equity? His research found that critics say "tracking not only fails to benefit any student, but that it also channels poor and minority students into low tracks and dooms a vast number of students to an impoverished education. Defenders of tracking, on the other hand, argue that high ability students languish in mixed ability classes" (Debate section, ¶ 1).

In actuality, Loveless (1998) found that research on heterogeneous/homogeneous grouping does not conclusively identify one or the other as the better way of organizing students. What he did find, however, was that when curriculum is adjusted for different ability groups, student achievement is boosted, especially for high-ability students receiving accelerated curriculum.

Research has also been conducted to analyze the factors that accounted for variability in the findings of studies whose purposes were to determine within-class groupings on student achievement. Studies were analyzed that compared homogeneous ability grouping with heterogeneous grouping (Lou, Abrami, Spence, Poulsen, Chambers, & d'Apollonia, 1996). Homogeneous grouping was found slightly more superior. However, results were not uniform across studies. Careful analysis showed that:

- Low-ability students perform best in heterogeneous groups.
- Medium-ability students perform best in homogeneous groups.
- High-ability students perform equally well in either type of group (Lou, et al., 1996).

Here we see again that neither homogeneous nor heterogeneous grouping alone can be sold as good or bad for all students.

The results of a meta-analysis by Lou, Abrami, and Spence (2000) suggested that "the most important pedagogical predictors of the effects of small-group instruction are teacher training, grouping basis, and type of small-group instruction" (p. 111). For within-class, small grouping techniques to be successful, teachers must acquire adequate training in group work. Consideration should also be given to the composition of the groups. And finally, strategies such as cooperative learning can facilitate successful small group work.

Data from another study by Gamoran and Weinstein (1998) suggested that "elimination of tracking is a goal that is idealized more often than it is achieved" (p. 385). In the study of 24 restructured schools, his findings were consistent with previous

research in that homogeneous grouping encourages higher-quality instruction in high-ability groups yet “neither grouping by skill level nor heterogeneous grouping presents insurmountable barriers to high-quality instruction, but neither do they ensure it” (p. 399).

According to research conducted in the United Kingdom by Hallam, Ireson, Mortimore, and Davies (2000), ability grouping in the primary grades is considered the norm and is accepted by pupils. A study of six schools with varying ability grouping practices was initiated. The purpose was to determine what effect the grouping strategies had on students’ personal and social development. Results showed that “overall attitudes to school do not seem to be affected by ability grouping per se” (p. 15).

Alternative Grouping Strategies

Holloway (2001) also looked at multiage classrooms. Positive results were found for grouping students with an age range of 3 years. The median effect size on achievement was +0.50. Also, students who spent 3 years in a multiage program showed increases of +0.91 for reading achievement. The results showed an academic advantage with no negative social and emotional effects for multiage grouping.

Another grouping strategy examined was small group arrangements utilizing a diversity of instruction. Lou, Abrami, and Spence (2000) found small, but positive, effects of small-group instruction on student achievement. Small-group instruction was found to be rewarding for students of all ability levels and more helpful for elementary students rather than older students.

Opitz (1992) reported that another alternative to ability grouping for reading instruction is the Cooperative Reading Activity (CRA). In this activity, students are given a section of literature to read. They individually complete a *main ideas* paper. Then they gather in groups of four (the same four had the same section to read) to work collaboratively to come up with a group *main ideas* to present to the class. The goal of this cooperative activity was to show students that everyone could read a part of a literature selection and contribute to one another's learning.

An article in *The Reading Teacher* reported on yet another alternative to ability grouping, the *Four Blocks* method (Cunningham, Hall, & Defee, 1998). The purpose of this project was "to provide reading instruction to children with a wide range of entering levels without putting them in fixed ability groups" (p. 652). Data concludes that putting struggling students in the *bottom reading* group and pacing instruction more slowly does not solve the problem of the struggling reader. They reported that, "as a matter of fact, children placed in the bottom level in first grade usually remain there throughout their elementary school careers and almost never learn to read and write up to grade-level standards" (p. 652).

At completion of the 8-year study, they concluded that the *Four Blocks* framework was much more effective than the previous ability-grouped instruction. *Four Blocks* instruction proved profitable for all children, from the lowest-ability to the highest-ability student. From the psychological aspects, it proved beneficial, as well. Children had no notion of being in the top, middle, or bottom level. It was clear from the study that being placed in static reading groups, defined by ability levels, was as limiting

to those in the top of the top group as it was for those in the bottom of the bottom group (Cunningham, Hall, & Defee, 1998).

Another alternative for teaching reading was reported in *The Elementary School Journal* (Mathes, Torgesen, Clancy-Menchetti, Santi, Nicholas, Robinson, & Grek, 2003). The research provided more information about the best instructional delivery arrangements for increasing the reading skills of struggling readers. It compared peer-instruction to teacher-directed instruction. Results showed that both peer-assisted and small-group, teacher-directed instruction enhanced reading skills of struggling readers more than typical, undifferentiated instruction. Also implied from the results was that teacher-directed instruction in small groups was more powerful than similar peer-assisted instruction. Again, this study showed the importance of differentiated instruction, regardless of the grouping techniques.

Perspectives and Requirements for Change

While research shows that small grouping based on individual skills deficiencies, multiage grouping, and gifted-student ability grouping results in student achievement, a study by Riehl (2000) found that school administrators do not encourage special grouping programs. Many are reluctant to change, and view alternative grouping schemes as complex and challenging.

Schumm, Moody, and Vaughn (2000) conducted a study with third-grade students and teachers. Their first study was to learn more about teachers' grouping practices for reading instruction and their perceptions of the effect of homogeneous and heterogeneous grouping on the academic and social progression of students. Results showed that

teachers used whole-class instruction and provided little insight into the effects of homogeneous and heterogeneous grouping. If any, they leaned toward heterogeneous grouping due to the social stigmatism attached to homogenous grouping.

The second study was to assess students' perceptions of grouping arrangements for reading instruction. Results indicated that students of all reading levels prefer mixed-ability groups and pairs. Their responses, however, reported that whole class instruction along with some independent work was the typical method used by their teachers. They endorsed mixed groups for all levels of readers except nonreaders. They agreed that nonreaders should be grouped in ability groups. Even nonreaders responded that this was the best method (Schumm, Moody, and Vaughn, 2000).

In Wren's (n.d.) study on flexible grouping, he reported two reasons that flexible grouping is not being utilized to its fullest potential. First, "teachers must be adept at giving and interpreting ongoing reading assessment" (¶ 5). Much time is required to assess each child several times within the school year and then interpret the results in order to make changes in group placement. This adds to a teacher's already filled workload. Second, "in order to have confidence about moving children from group to group, the teacher needs to have a very sophisticated understanding of how children learn to read" (¶ 6). This diagnostic ability by the teacher was compared to the skills of a doctor in an emergency room. Some behaviors may appear to be traumatic to the typical person while they appear to be superficial to the doctor's knowledgeable eye. Another patient, appearing healthy to the normal eye, may be given immediate attention by the doctor.

Teachers must gain a level of sophistication about reading acquisition in order to succeed at flexible grouping (Wren, n.d.). Wren found that most elementary teachers have as little as six hours in reading coursework. *Psychology of reading* courses are rare. Also rare are courses that focus on how children learn to read as opposed to courses that focus on instructional activities or reading curricula.

Conclusion

The overall results of research show that the effects of grouping programs depend on their features. Simply grouping by ability, while delivering the same curriculum, has no clear advantages. Programs that assign students based on reading skills, to groups of *redbirds*, *bluebirds*, and *blackbirds* usually result in blackbirds always being blackbirds for the remainder of their school experience.

Research concludes, overwhelmingly, that "any grouping plan, must allow for frequent reevaluation of students' skills, and such grouping must allow for easy reassignment of students who show progress, (Hopkins, 2003, ¶ 6). This article also reported that Anne Wheelock, author of *Crossing the tracks: How untracking can save america's schools*, says that ability grouping doesn't improve achievement and is harmful to students.

An analysis of the research on ability grouping was best summerized in an article by Kulik (1992):

- Bright, average, and slow students profit from grouping programs that adjust the curriculum to the aptitude levels of the groups.

- Benefits are slight from programs that group children by ability but prescribe common curricular experiences for all ability groups.
- Highly talented students profit greatly from an enriched and accelerated curriculum. (Guidelines section, ¶ 1)

Petrello (2000) researched many studies to see how each ability group of students benefited from heterogeneous or homogeneous grouping. Findings were consistent with other research. Lower-ability groups were found to benefit the most from heterogeneous ability grouping.

When looking at small group instruction, regardless of homogeneous or heterogeneous groups, Abrami, Lou, Chambers, Poulsen, and Spence (2000) found that, to be maximally effective, within-class grouping practices require the adaptation of instruction methods and adaptation of instruction materials for small-group learning and that, yes, indeed, educators should group within-class for maximum learning.

Definitions for the project are presented in Appendix A.

Data Collection and Results

Participants

A fourth grade classroom of 25 students at a suburban elementary school served as research participants. The classroom teacher and the student teacher participated by delivering identical reading instruction to participants. Student participants were not informed of the details of the study. They knew only that they were participating in reading groups rather than whole-class instruction for reading. The classroom teacher

and the student teacher were aware of the study, as it was necessary for them to coordinate and agree on teaching strategies to ensure identical curricula delivery.

Apparatus

The major, quantitative, data collection technique used was the Dynamic Indicators of Basic Early Literacy Skills (DIBELS), 6th edition, assessment tool (DIBELS Home Page, n.d.). This assessment tool consists of two individual assessment measures of early literacy development. The oral reading fluency assessment measures the number of words read correctly during a private oral reading session between the teacher and the student. The retell fluency assessment measures the number of words the student uses in retelling during a private reading session between the teacher and the student. Issues regarding reliability and validity are addressed within the documentation provided with the DIBELS assessment:

> Each measure has been thoroughly researched and demonstrated to be reliable and valid indicators of early literacy development and predictive of later reading proficiency to aid in the early identification of students who are not progressing as expected. When used as recommended, the results can be used to evaluate individual student development. (DIBELS Home Page, n.d., ¶ 2)

Procedure

A parental consent form was used to gain permission of students' parents to use their child's test results in this study. The student teacher prepared lesson plans to cover 4 weeks of reading instruction. These were approved by the classroom teacher.

The DIBELS assessment was administered to each student participant at the beginning of the study to obtain a benchmark for student literacy skills. Based on the combined score of both the oral reading fluency assessment and the retell fluency assessment, students were classified as having high, medium, or low literacy skills. Group A consisted of the mixed ability group, or heterogeneous group, with 2 high-ability students, 2 medium-ability students, and 4 low-ability students. The remaining students were divided into homogeneous groups with group B consisting of 6 low students, group C consisting of 6 medium-ability students, and group D consisting of 5 high-ability students.

The study period spanned a time of 4 weeks, with groups meeting once every other day for 45 minutes. During this time, identical reading instruction was delivered via identical teaching strategy to the groups by two teachers. The classroom teacher facilitated groups C and D, while the student teacher facilitated groups A and B, containing the low-level students. Students who were not scheduled for group work on a particular day completed worksheets pertaining to stories they read previously in their reading groups.

Both measures of the assessment tool were administered again at the end of the study and the combination score was used to determine if participants' literacy skills had improved. Pre- and post-study assessment results of students classified as low-level students were examined to identify achievements in literacy skills. The scores of low-level students in the heterogeneous group were compared to the scores of low level

students in the homogeneous group to determine which students in which groups showed gains.

Results

Pre- and post-study assessment results of students classified as low-level students were examined to identify achievements in literacy skills. The scores of low-level students in the heterogeneous group were compared to the scores of low-level students in the homogeneous group to determine which grouping strategy produced gains.

Figures 1 and 2 present both pre- and post-study assessment scores for low-level students in the heterogeneous group. All students showed a gain in retell fluency; only 1 student showed a slight decrease (1 point) in oral reading fluency. The combined scores of the two measures show an increase in reading fluency for all students in the heterogeneous group, with the mean gain being 11 points and a median gain of 10.5 points.

Group A (Heterogeneous) Assessment Results – Pre- & Post-Test							
Students	**Oral Reading Fluency Pre-test**	**Oral Reading Fluency Post-test**	**Retell Fluency Pre-test**	**Retell Fluency Post-test**	**Combined Measures Pre-test**	**Combined Measures Post-test**	**Points Gained**
L01	40	46	24	26	64	72	8
L02	42	45	30	40	72	85	13
L09	110	109	26	28	136	137	1
L10	98	112	42	51	140	163	23
Means					**103**	**114**	**11**

Figure 1. Pre-test and post-test scores for participants in heterogeneous Group A; mean gain of 11 points.

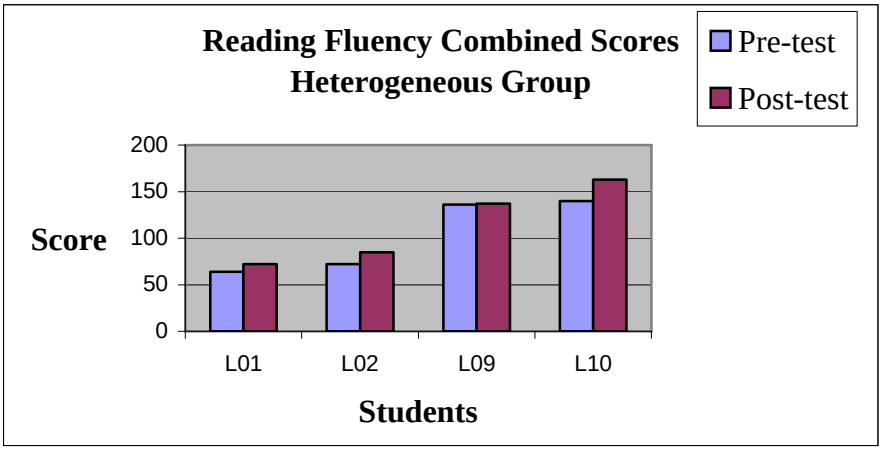

Figure 2. Results of pre-test and post-test scores of combined measures for each participant in heterogeneous Group A.

All low level students in the heterogeneous group increased their reading fluency. Most students increased their score between 1 and 10 points. One student increased by 11 to 20 points and another student had a significant increase of more than 20 points (see Figure 3).

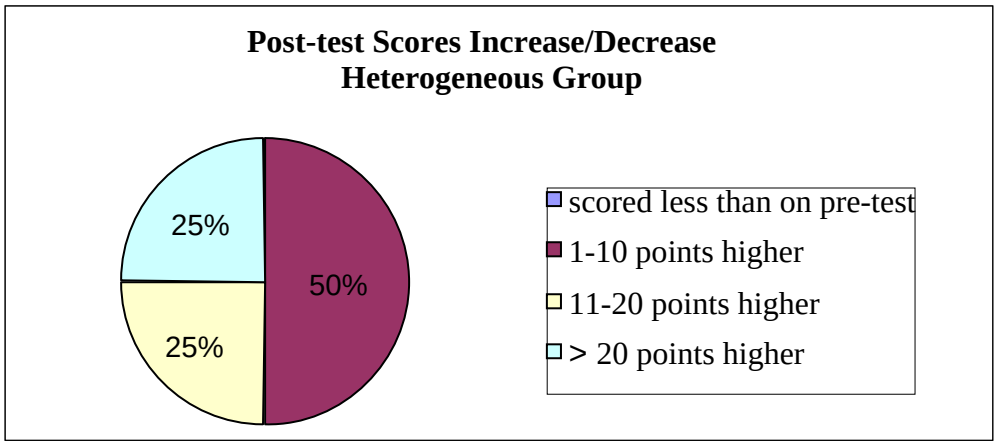

Figure 3. Percentage of participants in heterogeneous Group A who increased scores by a certain number of points.

Figures 4 and 5 present both pre- and post-study assessment scores for oral reading fluency and retell fluency for low level students in the homogeneous group. Only two of six students showed a gain in retell fluency while three of six students showed a gain in oral reading fluency. The combined scores of the two measures show an increase in reading fluency for only half of the students in the homogeneous group, with the mean gain being negative 2 points and the median being negative 1 point.

Group B (Homogeneous) Assessment Results – Pre- & Post-Test							
Students	**Oral Reading Fluency Pre-test**	**Oral Reading Fluency Post-test**	**Retell Fluency Pre-test**	**Retell Fluency Post-test**	**Combined Pre-test**	**Combined Post-test**	**Gain**
L03	52	44	23	20	75	64	-22
L04	56	52	21	36	77	88	-11
L05	58	53	53	36	111	89	-11
L06	79	90	34	32	113	122	9

L07	86	89	35	21	121	110	11
L08	99	104	30	38	129	142	13
Means					**104**	**103**	**-2**

Figure 4. Pre-test and post-test scores for participants in homogeneous Group B; mean gain of negative 2 points.

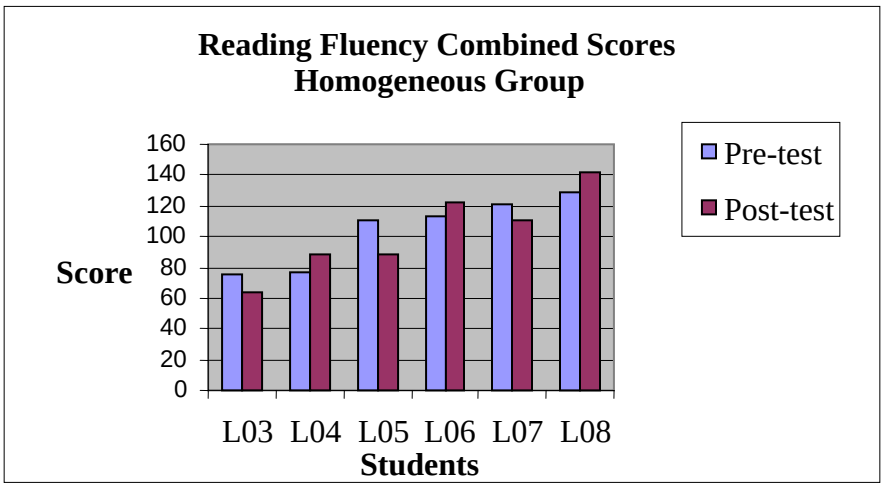

Figure 5. Results of pre-test and post-test scores of combined measures for each participant in homogeneous Group B.

Figure 6 shows that one half of the students in the homogeneous group scored less on the post-test than on the pre-test. One student increased his/her score by 1 to 10 points and 2 students increased their scores by 11 to 20 points.

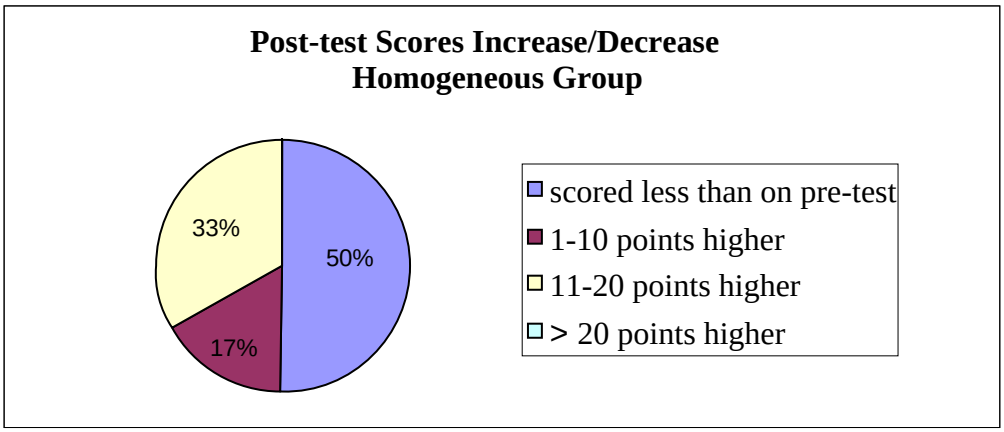

Figure 6. Percentage of participants in homogeneous Group B who increased/decreased scores by a certain number of points.

Figure 7 shows the increase or decrease in points scored on the post-study assessment for each low-level student. More students in heterogeneous group A had increases in their scores than did students in homogeneous group B.

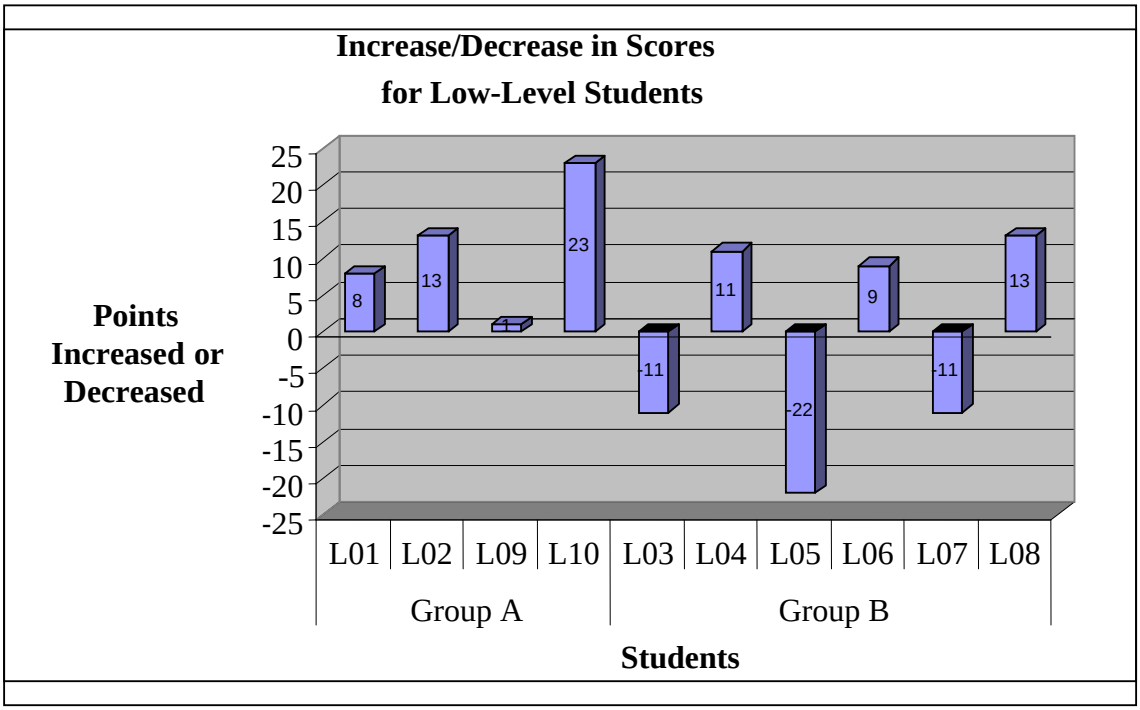

Figure 7. Increase/decrease in points scored for each low-ability participant.

The data indicates that 100% of low-level students in the heterogeneous group increased their reading skills but only 50% of low-level students in the homogenous group increased their reading skills.

Conclusion and Recommendations

This study examined the effects of low-level students being placed in a heterogeneous group as compared to low-level students being placed in a homogeneous group while an identical curriculum was delivered to both groups. Pre-test and post-test scores indicated that a higher percentage of students in the heterogeneous group showed gains than those students in the homogeneous group showed gains. Results of this study were consistent with results from previous research which shows that low level students benefit from heterogeneous grouping, rather than homogeneous grouping, when an identical curriculum is delivered to both groups.

Even though this study clearly indicates advantages to low-level students placed in heterogeneous groups, questions still remain. This study used only a small percentage of all available low-level students in the school. Would results have been significantly different if a greater number of students were chosen as participants? Another possible flaw in this study is that sufficient time may not have been given to delivering reading instruction before testing the students a second time. Due to the time constraints of the completion of the university program, a period of only 4 weeks was given to delivering curriculum.

Another surprising result of the study was that some participants actually scored lower on the post-test than the pre-test. Possible explanations could be that the personalities in Group B were in conflict, which inhibited learning for some of the participants. Another possible explanation is the type of background these students have. Were they familiar with small-group work and what were their attitudes about participation? Participants' backgrounds were not investigated prior to this study.

This study strongly indicates no clear advantage of homogeneous grouping when curriculum is not modified. Still, today, homogeneous grouping, without curricula adjustments, is the norm for many elementary schools and classroom teachers. Are today's teachers not aware of the research performed on grouping strategies? Are teachers more comfortable with traditional methods and resistant to change? Are teachers not aware of how to modify curricula to meet the needs of students at all ability levels? One recommendation for teacher professional development is to expose teachers to results of the research and to teach them how to modify the curriculum, should they choose to continue to group by ability levels. Training on the use of technology for various ability groups would also be beneficial to teachers. Many software programs exist which aid in teaching reading skills. These could be used as a source for curriculum modification.

Further Considerations

As an extension of this project, various teaching methods identified in the literature review could be examined. For example, how would cooperative learning groups affect student achievement? How would flexible grouping compare to fixed-

ability groups? Any of these methods could easily be assembled into an extension of this study.

Another extension to this study may be to determine the effects on literacy skills when the curriculum is modified to address the needs of each group. This study did not allow for curriculum modifications. What would happen in different grouping strategies if a modified curriculum was delivered? The curriculum could be modified to focus on the very basic skills needed for the low-ability group while a different curriculum is used to challenge the high-level ability group.

Are there grouping strategy effects on the middle-level and high-level students? Only the low-level students were examined in this study even though the curriculum was delivered to all students. Another extension to this study would be to examine the pre-test and post-test scores of the middle-level and high-level students.

Another extension to this study would be to perform a longitudinal study of these students as they progress through the grades. Do *blackbirds* really remain *blackbirds?* What grouping strategies do they participate in as they move through higher grades?

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Appendix A

Definitions

Ability grouping – grouping arrangement of students based on academic assessments. Usually consists of 3 groups (low, medium, and high).

Cooperative learning – structured form of small-group work but each team member is assigned a specific role. It serves as an alternative to whole group instruction. It operates under four basic principles: positive interdependence, individual accountability, equal opportunity, and simultaneous interaction.

Deontological Ethics – ethics of duty and obligation. "Do unto others as you would have them do unto you."

Ecological Ethics – considers the relations between the researcher and participants. Must be sensitive to how the processes of giving information, reciprocity,

and collaboration are viewed by other participants. One must be democratic, equitable, liberating, and life enhancing.

Effect-size – describes the difference between 2 groups (heterogeneous versus homogeneous groups).

Flexible grouping – students move in and out of groups depending on what the lesson is and based upon their individual instructional needs.

Four Blocks method – language arts time of 2 ½ hours is divided among four blocks – Guided Reading, Self-Selected Reading, Writing, and Working With Words, each of which consists of 30-40 minutes.

Generalizability – the applicability of findings to settings and contexts different from the one in which they were obtained.

Heterogeneous grouping – whole classes of students of varying intellectual ability or within class groupings where 2-5 students of varying abilities learn together.

Homogeneous grouping – whole classes of students of similar intellectual ability or within class groupings where 2-5 students of similar intellectual ability learn together.

Joplin plan - students are grouped across grades into ability groups for reading but then return to their grade level for other studies.

Meta-analysis – technique used to combine and integrate findings of many studies.

Multi-age grouping – students of ages varying by as much as 3 years are taught in one group.

Relational Ethics - ethics that consider the working relationships of individuals. This includes working, talking, and debating together to help each person achieve individual and collective goals.

Reliability - the consistency with which our data measures what we are attempting to measure over time.

Small-group instruction – a class of students is taught in several small groups.

Validity – the degree to which scientific observations actually measure or record what they claim to measure.

Whole-class instruction – students are taught as a single, large group.

Within class grouping – a class of students is taught in several small groups.

XYZ grouping – students are assigned, based on test scores and school records, to high, middle, and low classes. All students receive the same basic curriculum.

Concrete Thinkers in an Abstract Class:

The Search for an Exercise to Improve Poetry Comprehension and Creation

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The University of Tennessee at Chattanooga

The Institutional Review Board of the University of Tennessee at Chattanooga (FWA00004149) has approved this research project 05-253.

Concrete Thinkers in an Abstract Class:
The Search for an Exercise to Improve Poetry Comprehension and Creation

Introduction to the Problem

On a damp fall afternoon, a dozen or so seniors in a struggling inner city school huddle over worksheets for their "strategic literacy" class. The students, identified by test-administrators as reading on a second-grade level, pore and pick through reading comprehension handouts culled from a commercially sold workbook. In reality, the fourth-grade sheets of five-paragraph pieces provide little more than practice in vocabulary, syntax, and immediate recall. This comprehension exercise offers little in the way of comprehension. Across town, 15 miles away in one of the system's overachieving magnet schools – a self-proclaimed college prep program where 95% of graduates enroll

in four-year universities – two dozen sophomores pore and pick through a multicultural novel, struggling to identify recurring themes and motifs "hidden" within. These two sets of students share little in common; indeed, their past performances and future plans run at polar ends. The students converge on a common problem, however, when the topic turns toward interpreting and creating abstract concepts. In short, many of today's high school students, regardless of socio-economic status and educational track record, struggle with the abstract side of language arts, unable to break concrete language down into deeper meaning. Nowhere is this truer than when classes turn to poetry.

Review of Literature

For the most part, identifying what is abstract and what is concrete is not that difficult: "jail cells" are concrete, for example, while "justice" is abstract. Still, researchers have published extensively, attempting to prove the existence of the two distinctly different domains in language, and have amassed volumes of data trying to define each type's characteristics. An admittedly over-simplified explanation posits anything that possesses physical characteristics into the concrete column, while anything lacking physical attributes resides in the abstract realm. One confusing wrench in the lexicon is a category incorporating words that cannot be easily labeled as abstract or concrete, but instead convey multiple meanings encompassing abstract and concrete characteristics as defined by context (Krug, Wiemer-Hastings, & Xu, 2001).

Equal amounts of paper have been sacrificed arguing over exactly *how* people differentiate between these types and *why*. Theories abound on this topic, from the straightforward – cataloguing lists of imagery associated with words to determine

categories – to the complex – connecting abstract concepts to experience-based knowledge to foster understanding (Boroditsky & Ramscar, 2002). Despite this wide range of research, academics generally agree that the two dichotomies do exist and that concrete entities pose few problems with definition and identification. Today's research largely focuses on abstract thought, moving the concept far beyond Piaget's clear-cut timeline for growing up. The dominant theories include (a) dual-coding, which rates words based on the number of images it evokes; (b) context availability, which measures how long it takes to link an abstract concept to a memory-based context; and (c) contextual constraint theory, which rates the abstractness of a word based on the kinds of context that define it (Krug, et al; 2001).

While all of this may indeed help categorize isolated words into convenient lists and may even help educators understand how and why students identify words and concepts as abstract and concrete, language does not occur within a vacuum. Rarely do classrooms employ lists of words in search of context. Rarely do teachers ask students to predict the categories of words. Instead, context is usually provided within texts themselves, within literature and poetry. Students are not asked to simply identify whether or not words and phrases are abstract. Rather, true comprehension hinges upon a reader's ability to find the abstract masquerading as the concrete in metaphor and irony, in symbolism and motif (Barsalu & Wiemer-Hastings, 2004). Models exist to teach students how to recognize that a jail cell is concrete and justice is abstract. How, then, do high school students learn to recognize when the jail cell stands for death or hell? How do students learn to recognize when the concrete becomes the abstract, and how do they

uncover what it represents? Can an in-class model help high school students identify and interpret the abstract concepts hiding within the concrete words of the language arts class?

The model this study promotes is built upon a platform with established planks of existing research: (a) the presupposition, as explored above, that there is a difference between abstract and concrete language; (b) the theory that multiliteracies such as visual and technological literacies exist as viable learning styles in today's classrooms; and (c) that reading comprehension hinges on the speed and skill with which students access prior knowledge, especially world knowledge.

At the moment, multiliteracy is a rather broad umbrella concept that pulls in a wide array of meanings, as well as an eclectic, cross-curriculum collection of devotees promoting social, cultural, visual, aural, media, print, and technological literacies as focused and intertwining pathways toward reading comprehension. "The notion of literacy needs to be reconceived as a plurality of literacies and *being* literate must be seen as anachronistic. As emerging technologies continue to impact on the social construction of these multiple literacies, *becoming* literate is the more apposite description" (Unsworth, 2001, p. 10).

Within this multimodal category, visual literacy has grown in popularity and acceptance among educators. It can be slippery to define and lends itself to a deep swath of interpretations, applications, and disciplines, but, in short, visual literacy is the learned ability to transform information into graphics and pictures in order to help communication; it is an organizational exercise in "promoting understanding, retention,

and recall of academic concepts" (Stokes, 2001, p. 4). In fact, Unsworth contends reading has always been multimodal in general, visual in particular, thanks to a history of different typefaces, font sizes, and page layouts in printed texts. Not far behind in popularity, publishing, and theory is the multiliteracy concept of technological literacy – the introduction of computers and related technology as vehicles toward comprehension. This practice, according to McLoughlin and Krakowski, goes hand-in-mouse with its more established cousin, visual literacy. Both, the authors contend, are natural extensions of what students experience outside the classroom on a daily, if not hourly, basis – the marriage of technology and visuals to create multimedia saturation through television, the Internet, video games, and even cell phones. So why not, the theory advances, take how students learn outside of school and incorporate it into classroom instruction? "Multimedia tools enable the learner to experience, observe and participate in activities which would otherwise be out of reach or not possible in formal learning contexts" (McLoughlin & Krakowski, 2001, p. 4-5).

To advance the idea further, the creation of classrooms that cater to multimedia literacies have the potential to promote and bolster a venerable cornerstone or comprehension – prior knowledge. Specifically, what is important to the application of this abstract-to-concrete model is a student's ability to recall and employ domain knowledge to "understand principle, increase fluency, broaden vocabulary, and enable deeper comprehension" (Hirsch, 2003, p. 12). A deep store of prior domain knowledge, not just volumes of vocabulary samples and definitions, is what truly separates expert readers and struggling novices. Hirsch contends this established prior knowledge

storehouse frees up working memory during reading, allowing readers to quickly and precisely make “connections between the new material and previously learned information, to draw inferences, and to ponder implications” (2003, p. 13). In fact, Hirsch suggests many, if not most, comprehension problems spring from a reader’s inability to fill in contextual and subtextual blanks in understanding with prior-knowledge connections. It sounds simple enough, but a growing problem educators face today is a student population with an undefined, untapped, and widely diverse plane of prior knowledge. Simply put, the teachings and the texts do not coalesce with the prior knowledge of the students. Most likely, it is not that students do not possess adequate prior knowledge, but that teachers have not adequately recognized and exploited an elusive and very different store of student domain knowledge. “They” do not know what “we” know; “we” have not experienced what “they” have.

How, exactly, is all of this related? What does multiliteracy theory have to do with prior knowledge and how do both theories apply to abstract comprehension? Established research shows that a clear distinction exists between abstract concepts and concrete language. Published research also shows that multiliteracies do exist among students and that visual and technological literacies may combine to create multimedia literacy. Finally, research shows that prior knowledge is essential to reading comprehension and recognition of abstract elements. This study, then, hopes to employ a model of multimedia literacies in order to tap into students’ existing stores of prior domain knowledge to advance abstract comprehension.

Data Collection and Results

Method

Participants

The study included two classes of high school sophomores, 56 students, comprised of 15- and 16-year-old males and females representing a diverse range of socioeconomic backgrounds, ethnic cultures, academic histories, and learning styles.

Materials

This model used graphic organizers – primarily charts, creative webs, and blank storyboards – different selections of classic and abstract art, examples of various styles of poetry, access to computers with disc burners, PowerPoint software, storage discs, and flash drives. Although it was neither the ideal situation nor the original plan, students worked in groups to create a PowerPoint slide show, due to a lack of available technology.

Procedure

The first goal of this model is to provide students with a method and means to access prior knowledge in interpreting abstract concepts. It provided structure and instruction to help students fit these concepts into workable connecting units of action, image, sound, and connection. After triggering prior domain knowledge, this model then allowed students to explore and interpret the abstract through multimedia literacy; participants took those connecting units and applied them to a PowerPoint slide show. The idea was to identify and create abstract meaning for bravery, betrayal, or ambition interpret it through individual connections, and drive it through multimedia literacy. But

what form should it take? What structure and size would be workable without overwhelming students and overshadowing the primary concept?

There is no better place to test this model than in the study of poetry – the very embodiment of the concrete made abstract. In poetry, the concrete world melts into ethereal abstractness. Concrete minds tend to view poetry as limiting and confusing, confined by restrictive structures and confusing contexts; abstract thinkers, on the other hand, see poetry as a way of freeing the concrete world from its physical confines, of letting metaphor, imagery, symbolism, and personification drive the meaning of the text.

Through this model, manifested as a one-week unit, students practiced through graphic organizers (see Appendices A, B, C) before ultimately combining all of the elements into one PowerPoint poem. The computer work allowed students to show how all of the basic concrete elements, action, image, sound, and connections, combined to form abstract ideas. In short, using PowerPoint showed students that words are not confined to two-dimensional ink and paper, but, instead, words can equal action, sound, image, and connections; concrete can equal abstract.

The week began with students building descriptive word banks in response to different images and paintings: Rene Magrite's *Treason of Images*, Picasso's series of Olga paintings and *Seated Bather*, and Brueghel's *The Kermess*. The goal was to have students practice writing descriptions and observations about subjects with ambiguous meanings before honing the word lists into more vivid selections. The students then moved toward assigning more abstract language to the images, thereby creating their own interpretations of symbol and metaphor. Students created word banks – simple and

descriptive at first before moving towards abstract assignments. This process was then repeated with poetry samples such as Emily Dickinson's hummingbird poems and e.e. cummings' shape poems. The model originally called for repeating the process of graphic organizers and prior knowledge word banks with sound and action, music and movement. However, time constraints and limited access to a computer lab trimmed the original model down to focus solely on images and words, paintings and poetry. The students were still challenged, however, to weave connections to sound, movement, and sensation.

The ultimate idea was to move students from simple observations into complex interpretation. The model, in essence, works in reverse; Give students sets of concrete images, sounds, actions, and have them assign abstract qualities before using concrete language to represent abstract concepts. In a final exercise, students chose an abstract idea drawn from the context of previous lessons, and presented it as a PowerPoint slideshow, complete with images, action (animation), and sound. Students in this class had just finished a unit on Shakespeare's *Julius Caesar*, so the abstract concept each group chose revolved around recurring abstract themes from the play – ambition, betrayal, duty, loyalty, or superstition.

Results

Prior to the 1-week unit, students were given a pre-test and qualitative survey (see Appendix D) to assess prior knowledge, comprehension, and attitudes toward poetry. The test was given more than 1 week prior to the unit and was administered with little explanation in the hopes of encouraging student honesty in this qualitative survey.

Assessment for the model consisted of the PowerPoint presentation, and students' progress was gauged through a post-test qualitative survey (see Appendix E). All student work was kept in a secure location and remained completely confidential and anonymous. Student consent and parental assent forms were required for participation. Only the primary research agent and cooperating teacher had access to student work. Resources needed to test this model included access to PowerPoint software and two dozen computers with either CD burners or flash drive ports.

The test was divided into a multiple choice section that gauged attitude, interest, prior knowledge, and personal concepts of poetry, before closing with an explication assignment for a poem that lacked background information or specific directions. The multiple choice questions followed the descending pattern of choices on a Likert scale from "a" to "d," with "a" representing extremely favorable, "b" representing somewhat favorable, "c" representing neither favorable nor unfavorable, and "d" representing unfavorable (see Figure 1).

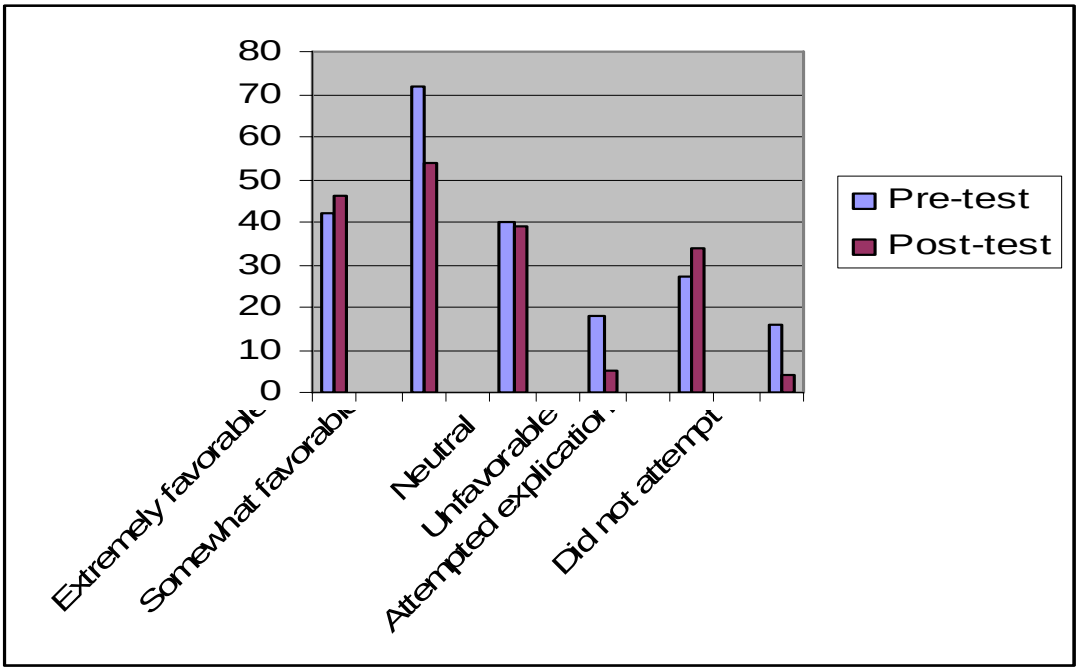

Figure 1. The bar graph charts the results of the pre- and post-tests, revealing a dip in unfavorable attitudes toward poetry and a rise in attempts to explicate a sample poem following the abstract poetry unit. Analysis of the test depended on translating the survey into a Likert scale.

Only 43 of 54 students returned the pre-test, and, of that number, 16 left the poetry explication requirement blank. Of the four core multiple choice questions designed to gauge students' interest in poetry (172 possible responses), there were 42 extremely favorable responses, 72 somewhat favorable response, 40 neutral responses (neither favorable nor unfavorable), and 18 unfavorable responses. Many students left blank a question asking them to cite their favorite poet, but, of those that did respond, Maya Angelou scored the most votes with five. Others to garner votes were Shel Silverstein, Robert Frost, and a handful of popular songwriters.

Overall, the pre-test revealed that students entered the week of poetry study with a generally favorable concept of reading and writing poetry (114 extremely or somewhat favorable out of 172 possible; 58 neutral or unfavorable). However, despite the favorable responses, many students still did not attempt the poetry explication or could not name a favorite poet.

A post-test was administered to two classes of 27 sophomores to gauge changes in interests, attitudes, and interpretation of poetry as well as advances in explication. It was administered immediately following the 1-week multimedia poetry unit. The test was almost an exact copy of the pre-test in hopes of ruling out changes in questions and construction as an influence on responses. The one major change was the replacement of the poem to be explicated. Using the exact same poem for both tests would have had students working from a point of recall and memory rather than interpretation during the explication.

Fewer students submitted the post-test – 38 out of a possible 54. Of that number, however, only four students did not attempt the poetry explication. Of the four core multiple choice questions designed to gauge students' interest in poetry (144 possible responses), there were 46 extremely favorable responses, 54 somewhat favorable, 39 neutral (neither favorable nor unfavorable), and just 5 unfavorable.

Overall, 100 responses out of the possible 144 were either extremely or somewhat favorable, leaving 44 responses as neutral or unfavorable. Although fewer students responded to the test, the post-test did show a dramatic decline in unfavorable responses and a jump in attempts to explicate the poem.

Conclusions and Recommendations

Traditional educators may balk at the use of slideshow software to teach poetry and abstract imagery, but PowerPoint is a vehicle in this model, not a destination. The idea was to tap into multimedia literacies, so different software that incorporates movies, photos, and animation could work just as well. PowerPoint was selected simply because it allowed students to incorporate their connections to images, sound, and action, and it is widely taught and available at many area schools.

While technology is an integral part of this model, it also proved to be the hardest part to move from concept to application. While students in this project had been trained in PowerPoint and were computer literate, the school's computer lab proved completely inadequate. The computers ran the gamut from old and slow to new and fast, but few were networked together and fewer still were compatible in any way. None had disc burners, a few had USB access, but most depended on floppy disks. In short, it was almost impossible to move information from one computer to another. Students were unable to save directly to the computer due to nightly purging, and attempting to access a previous day's work became frustrating. Also, there were not enough computers to allow students to work individually, so students had to create slideshows in groups. Worst of all, more than half a day was lost when a fuse blew and a bank of 10 computers went down.

Students responded enthusiastically to in-class work on graphic organizers and word banks. They also seemed quite interested in delving deeper into abstract ideas through art, and the post-test analysis showed a shift from negative to positive in attitudes

about writing and reading poetry. In qualitative reflections, students responded positively to the overall idea of the model, but almost universally hated the group work aspect. In the future, individual work would be the ideal approach to this.

Also, in my opinion, the graphic organizers were overdone. One exercise would have been enough for the process, and another representation of prior knowledge needs to be found. The work within student portfolios showed that students grasped the idea of graphic organizers, and that the webs and charts were effective at tapping into prior knowledge connections. However, few students did a thorough job on both web and chart. One form of graphic organizer would be enough for future applications. Another process for making connections needs to be found to supplement this model.

Any professional development for teaching this model would include training in appropriate technology, in the use of graphic organizers such as webs, and in the concept of multiple literacies. However, the importance of multiliteracies and prior knowledge is growing in acceptance and popularity among educators, and the problem of abstract interpretation crosses content boundaries, from language arts to social sciences, natural sciences to mathematics. This model is not bound to English class, not confined simply by poetry. Again, these are vehicles toward abstract thought, not destinations. Although the model certainly needs tweaking and refining, it appears sound in theory and should be capable of duplication.

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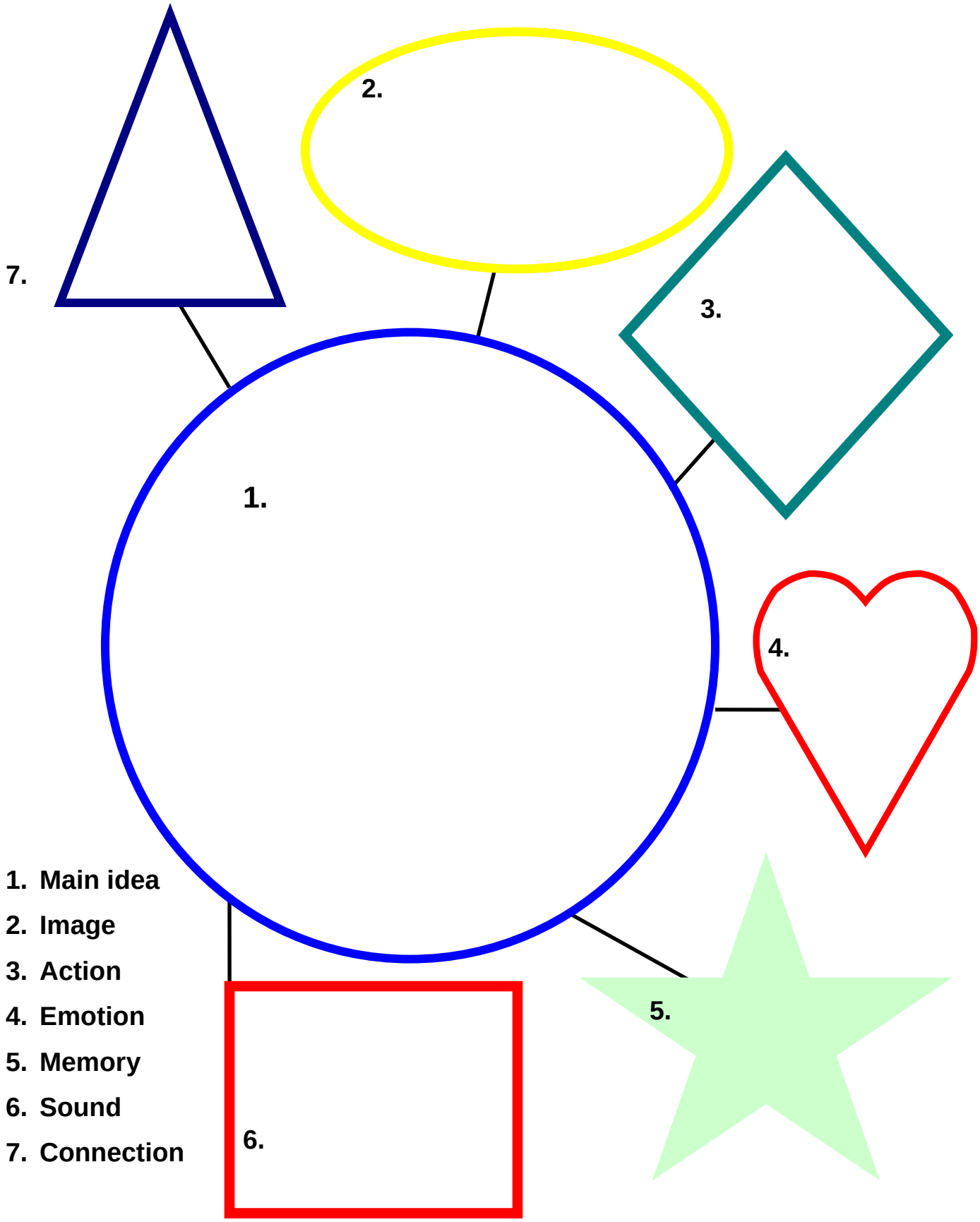
Appendix A. Creative Word Web.

Creative Word Web was used to access prior knowledge to make connections and interpret abstract concepts. The abstract theme would go in the center circle, and students follow the key to fill in connections.



1. Main idea
2. Image
3. Action
4. Emotion
5. Memory
6. Sound
7. Connection

Appendix B. Connections Chart.

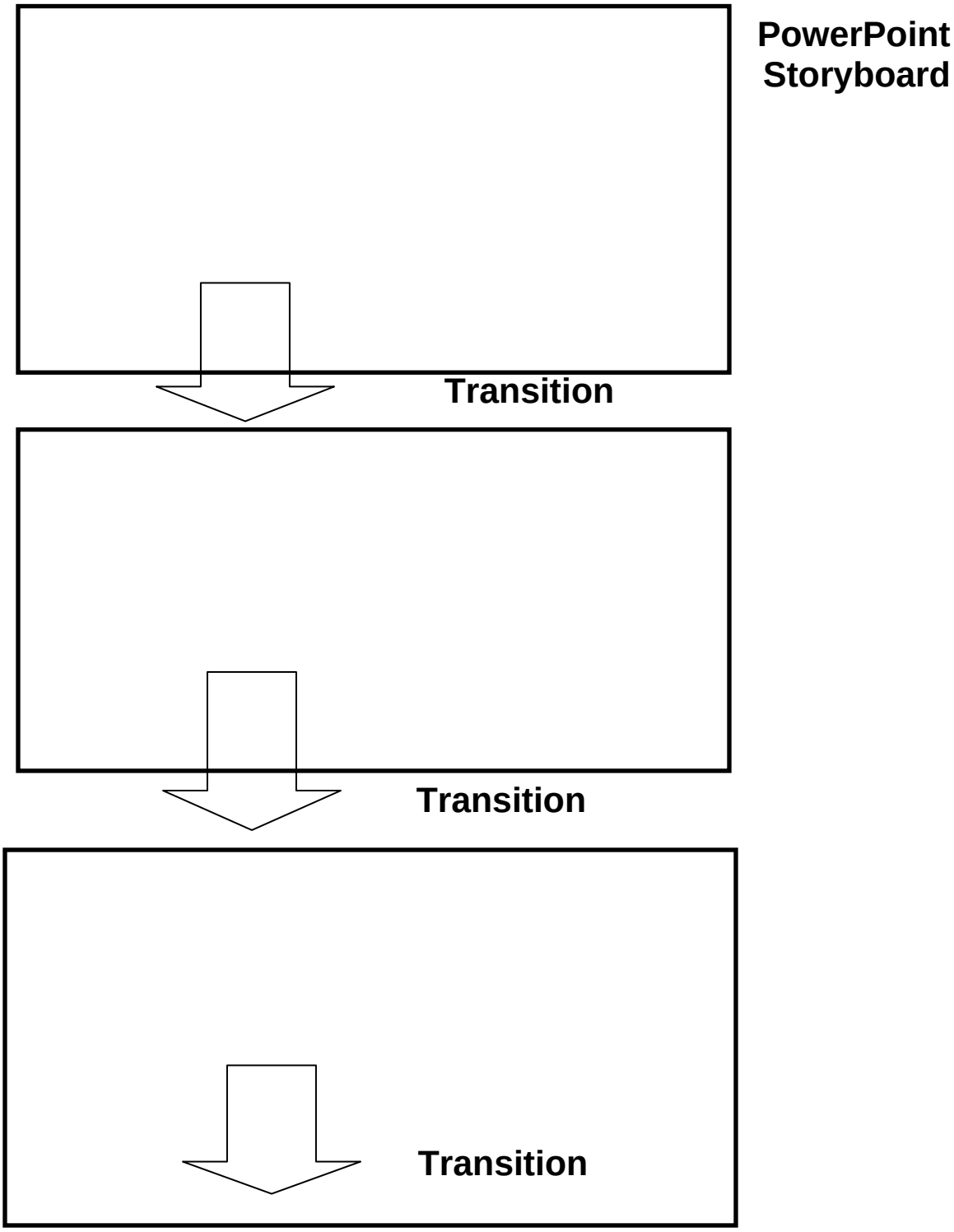
Connections Chart was a second graphic organizer used to make connections to abstract ideas.

TOPIC:

	Noun	Verb	Adjective
image			
sound			
feeling			
action			
memory			
connection			

Appendix C. Power Point Storyboard.

Before students could create their PowerPoint slideshow, the first had to fill in this storyboard graphic organizer to show that they used their connections and had specific reasons for choosing specific art, sound, animation, etc.



Appendix D. Pre-test.

The pre-test was designed to gauge student interest, attitude, and prior knowledge regarding poetry.

Pre-Test

Select the answer that best represents your opinion.

1) For me, studying poetry in class is:

a) An interesting way to stretch my creativity _____

b) Challenging but likeable _____

c) Usually a struggle _____

d) A fate worse than death _____

2) Which statement best describes how you feel about poetry:

a) I really enjoy reading and writing poetry _____

b) Poetry is OK, but not my favorite thing _____

c) I can take it or leave it _____

d) I'd rather have a root canal _____

3) When I read poetry, I:

a) Usually understand what the poet means _____

b) Occasionally have problems understanding _____

c) Sometimes get it, but usually do not _____

d) Am always clueless _____

4) When I write poetry:

a) It helps show what I'm feeling _____

b) I'd like to write more, but don't know how _____

c) It's usually because the teacher made me _____

d) It's a cold day in July _____

5) My favorite poet(s):

a) The Romantics _____

b) The Victorians _____

c) The Beats _____

d) Kurt Cobain _____

e) The Black-eyed Peas _____

e) Other _____

6) Poetry can involve the following (check all that apply):

a) Pencils _____

b) Paper _____

c) Computers _____

d) Artwork _____

e) Music _____

7) Briefly explain what you believe the author is saying in this poem:

Exultation is in the going
Of an inland soul to sea,
Past the houses – past the headlands –
Into deep Eternity

Bred as we, among the mountains,
Can the sailor understand
The divine intoxication

Of the first league out from land?

(Emily Dickinson)

Appendix E. Post-test.

The post-test mirrored the pre-test in form and content, and was designed to gauge student interest, attitude, and prior knowledge following the abstract poetry unit.

Post Test

Select the answer that best represents your opinion.

1) For me, studying poetry in class is:

a) An interesting way to stretch my creativity _____

b) Challenging but likeable _____

c) Usually a struggle _____

d) A fate worse than death _____

2) Which statement best describes how you feel about poetry:

a) I really enjoy reading and writing poetry _____

b) Poetry is OK, but not my favorite thing _____

c) I can take it or leave it _____

d) I'd rather have a root canal _____

3) When I read poetry, I:

a) Usually understand what the poet means _____

b) Occasionally have problems understanding _____

c) Sometimes get it, but usually do not _____

d) Am always clueless _____

4) When I write poetry:

a) It helps show what I'm feeling _____

b) I'd like to write more, but don't know how _____

c) It's usually because the teacher made me _____

d) It's a cold day in July _____

5) My favorite poet(s):

a) The Romantics _____

b) The Victorians _____

c) The Beats _____

d) Kurt Cobain _____

e) The Black-eyed Peas _____

e) Other _____

6) Poetry can involve the following (check all that apply):

a) Pencils _____

b) Paper _____

c) Computers _____

d) Artwork _____

e) Music _____

7) Briefly explain what you believe the author is saying in this poem:

Tell all the Truth but tell it slant –
Success in Circuit lies
Too bright for our infirm Delight
The Truth's superb surprise
As Lightning to the Children eased

With explanation kind
The Truth must dazzle gradually
Or every man be blind
(Emily Dickinson)

Evaluation of a Pre-Test and Post-Test

For a Nocturnal Animals Unit

Melanie Oliver

EDUC 590

Dr. McAllister

December 3, 2005

The Institutional Review Board of the University of Tennessee at Chattanooga (FWA00004149) has approved this research project 05-227.

Introduction

The purpose of this project was to develop student knowledge about nocturnal animals. Students were given a pre-test prior to instruction and a post-test following instruction. This topic was assigned to the researcher during the first 8-week placement of student teaching. The unit of study was designed for a public kindergarten class in a suburban setting.

Review of Literature

Today's classrooms are filled with diverse learners who possess different characteristics. As student populations have become more diverse, the ability to teach to the needs of diverse learners has become increasingly important (Haar, Hall, Schoepp, & Smith, 2002). Effective teachers should recognize the individual needs of their students and make the necessary modifications to meet those needs (Ostoits, 1999).

Many state and national standards now require that students be engaged in learning (Searson & Dunn, 2002). Accommodating different learning styles is one way to engage learners and increase student achievement (Searson & Dunn, 2002). Students who are actively engaged learn better and faster than students who are not engaged (Martin & Potter, 1998).

An individual's learning style is the way he or she processes, internalizes, and concentrates on new material (Martin & Potter, 1998). Students learn when they receive

information in the same way that they process information (Martin & Potter, 1998). Teaching to learning styles can increase academic achievement and improve student attitudes about learning (Green, 1999). Research has shown that test scores increase when teachers accommodate different learning styles (Shaughnessy, 1998).

According to Dunn (as cited in Green, 1999), there are three main learning styles. The auditory learner learns by hearing. Listening to stories is an effective learning method for the auditory learner. The visual learner thinks in pictures or words. Often the visual learner experiences difficulties with spelling and reading because the letters do not represent pictures (Bisson, 2002). Finally, the kinesthetic learner uses the whole-body approach to learning. The tactile way of learning is part of the kinesthetic learning style. Hands-on activities are effective for the tactile learner. Dunn (as cited in Green, 1999) contends that learning styles are developed through biology and experiences.

There are different assessments available to identify learning styles. The Learning Style Inventory is one instrument that is used to identify learning styles. The test was developed for students in grades 3-12. The assessment includes 100 questions that relate to the students' environmental, emotional, physiological, and psychological preferences (Searson & Dunn, 2001).

Data Collection and Results

Currently there is no instrument available to identify learning styles in very young children. The researcher conducted the study to determine if the post-test scores would improve with learning-style approaches as research has shown with older children.

There are different ways to teach about nocturnal animals. This unit was developed to accommodate visual learners, auditory learners, and kinesthetic/tactile learners. A nocturnal animals unit was designed to introduce one nocturnal animal per day for 5 days. Each lesson was planned to accommodate each learning style.

Literature and informational texts were selected to benefit the auditory and visual learners. Bisson (2002) suggests that the auditory learner does best when listening or speaking. For every nocturnal animal that was introduced, a fiction book and, a non-fiction book were read to the students. Reading aloud helps build a foundation for later reading success (Wood & Salvetti, 2001). Furthermore, hands-on activities were available each day to benefit the kinesthetic/tactile learner.

On the first day, students were asked to define nocturnal. The children were unable to define the word. The researcher explained that nocturnal animals hunt for food at night and a song was introduced to reinforce the definition. The researcher also pointed out that the sleeping habits of dogs, cows, and pigs are different from those of nocturnal animals.

Owls were discussed on the first day. The researcher presented an owl replica to the class and students correctly identified the animal. The labeled replica was used to introduce the parts of an owl. The students learned the location of the facial disks, talons, and ear tufts. Next, a poem about owls was presented to the students. *Owl Babies*, by Martin Waddell (1996), and *Owls*, by Gail Gibbons (2005) were read to the students on this particular day.

Owls, by Gail Gibbons, included information about an owl's diet. The students were placed in groups. Each group dissected and observed an owl pellet. Next, students drew

pictures of animals that are eaten by owls. The lesson concluded with a review. Each student was asked to name a characteristic of owls. Finally, students were asked: When do owls hunt for food? What does nocturnal mean? How do owls help our environment?

The students were given pre-cut, construction paper, owl parts and they were instructed to create their own owl based on the knowledge that they had obtained during the lesson. Students were evaluated by their drawings and by their completed owls.

Day 2 of the unit explored opossums. To introduce the lesson, the researcher allowed students to perform a scent test. Containers of fragrant items were placed on the tables and the students were allowed to identify the items. After completing the scent test, the students compared their findings with each other. Students were asked how they determined the items that were in the containers. The students unanimously agreed that they used their sense of smell to determine the source of the scents. Then, they were informed that they would discuss a nocturnal animal that depends on its strong sense of smell to hunt for food.

The researcher displayed a model opossum and asked the students to identify it. However, only one student correctly identified the opossum. Pictures of opossums were displayed to aid the visual learners. *Possum Baby* (Freschet, 1978) and *Possum's Harvest Moon* (Hunter, 1998) were read to accommodate the auditory learners. Because opossums are marsupials, the students created pouches and baby opossums out of art supplies. These activities were developed with the kinesthetic/tactile learner in mind. The lesson was assessed by the researcher listening to the discussion among the students

when they were asked the following questions: What is a marsupial? What is a characteristic of a marsupial? What sense does an opossum use to hunt for food?

The third lesson in this unit of study examined bats. Students were asked to share their knowledge about bats with the class. The researcher introduced a song about bats that included movements. Photographs of bats were shown to the class and *Amazing Bats* (Simon, 2005) was read to the students. Next, the researcher asked the students if bats are birds. Some students claimed that bats are indeed birds. After *Stellaluna* (Cannon, 1993) was read, the class unanimously agreed that bats are not birds. The class completed a Venn diagram that showed the similarities and differences of bats and birds. The students completed a bat fact booklet that was used as an assessment. The students used invented spelling to write facts about bats. At the conclusion of the lesson, students were asked the following questions: How do bats help the environment? How are bats similar to birds? How are bats different from birds?

The fourth lesson explored spiders. During this lesson, pictures of spiders were shown to the class. *Spiders Are Not Insects* (Fowler, 1996) was read to the students and the researcher discussed the differences between spiders and insects. Students examined pictures and were able to determine that insects have six legs while spiders have eight legs. The researcher also explained that spiders are part of a group called arachnids. *The Very Busy Spider* (Carle, 1990) was also read to the students. The students were given a photocopied spider web, a construction paper circle, and small rectangles. They were instructed to glue the spider onto the web and place the correct number of legs on the spiders. All students correctly completed this activity. At the end of the lesson, the

students were asked the following questions: How do spiders help the environment? What are the differences between spiders and insects?

Raccoons were discussed on the fifth, and final, day of the unit. The researcher showed the students a model raccoon and all of the students were able to identify the animal. *Raccoons* (Fowler, 2000) was the informational text that was shared on that particular day. The researcher also read *Raccoons and Ripe Corn* (Arnosky, 1991) to the students. After reading the story, the researcher explained that raccoons often invade cornfields in search of food. Students were then asked to name foods that are made from corn. Their answers included corn and popcorn.

Students sampled different foods that are made from corn. They sampled corn chips, Corn Chex cereal, and popcorn. Each student was asked to select his/her favorite food made from corn and the results were graphed on chart paper. The class favorite was the corn chips. Next, the students created paper plate raccoons.

Data was collected prior to teaching the unit on nocturnal animals. The oral pre-test was administered by the researcher to determine how much the students knew about nocturnal animals. The test was administered to 20 students-10 boys and 10 girls. The students received no assistance during the evaluation. The pre-test and post-test contained pictures because the kindergarten students were unable to read and write proficiently (see Appendix A). Eight responses were counted for question 1, and one response was counted for each question 2 through 4.

The pre-test results showed that the students had not acquired a wealth of knowledge about nocturnal animals before the unit was introduced to them. Figure 1 shows the pre-

test and post-test scores for each student. The mean score was 50.95. However, the results of the pre-test did not change the teaching strategies that were used to teach the unit.

The oral post-test was administered by the researcher at the conclusion of the 5-day unit. The post-test findings showed the mean improvement of the students was 34.65. Again, the test was given orally and the students received no assistance. The post-test results showed that the mean score increased to 85.6. Based on the results of the post-test, the strategies that were used to teach the unit were successful. The researcher feels that accommodating different learning styles contributed to the success of the unit. Each student increased his or her score on the post-test, with the exception of one student, and his score was unchanged.

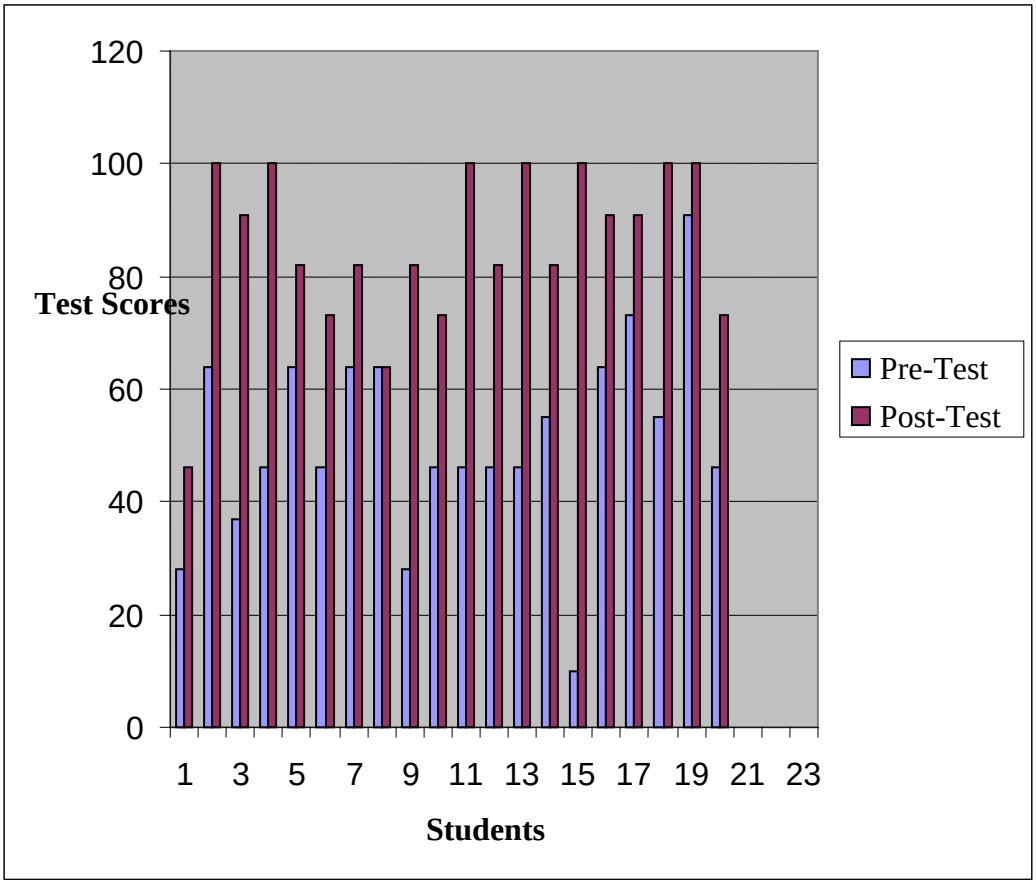


Figure 1. Pre-test post-test scores.

Conclusions and Recmmendations

The evaluation of the pre-test and post-test of the nocturnal animals unit showed that the students' knowledge about nocturnal animals improved. The pre-test showed that students did not have a great deal of knowledge about the subject. Following instruction of the nocturnal animals unit, the knowledge about nocturnal animals was improved.

The strategies used to accommodate different learning styles proved to be effective. These strategies could be taught in a professional development session. However, improvements can also be made. The researcher could develop lessons that are geared

toward multiple intelligences. Furthermore, test development skills could be improved through professional development sessions and through the available resources.

Technology is one way to meet the needs of diverse learners. The National Science Foundation awards grants to school districts in the areas of science, mathematics, and technology. Grants are awarded by the National Science Foundation to increase understanding and engagement in science, mathematics, and technology. Project MaSS is a program in Hamilton County that has been funded by the National Science Foundation to improve the quality of mathematics and science instruction.

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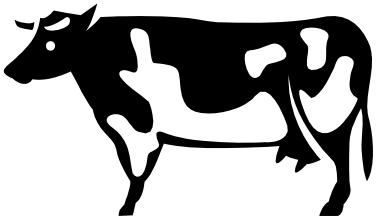
Appendix A

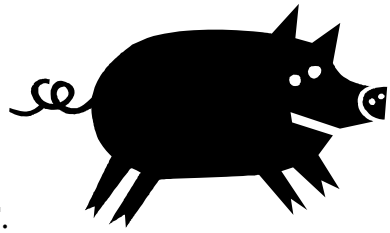
PRE-TEST/POST-TEST

1. When I point to the animal tell me if it sleeps during the day or at night.

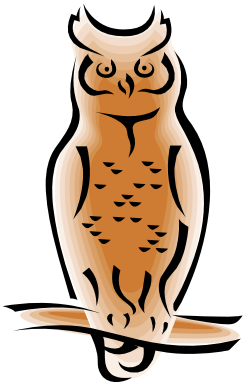
A. 

E. 

B. 

F. 

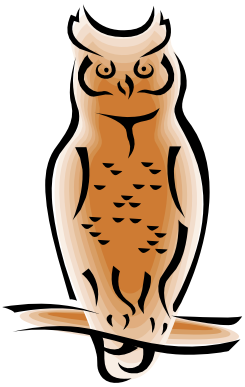
C. 

G. 

D.

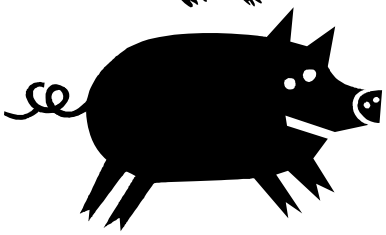
H.

2. Point to the animal below that is a marsupial.



3. Point to the picture below that shows where a baby marsupial lives.

4. Point to the animal below that is nocturnal.



The Effects of Journaling on Communicating

About and Understanding Visual Art

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The Institutional Review Board to the University of Tennessee at Chattanooga (FWA00004149) has approved this research project 05-223.

The Effects of Journaling on Communicating About and Understanding Visual Art

Introduction to the Problem

I believe that students need to be challenged to read and write more because it has been shown that they are lacking in those basic skills. This is evident by looking at much of the national educational legislation that has been passed in recent years. If students are lacking in basic skills, it only makes sense that they are lacking in more complex skills, as well. Critical thinking is one of those higher-order, complex skills. It is my strong belief that students need to have greater challenges in critical thinking, as well as in verbal and written communication skills, and that a visual arts classroom is an ideal

forum to hone these skills. I chose this area of study because I have seen, first-hand, how difficult it is for students to critically discuss (whether through writing or discussion) artwork in a visual arts classroom. In order for students to become more adept at written and verbal communication, it is important for them to be given relevant instruction in the language/vocabulary of the subject area, as well as factual information in said area. It is my belief, that if students are presented with all of these necessary components, and provided with a means in which to organize these components, they will become stronger communicators about those components. These skills are congruent with many of the educational standards for a visual arts curriculum, in particular with the Tennessee State Visual Arts Curriculum Standards, which are applicable to me as a soon-to-be licensed teacher in the state of Tennessee (Tennessee Department of Education, n.d.).

Review of Literature

My background research indicates that there have been a number of studies done regarding the use of journaling as a means of improving a variety of skills in the classroom, in various subject areas. The area in which this study focused upon is the use of journaling to enhance communication skills and comprehension of art in the visual arts classroom. In this study, "communication" refers to written and oral performance. "Comprehension" refers to the retention and synthesis of information, including

biographical facts regarding artists, art history, specific works, art processes, and inferred criticism based on direct observations and applied knowledge.

A notable author in the field of arts education once stated, "[that] there is a way in which the visual arts express meaning that is different from other modes of representation" (Ehrenworth, 2003, p. 44). Ehrenworth goes on to explain that a piece of art not only represents a figure or an event, but also the feelings that the creator of the work had about the subject that is represented (Ehrenworth, 2003). With this in mind, it makes sense that it is important to approach education in the visual arts in a variety of ways. If a teacher simply chooses to provide factual data about artworks to students, it would seem that students would have difficulty understanding the works. This is especially problematic when taking into consideration the notion that in many cases, the artist and time period is unknown. The subject matter and historical connections can be rather subjective and the facts are often no more than debatable conjecture, leaving interpretation solely up to the viewer. Hence, it is important to give students a means to take the information that they have been given, and create their own meaning of it. A combination of two simple skills that can be used in the classroom, which I believe can help students formulate meaning and enhance comprehension, are writing about and discussing artists and their works.

Talking about art is a relatively new facet of art curriculum (which traditionally focused on production) that can better facilitate learning the essential curricular components of visual art such as aesthetics, art criticism, and art history (Cotner, 2001).

Cotner's study, as well as a study by Brandon, Desmond, and Koroscik (1985), focuses on the importance of verbal communication about art. In an article about a writing workshop in which she used visual images to aid in expanding student's creativity in their writing, Ehrenworth said that, "sometimes [children] can articulate what they see in a visual image more than...in a written text" (Ehrenworth, 2003, p. 44). Stout, who has done extensive research on the importance of writing in the classroom, used these words to summarize other notable authors: "Writing progresses as an act of discovery; no other thinking process helps us so completely develop a line of inquiry or mode of thought" (Stout, 1993, p. 36).

I feel that communication about art can become richer, through the use of reflective writing in the form of personal journaling. According to research regarding art criticism, "...*writing* responses in art criticism provides students with greater depth in learning, allowing students to refine their verbal and perceptual abilities" (Cooper & Johnson, 1994, p. 22). Stout (1993) recognizes the historical importance of writing in the lives of visual artists, the most famous examples of which are Leonardo DaVinci's notebooks. She sees a natural connection between writing and an arts curriculum. However, Stout cautions that, although journaling can be a viable means for art students to develop their critical thinking skills, it is important for art teachers to provide focus for the student writing, as opposed to allowing the students to practice freeform writing. It is also important to keep in mind that, just because the students write about what they are seeing or learning, does not mean that they will automatically develop greater metacognition, and that the students need help via teacher modeling (Stout, 1993).

Wales (1998) experimented with incorporating more writing in his art curriculum, using "artist's notebooks" to help dispel any student misconceptions regarding separatism among disciplines and to promote better planning and organization of thoughts amongst his students. A writing teacher in Pennsylvania used journaling and viewing artworks as a way for students to write poetry, and to connect to the art on a more personal interpretive level (Bates, 1993).

In an action research project that dealt with journaling as a means to have a deeper understanding of art, research indicated that students, on average, were able to retain concepts and vocabulary, and were more willing to discuss their art with parents and with others (Todorovich, 2002). Based upon these findings, the following research question was developed: Will examining a piece of work, and formulating their thoughts about it in writing, enable students to retain more information about the work and/or the artist? In addition to answering this question, the following are possible beneficial outcomes of the proposed process:

1. If students are provided with guiding questions and topics, their overall written communication abilities might improve.
2. If students are generally shy in group discussions, the journaling could help enable them to become more vocal in class, perhaps with improved oral communication skills.

I expect that the specified-format journaling will help students to examine a given work more fully, so that their input in discussions and writings will be more relevant and in-

depth, and possibly even enable them to comprehend more relevant information regarding a given work or artist.

My research experiment attempts to not only improve the quality of students' analysis and criticism of other visual art, but enable them to look more critically at their own work, as well. What I propose to find is a qualitative difference in the way that students view a piece of art, and are able to communicate about that piece. If they are creating a piece of work in an attempt to self-express, they need to be able to understand it, and discuss it. My hope is that students will be able to look closely at various works of art and ask themselves questions that will engage them enough to want to investigate it more fully, and formulate their own criticism about the work. In order to help students accomplish these goals, I will provide a format which can be followed to guide student writing, prior to class discussion. Beyond the educational goals, I believe that understanding art can breed self-awareness, which could, in turn, bring about/promote self-confidence, self-motivation, a greater understanding of/acceptance of others, and even a desire to promote positive social change.

Data Collection and Results

Subjects

I conducted my research in a secondary art classroom in a Hamilton County private high school where I was placed as a student teacher in my graduate M.Ed. studies. The students who participated in the study were in different grades (11th and 12th grades)

due to the “elective” nature of the art course. The groups were two Art II classes, meaning that the members had at least some initial/prior exposure to art at the elementary school, middle school, and/or early high-school level, with a required Art I prerequisite class in 10th grade at this school. Each class was comprised of 10 students (20 total students), all of whom were willing participants in the study. The classroom populations were comprised of a higher ratio of girls to boys (7:3 in both classes), with relatively diverse socioeconomic backgrounds, though most were from middle to upper middle class families. Nineteen of the 20 students happened to be Caucasian, with 1 foreign exchange student from a South American country, whose first language is Spanish. The two classes played a separate role in the study, neither knowing that one was being treated differently than the other, with one as the control group, and one as the treatment group.

Materials

Each participant required access to a pen or pencil, and a teacher-made journal format sheet (see Appendix A), both of which were provided for them. I used reproductions of various artworks, some of which were larger-format that my cooperating teacher owned, and some of which I photocopied and printed from books, educational magazines, or the Internet, for students to examine. In several cases, I showed the students the more clearly-represented photographic reproductions that were in reference books, in addition to the individual copies. I used a dry-erase board to write down information for the students to view during the discussion sessions. The other two

instruments used were ones that I created (see Appendices B & C), which I provided for the students. I used large envelopes and folders as my portable data storage.

Variables/Obstacles

The curriculum had to allow for discussion of a piece at the beginning of every class period to keep the students in a routine and in order to keep data consistent. The main risk was that students would be upset, or potentially bored, by the fact that they had to write in an art class. There was also the risk of discomfort/anxiety associated with class discussion, which was strongly encouraged (possibly via a pre-imposed participation grade), but it was voluntary participation, so they could have avoided speaking, if they wished. I did hear some grumbling and complaining, but it had mainly to do with the writing. My estimation is that some students were bored with it, and would have rather gone straight to our production activity. It is important to note that one class can be different from the next, just based upon social groupings and time of class period, but each class was kept on the same schedule/pace and curriculum, in order to keep the data as consistent as possible.

Procedures

The initial type of data that was used was an anonymous questionnaire regarding personal confidence and enthusiasm with writing about and discussing art, which was given to the participants prior to the treatment (see Appendix B). The same anonymous questionnaire was given after the treatment was completed, to check for any possible changes in student's attitudes (see Appendix B). There was no incentive for the students

to vote one way or another. The students were simply urged to be honest and choose the most appropriate rating of their feelings. All of the participants in both the control and the treatment groups were given this instrument prior to, and after, the study. The study lasted approximately 5 weeks (eight treatment class sessions, and one session for the final data collection pieces).

The study operated under a control vs. treatment group format. The two classes received the same treatment of examining specific works of art for each class meeting (the same work for each class), followed by a teacher-led discussion about the artist and the work. Each class would be given access to a reproduction of the work for examination, and the students were urged not to talk or discuss the work (this amount of time varied slightly, but was approximately 3 to 5 minutes). On the board, I would write the title of the work, the year that it was created, the national origin of the artist, artist's birth and death dates, the genre of the work, and/or influences of the work (such as the movement or style of art with which the work and/or the artist was associated), and the medium and or technique that was used, as well as descriptive words that students used in the discussion in relation to what they were seeing. Generally, I would first ask what they felt was the mood of the piece. The students were then asked to write down their own assessment of the mood, being assured that this was an opinion and not necessarily right or wrong. All of these things were written down after I gave the students time to guess any of the information, just based upon their initial examination of the piece. The control group was given time to examine the work of art, which was followed by a brief teacher-led class discussion regarding the work of art and/or artist, which was then followed by

the usual class business of a production activity that related to the artist of note. I tried to allow for the examination of works and class discussions to take roughly the same amount of time among the two classes, but because there was writing in the treatment class, the sessions in that class took slightly longer. (Generally, about 20 to 30 minutes of class time was used for the main part of the study.) In both classes, during our production activity, and in some cases, at the beginning of the next class meeting, I would occasionally ask the students the name of the artist that we had learned about that day, along with other simple review questions. However, I did not always do this, and it was not necessarily the same for each class group.

The treatment group was given time to examine the work and write about it in the pre-discussion section of their journal format sheets (see Appendix A). Then, during their class discussion, they could fill out any pertinent factual information in the appropriate spaces on the sheet (which also included a space for extra credit vocabulary information). After the discussion, students were asked to write (in the post-discussion section) about anything that they learned, or if they changed their minds about the work, based upon new information, as a result of the discussion. The journal pages of the students in the treatment group were read by the investigator to identify the "quality/quantity" of their writing and to track any trends and changes using a point system on the journal format sheets (see Appendix A). After the journal pages were collected and stored, the usual class production activity would commence. The students never reviewed their journal pages, or received the scores as a grade; I collected them after each session and stored them as data.

During the class discussions, a second piece of data was collected. For each class session, I had a sheet of paper containing each student name. I put check marks by student name to note the frequency of questions, answers and comments that were posed by individual students (though I did not distinguish between a question, answer, or comment in my check-mark talley). Because the field notes/logs were hidden from student view and notes were often recorded during a "rapid fire" discussion, it was sometimes difficult to get a completely accurate count. The check-mark system allowed me to see if certain students consistently participated or did not participate, or if there was a change in the willingness of students to participate more versus the same students participating during each discussion session. I would sometimes note if a student was just making silly comments, or if they were talking to one another instead of participating in the discussion.

The final piece of data collection was in the form of a culminating in-class essay, which allowed students to choose one of the discussion pieces and write about any and all specific information that they could recall about it, discussion of the mood/what they felt that the piece was trying to convey, and whether or not they liked the piece and why. These "culminating" opinion essays allowed for further analysis to be made regarding the impact of the journaling on students' abilities to articulate their thoughts and measure of informational retention. Items that were being assessed were retention of relevant vocabulary and factual information, analysis, discussion of personal reaction, etc. (see Appendix C). The students in both the control and the treatment group had to write the essay, and were not told about it until the day it was given. The only information that was

provided to the students was a list of the artworks and the corresponding artist, all of which were written on the board, in random order (so the students would not necessarily know when each work/artist was discussed). The students were encouraged to write about the piece that they liked the most or the least, or the one about which they could recall the most information. During the final essay, the students were not allowed to discuss anything, see reproductions of the works, or see additional materials that related to the artist or work. The students were given as much time as they needed, in order to complete the essay.

Results

I divided the survey results into four categories: the control group pre-treatment and post-treatment results and the treatment group pre-treatment and post-treatment results (see Appendixes D & E). There was a slight error in numbers, possibly due to a student absence and/or a misplacement of the survey, which caused me to have one less survey from the control group in both the pre- and post-treatment categories. (It is impossible to know whether or not both surveys were from the same person. It is also impossible to determine whose was missing because of the anonymous nature of this collection piece.) Hence, there were 10 sets of surveys collected from the treatment group and 9 sets of surveys collected from the control group. In the treatment group, there was a slight trend toward liking/feeling more confident about "writing about others' art." For the treatment group, in reference to "talking about others' art in a class discussion," there was a slight trend toward being more confident/liking it more by some, and a slight decrease in confidence/enthusiasm levels by others. In the control group, there was a slight trend

toward disliking/lower confidence with "writing about others' art" and a very slight trend toward disliking/lower confidence with "talking about others' art," as well (see Appendices D & E).

Two of the questions on the survey (see Appendix C) deal with writing and discussing one's own work, which was not an actual activity of my study, however, students did fluctuate somewhat in their responses to those questions, as well (see Appendixes D & E). It is difficult to determine, for certain, whether any of these results can be contributed to a trickle down impact of the treatment, impulsive responses, the possible fickle nature of young students, etc.

The data from my personal field notes did not reveal very precise data. One reason for this is that if a student was absent, there was no way to determine if they would have participated in the class discussion or how much they would have participated. The other reason, as I mentioned earlier in the *Procedures* segment, was my inability to always get an accurate count. However, the information that I recorded revealed a few notable items.

The counts of questions/answers/comments from the control group (see Appendix F) reveal the following: only 1 out of the 10 students did not participate in the class discussions at all, 2 of the 10 students participated in every discussion, 1 student participated in all but one discussion, and the remaining 6 students participated randomly. Out of the six students who participated randomly, only one student seemed to participate at the beginning of the study, and then stopped participating (but to be fair, that person was absent for two sessions in a row, after the sessions in which he/she participated), and

two of those six students showed an increase in participation, as the study progressed. The actual frequency counts did not reveal any particular trend; no student's daily frequency counts increased as the study progressed.

The counts of questions/answers/comments from the treatment group (see Appendix G) reveal the following: all of the 10 students participated in discussions, 2 of the 10 students participated only once, 4 of the 10 students participated every time that they were there, 1 of the 10 students participated in all but the first discussion, and the remaining 3 students participated slightly more sporadically, with only 1 student tapering off toward the end of the study. The actual frequencies did not follow a particular trend, but in the case of two of the students who participated in all of the discussions, the daily frequency counts decreased over time. Overall, the treatment group discussions revealed a greater amount of participation than the control group. However, it is impossible to determine that this was a direct result of the journaling, as opposed to excitement/interest in specific works, a greater possible number of shy students in the control group, absences of certain students, etc.

In examination of the treatment group's journal scores, there was not a significant amount of change over time. All of the treatment group students participated in the journaling, and all did consistently well, on the whole (see Appendix A). I calculated the points scored, out of 15 (with up to 5 extra credit points per day), and divided that score by the possible points (based upon the number of days that the student was in class to participate, multiplied by 15), and came up with an overall percentage grade. The score breakdown was as follows: only 2 out of 10 students received a score of 80-85%, 3

students received scores of 90-100%, and the remaining 5 students received scores of 101-120%. The average class score was 100%. No student received lower than a 10 out of 15 points on a single journal assignment. Despite these impressive scores, however, there were no noticeable trends in the scores, whether an increase over time, or a decrease over time. Most students fluctuated consistently in their scores within a few points, per entry. In retrospect, I think that a critical instructional error was made with regard to the journal pages.

I believe that the format itself is valid, but what happened with the writing could have been affected by my initial instructions. In the format (see: Appendix A), there is a pre-discussion section and a post-discussion section. A predominant trend occurred in the writing for both of these sections, among all of the participants. These sections were supposed to be about personal connections and whether the student liked or disliked the artwork. Instead, based on my verbal instructions, most of the students just wrote whatever they thought about the piece, which were primarily observations/descriptions of the piece in the pre-section, and things that they learned about the artists in the post-sections. Because of this, the numerical score calculations do not accurately reflect what they were intended to reflect. Very few responses really had to do with their opinions and personal connections. All of this information is helpful to keep in mind for the last piece of data, the final essay.

The final essay was meant to be the most reliable piece of data for determining the answer to my research question: Will examining a piece of work and formulating their thoughts about it in writing, enable students to retain more information about the

work and/or the artist? However, due to the score that I assigned for each topic that was being assessed, as evidenced in Appendix C, I should have placed a higher point value on the factual information section, in order to have more accurate data regarding informational retention. I did count off minimal points if a student reported details that were not accurate (for example, if they wrote a specific date that was incorrect), which, occasionally, made a difference in scores. The class averages were not extremely impressive. The average score from the control group was 78% and the average score for the treatment group was 80%. It is interesting to note, however, that, on the whole, student essays from the treatment class were longer, and often contained more accurate, vivid, and detailed descriptions of artists and artworks. If there was a higher point value assigned for this information, it is likely that the overall scores for the treatment group would have been higher. The higher scores would have pointed more to the journaling having played a part in the retention of information, which appears to have been the case. The majority of the students in the treatment group lost points on the "critique and analysis" section. They neglected to write about their thoughts regarding the mood of the piece and/or what the artist was trying to convey, which relates to the trend from the journals in which students talked more about what they saw, and what factual information that they learned, rather than trying to give their opinions about and interpret what they were seeing.

Conclusions and Recommendations

In general, the results of this study are somewhat inconclusive. There was only slight evidence that would suggest that the journaling aided student comprehension. I

would recommend that, if someone were to repeat this project in another classroom, the study should be conducted over a longer period of time, and that some adjustments be made to the instrument scoring. The reality of the student teaching placement timeline is one that is not conducive to a thorough experiment for a study of this nature. Another general change that could be considered in future attempts to replicate this study would be to incorporate a greater use of technology.

Technology could easily play a role in future projects in this subject area. Slide projectors and/or videos could be used to show larger, better photographs/reproductions of artists and their works. It could be quite helpful to have students watch videos about artists and their works, in addition to or in place of, the teacher imparting the majority of the information. Computers could be used as the platform for student journaling (perhaps in the form of an on-line journal), for discussion boards, and for live chat rooms in place of, or in addition to, classroom discussion about artists and their works, and as sources for research about artists and their works. The use of technology may require more financial assistance for classroom materials.

The narrow focus of my study made it impossible to find any substantial information regarding the consensus of one of my professional organizations (Professional Educators of Tennessee), or to find opportunities for grant money availability with regard to this area of study. I did learn that one association that I am a member of, The Kappa Delta Pi Educational Honor Society, does have small grant funds available to teachers who are in any subject area (*Kappa Delta Pi*, n.d.). There are grants

available through programs such as the American Educational Research Association (A.E.R.A.) for researchers who conduct educational policy or practice studies (*National Art Education Association*, 2005). The National Endowment for the Arts Foundation (N.E.A.) has grants for educational research, curriculum practice, and professional development for public school teachers in the arts (*National Endowment for the Arts Foundation*, n.d.). These are just a few examples of available funding for studies such as this. Teachers just need to be proactive in their efforts, in order to receive funding.

The results of the project do not necessarily indicate that this is an area in which teachers need to receive additional training. However, I do feel that if visual arts teachers employ more writing into their curriculum, that academic and personal growth of students could be long-term outcomes. Despite the fact that the results of the study did not show a significant change in students' attitudes, abilities, and comprehension skills, I think that teachers could benefit from employing journaling in their various classroom disciplines. I would urge teachers to re-evaluate how they address the many elements of visual art (e.g., criticism, aesthetics, art history), and attempt to utilize a variety of methods that cannot only enhance basic comprehension skills, but also engage students in higher-order thinking and problem-solving, including methods to assist students with self-assessment and self-reflection.

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Appendix A

Journal Format

Title of Piece (1pt.):

Artist/ Date (1 pt.):

Medium/Style (1 pt.):

Mood of Piece (2pts.):

Personal Reaction (like/dislike, personal connection)

Pre-discussion (5 pts.):

Post-discussion (5 pts.):

Vocabulary/Extra Information (2- 5 pts.):

Appendix B

Questionnaire

How do you feel about writing about others' art (rate 1-5)?
1. hate it/ not confident
2. don't like it/ a little confident
3. it's okay/ fairly confident
4. like it a little/ confident
5. love it/ pretty confident

How do you feel about writing about your own art (rate 1-5)?
1. hate it/ not confident
2. don't like it/ a little confident
3. it's okay/ fairly confident
4. like it a little/ confident
5. love it/ pretty confident

How do feel about talking about others' art in a class discussion (rate 1-5)?
1. hate it/ not confident
2. don't like it/ a little confident
3. it's okay/ fairly confident
4. like it a little/ confident
5. love it/ pretty confident

How do you feel about talking about your own art in a class discussion (rate1-5)?
1. hate it/ not confident
2. don't like it/ a little confident
3. it's okay/ fairly confident
4. like it a little/ confident
5. love it/ pretty confident

Appendix C

Final Essay

Instructions: You must choose from one of the art works that we discussed in class, and write about it. You are encouraged to include any and all factual information that you recall about the piece and/or the artist, a critique/analysis of what you think that the piece might be trying to communicate and the mood of the piece, along with your opinions on whether or not you like the piece, and why. Be as detailed and specific as you can be! This essay will be graded as such: factual information, 10 pts; critique and analysis, 20 pts.; and opinion 10 pts.

Appendix D

Control group comparisons of writing and discussing art.

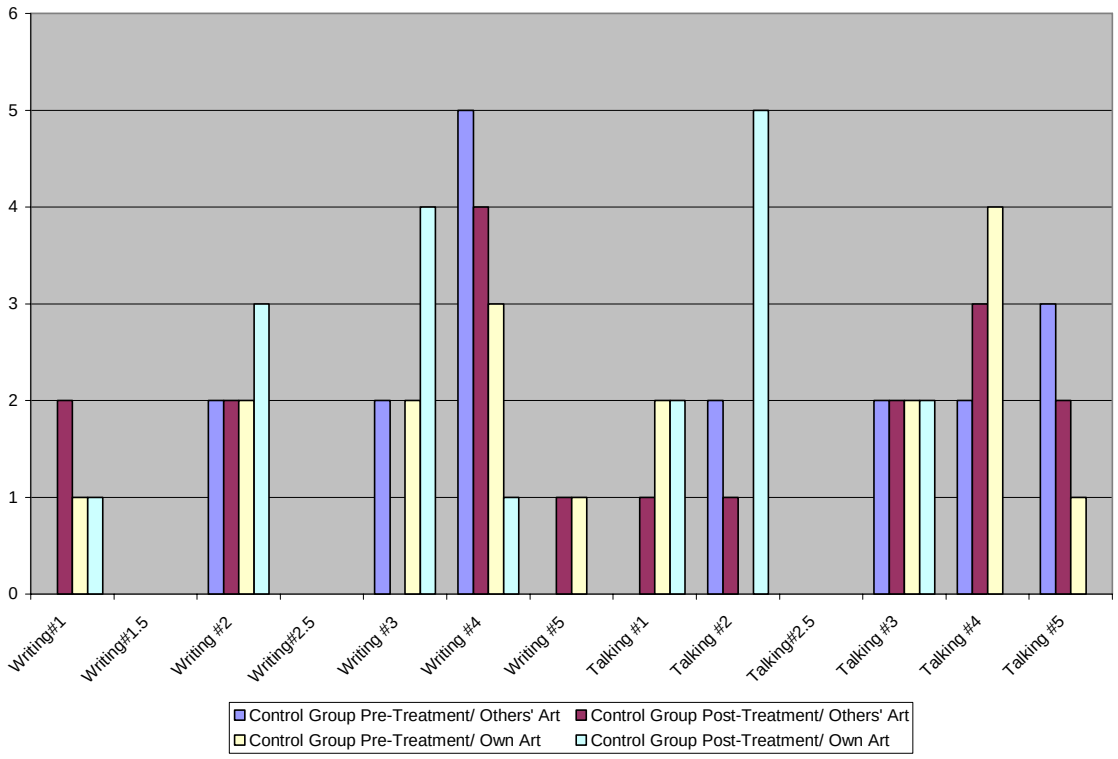


Figure 1. Comparative chart of survey regarding writing about and discussing one's own art and others' art: Control group.

Appendix E

Treatment group comparisons of writing and discussing art.

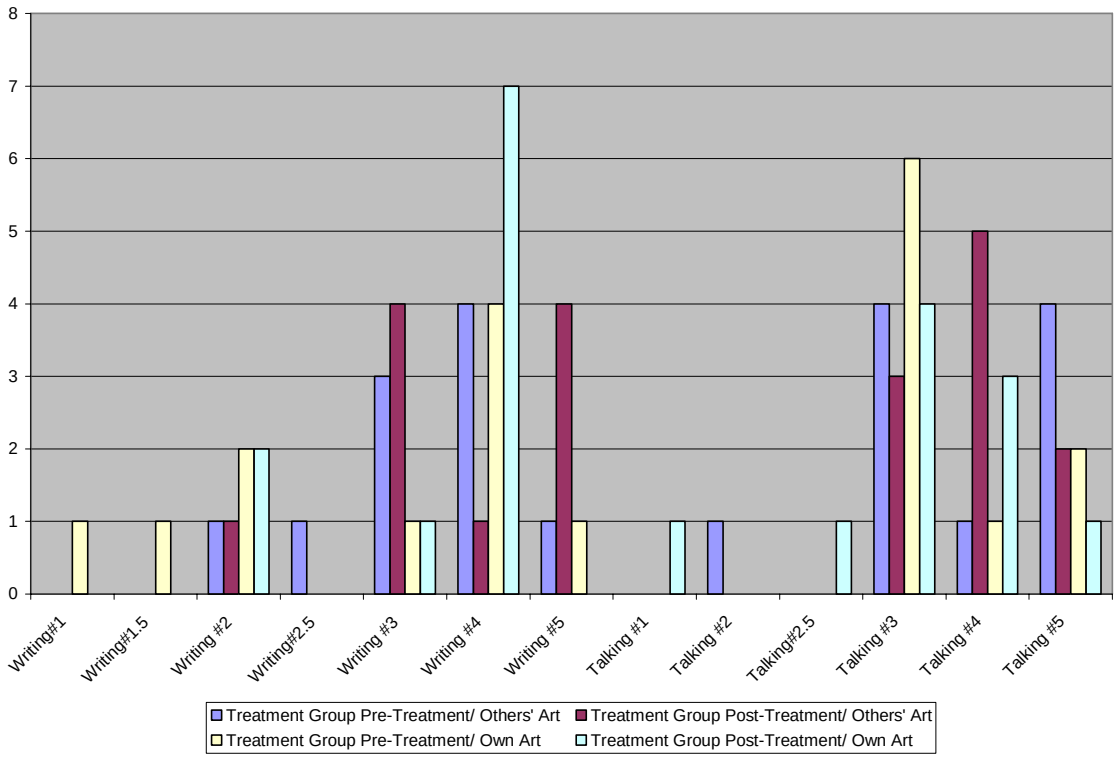


Figure 2. Comparative chart of survey regarding writing about and discussing one's own art and others' art: Treatment group.

Appendix F

Field log class discussion: Control group.

Number of Questions, Answers, Comments per day

Name	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7	DAY 8
Student A	0	0	2	1	2	2	2	3
Student B	1	2	1	1	1	1	0	2
Student C	1	2	**2**	**3**	**1**	**1**	1	0
Student D	0	0	0	0	0	0	0	0
Student E	2	2	2	Absent	Absent	0	0	0
Student F	0	0	0	1	1	1	1	0
Student G	Absent	**0**	**1S**	**0**	1	**0**	0	0
Student H	1	1	3	3	1	1	2	Absent
Student I	0	1	0	1	1	0	0	0
Student J	2	1	1	3	3	3	3	3

Bold= talked frequently outside of discussion

Absent= student absent that day

S=silly comment only

Figure 3. Field log class discussions from the control group.

Appendix G

Field log class discussion: Treatment group

# of Questions, Answers, Comments per day

	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8
NAME								
Student A	0	1	2	1	1	2	3	1
Student B	ABSENT	2	1	1	ABSENT	1	1	1
Student C	1	0	1	2	0	0	1	1
Student D	2	2	1	2	2	1	1	1
Student E	2	0	1	2	1	0	1	1
Student F	2	3	2	2	2	1	1	1
Student G	2	3	3	2	2	1	1	1
Student H	0	2	0	0	0	ABSENT	0	0
Student I	0	2	0	0	0	0	0	ABSENT
Student J	1	1	1	1	1	1	0	0

Bold= talked frequently outside of discussion
ABSENT= student absent that day
S=silly comment only

Figure 4. Field log class discussion from the treatment group.

Athletics and Academic Achievement:

How are they related?

Jason Scott

EDUC 590

Dr. McAllister

Dec 3, 2005

Introduction to the Problem

How many times have you ever heard the expression, "dumb jock?" Anyone that has ever dealt with student athletes, either teaching them or associating with them, has either heard or used this expression. How true is it? Is the everyday, run-of-the-mill, athlete always stupid? Are super intelligent people always physically inferior? Is there a genetic strand that conversely promotes intelligence while demoting athleticism, and vice versa? Does God only reward people with one or the other? Can one human being be gifted with both? Is it possible to be a superior athlete and maintain a high level of intelligence? If so, how do academics and intelligence relate to each other? This is what I intend to find out. These questions are what I intend to answer in this project, "Athletics and academic achievement: How are they related?"

In the world we live in today, athletes are put on such a higher pedestal. Their actions and comments are scrutinized on a daily basis. Careers and livelihoods are sometimes lost due to the lack, or perceived lack, of intelligence (e.g., John Rocker, Atlanta Braves pitcher). Is it really their fault, or is it something deeper? Maybe, you can't be on a higher level athletically and maintain an upper level of intelligence. With a better understanding of academics and athletics, we could understand the correlation between the two in order to be a little more tolerant of the "dumb jock," if need be. Otherwise, the media, and society, in general, can continue to scrutinize, at will.

You might ask, "Why do we need to know the relationship between athletics and academics?" Education is currently developing more and more every day. We, as educators, are always trying to find new and innovative ways to educate young people.

The latest trend in education is to specialize instruction to best suit each student. There are many different ways to approach this. Learning styles, strategies, and other teaching techniques are all developing in order to improve education and individualize, or personalize, classroom instruction. Anyway that educators can improve academic achievement is a worthwhile effort. If we can discover how athletics affect student athletes and their achievement, then we can use this information to better our classroom procedures.

Colleges and high schools, alike, could benefit from this particular research. Both are pressured to graduate athletes, while maintaining highly competitive teams. Some schools seem to do better at it than others. Why? Is it the way that an institution values its education, or is it the way that the education is delivered? By doing research in the correlation of athletics and academics, we can see why some schools are more successful than others so that the underachieving institutions can improve their education. In high school, especially, this kind of research would be beneficial due to the No Child Left Behind Act. School districts and principals, alike, are now being held accountable for the achievement of their schools. One aspect that high school principals are held accountable for is the graduation rates. With athletes comprising anywhere from 25% to 50% of a student body, and in some cases more, a greater population demographic might not be found to look at ways to improve achievement for the overall success of the school.

Review of Literature

The literature that I read for this project came from the library at UTC. Most of the journals asserted that athletics and extra curricular activities were a good thing for the

overall success of the student athlete. One of the articles, Teaching excellence: Helping students consider academic excellence, by Pam Paxton, stated that athletes do not benefit directly from participation in sports, but are indirectly molded to perform at the highest levels (Paxton, 1997). This change teaches the athletes to grow into a better athlete and that athletics isn't the only way to success. The article said that students take qualities learned on the field and use them in the classroom to become better students.

Another article, Extracurricular Activities and Academic Achievement, by Susan Gurna, (1996), studied the effects of athletics on both white and black students. The article originally intended to look at the effects on race, but it lead to another conclusion. School-related activities tend to promote academics much better than non school-related activities. The study found that there is a direct effect on the student's academic achievement is dependant on the type of after school activities in which he is involved.

A different article, *Academics and athletics in the social world of junior high school students*, by Alan Goldberg and Timothy Chandler, looked at the perceptions that students have towards academics and athletics. The survey consisted of 182 students that were transitioning to high school. They were asked the question, "What would you most like to be remembered as: star student, star athletes, school leader, or the most popular?" Results showed that 67.8% of students said they would like to be remembered as a brilliant student. Another 62.7% of students said they would like to be remembered as a star athlete. (Goldberg & Chandler, 1992). The article showed that popularity and leadership are not as important to freshman as are athletics and academics.

One article, entitled, *Academic comparison of athletes and non athletes in rural high schools*, by Holt Zaugg, looked at the correlation of athletes versus nonathletes in terms of grades at midterm and finals. The study examined football, basketball, and volleyball athletes. At the midterm, in every case except mathematics, the athletes were higher than the nonathletes. The athletes were behind by 1 percentage point in math. However, by the end of the semester, the athletes were overall ahead of the non athletes in every subject (Zaugg, 1998). The "no pass, no play" rule may have lead student athletes to step it up a little when semester grades were due. Either way, the athletes out-performed the nonathletes in all subject areas. This article also looked at the effects of athletics and discipline matters. The study showed a 6% drop in disciplinary referrals for athletes versus non athletes (Zaugg, 1993). The article never gave a direct correlation of athletics and intelligence, but it did say that athletics promotes the greater good of the student.

In the article, *Student Activities and Academic Eligibility*, a study done by Coleman, found that of the 10 high schools studied, 7 schools showed overall higher grade point averages for athletes than for their nonathletic counterparts.

Another perspective to look at is what predicts success. Academic success in school is not always the only predictor of adult success. Two other articles, *Student achievement and co-curricular activity participation*, by Ronald Gholson, (Gholson, 1985), and *Student activities and academic eligibility requirements* by Ronald Joekel, (Joekel, 1985), stated that academic success is not the best way to predict adult success. Both articles stated that they could not find any proof that good students always become

successful adults. Neither GPA's, SAT scores, nor college entrance exams could predict adult success. However, they did find that the best predictor of adult success could be found in the participation and success in extracurricular activities. They stated that success in extracurricular activities was the best predictor or adult success over grades and test scores.

In summary, all of the literature that I read seemed to come to the same consensus, that athletics are good for the overall student. None of the literature stated that there is a physiological or mental link between academics and athletics, but other influences from athletics lead the students to be better academic achievers. These influences not only help the student build better academic habits, but also build lifelong attributes that lead to being a more successful adult.

Data Collection and Results

I chose to use strictly quantitative data on this project. I used quantitative research in order to get statistical information to document. My quantitative research was done by looking at a random sample of student grade point averages (GPAs) and by looking at the records of students that have not passed the Georgia High School Graduation Test.

Although GPAs are not the only means of tracking academic success, it does give a good indication of where the student stands, in terms of academics. I randomly selected 100 students from a high school population of 1,325. This accounted for a sample of 7.55% of the overall population. With the help of the guidance office, I then pulled the cumulative GPA and sex and of each student. I then confirmed each student as an athlete

or not. All GPAs were categorized as 4.0, 3.5, 3.0, 2.5, 2.0, 1.5, 1.0, or 0, as is common on the 4-point system. The 4.0 represents all A's, 3.0 represents a B average, 2.0 represents a C average, and 1.0 represents a D average. The GPAs were placed on a spread sheet and separated by both athleticism, and by gender. (See Figures 1 and 2).

After looking at the sample of student GPAs, I then focused on the Georgia High School Graduation Test results. I pulled the list of students that had taken the GHSGT in the 2005 administration. I sorted out the students that had failed any part of the test and also distinguished who the athletes were on the list. I separated the athletes from the nonathletes and the passing students from the failing students. I then compared the athletes pass/fail rate to that of the nonathlete. (see Figure 3).

GPA Data

I used quantitative data throughout my research.

The results were interesting. For athletes, both male and female, the average GPA was remarkably similar. Of the thirty-nine male athletes sampled, the average GPA was 3.38. For the nineteen female athletes sampled, that average GPA was 3.33. The overall average of the fifty-eight athletes sampled was 3.33. The overall nonathlete results were 3.03 for the nineteen boys and 3.30 for the twenty-one girls sampled.

Athletes	**Male**	**Female**
	3.5	4
	4	3.5
	4	4
	3.5	3.5

GPA Scale	
A	4
B+	3.5
B	3
C	2.5

	3.2	3.5
	4	3
	3.5	3.5
	3	3
	4	1
	4	3
	4	3.5
	3	4
	3	2.5
	3.5	3
	3.5	3.5
	4	3.5
	1.5	4
	2.5	4
	3.5	
	3.5	
	3	
	2.5	
	3.5	
	3.5	
	3.5	
	3.5	
	4	
	1.5	
	3	
	3.5	
	4	
	2.5	
	4	
	3.5	
	3.5	
	3.4	
	4	
	3.5	
GPA	**3.38**	**3.33**
Overall Athlete GPA		**3.37**

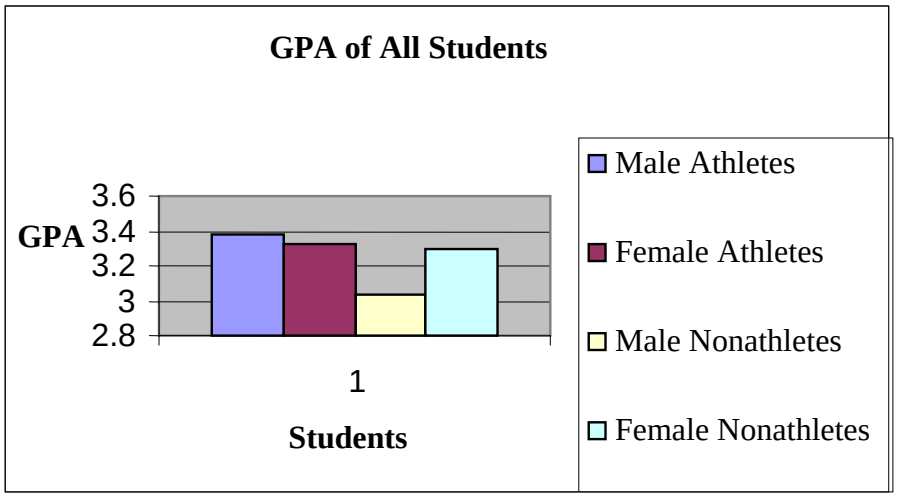
C+	2
D	1.5
D+	1
F	0

Figure 1.
Athletes.

Non-Athletes	Male	Female
	4	3
	3.5	3.5
	4	3.5
	3.5	4
	3.5	3.5
	3.5	3.5
	2.5	3
	2	3
	1	3.5
	3.5	2.5
	2	3
	2	4
	3	4
	3.5	2
	3	3
	3	3.5
	3.5	3.5
	3.5	4
		3.5
		2.5
GPA	**3.03**	**3.30**
Overall Non Athlete GPA		**3.17**

GPA Scale	
A	4
B	3.5
B+	3
C	2.5
C+	2
D	1.5
D+	1
F	0

Figure 2. Nonathletes.



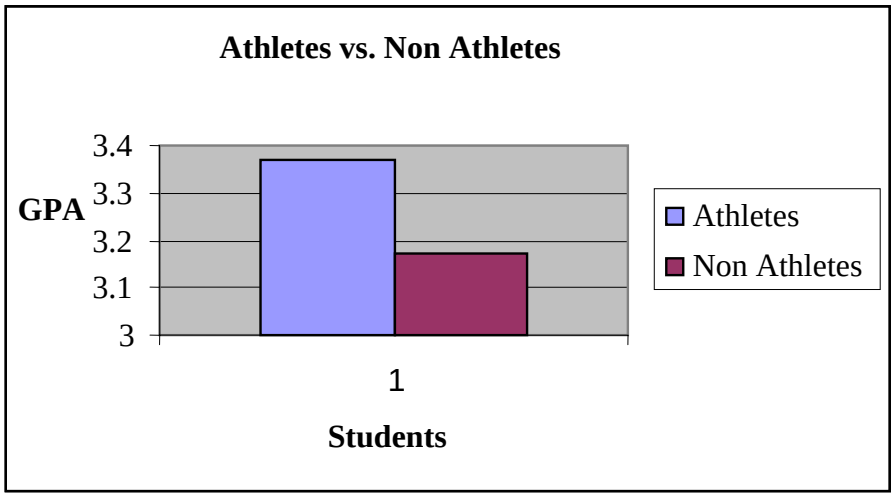


Figure 3. GPAs of all students by athletic status and gender, and athletic status only.

GHSGT Data

The Georgia High School Graduation Test, or GHSGT, is a standardized test that the state of Georgia requires of all it students in order to graduate. All students in the state of Georgia have to meet certain scores on the test in order to get an academic diploma. Students are allowed to walk on graduation night even if they have not passed, but they are not given an academic diploma. These students are given a certificate of attendance.

Students take the GHSGT during their 11th grade year. The test is composed of Language arts, Science, Social Studies, and Mathematics. Georgia high school students have to meet passing scores in all areas in order to graduate from high school with full accolades. The GHSGT is another example of quantitative or statistical data that I chose to look at in answering the question of academics and athletics and the relationship of one to the other.

I took the scores of all students that took the GHSGT including juniors and seniors. I compiled all the data from the test by the component parts. There were four main parts of the test including language arts, mathematics, science, and social studies. I totaled the percentages of students for the entire school that failed (see Figure 4). I then looked at only the athletes that took the test. I calculated the percentage of athletes the failed and compared it to the overall population of the school (See Figure 4).

Three of the four main subject's pass/fail percentage rates turned out better for the athletes than nonathletes. Mathematics was the only exception. Athletes outperformed the nonathletes by 1.88 percentage points in language arts, by 20.32 percentage points in

social studies, and by 23.58 percentage points in science. Nonathletes outperformed athletes by 3.43 percentage points in math (see Figure 4). The data clearly show that the athletes performed much better on this administration of the test, with mathematics being the only exception.

All Students

Subject	Total taken	Number failed	% fail rate
Language Arts	276	20	7.25%
Mathematics	275	26	9.45%
Social Studies	242	81	33.47%
Science	211	125	59.24%

Athletes Taking Test

Subject	Total taken	Number failed	% fail rate
Language Arts	114	7	6.14%
Mathematics	114	13	11.40%
Social Studies	108	24	22.22%
Science	102	48	47.06%

Nonathletes Taking Test

Subject	Total taken	Number failed	% fail rate
Language Arts	162	13	8.02%
Mathematics	161	13	8.07%
Social Studies	134	57	42.54%
Science	109	77	70.64%

Figure 4. GHSGT failure rates.

Since graduation in the state of Georgia is determined by passing this test, I wanted to research the GHSGT results for seniors only. These are the students that are most affected by this test. A senior with any section of the test not passed, would have had to have failed it during at least two administrations. I pulled the records of all the seniors in the school that had not passed at least one part of the test. There were 62 students that fell into this category of students that have not passed one or more parts. Only 7 of the 62 students either are, or were, athletes at some time in their high school career. This accounts for 11.3% of the "at risk" seniors. I then looked at students that have failed two or more sections to see how many athletes fell into that category. Five out of 62 student athletes failed two or three sections, accounting for 8.1% of the "at risk" seniors. Finally, of the 7 students that had failed all the parts, none were athletes.

It is hard to say if athletes learn better or not, but, from this evidence, it is clear that athletes are learning enough to pass the GHSGT and graduate with full credit, at a rate than do the nonathlete counterparts.

Conclusions and Recommendations

Through doing this project, I have established, or generalized, that athletics are good for students in high school, in terms of academic performance. The old cliché of the "dumb jock" is really not true. There will always be exceptions to everything, but, in my research, athletes turned out to be slightly more academically successful. The data clearly show that that average GPA and the percentages of students passing the GHSGT are higher for athletes than for non athletes. In looking at the results of GPA data, athletes showed a 0.2 point higher grade point average than did the nonathletes. Boys

showed the biggest GPA difference with a 0.35-elevation for athletes over nonathletes. Girls, on the other hand, showed very little difference between athletes and non athletes with, only a 0.03-point difference.

There is really no way to know if intelligence and athletics are mutually dependent or exclusive of one another without doing neurological studies. Also, there is no way to know if athletes are just motivated to do better or if there is a link between intelligence and athleticism. However, for whatever reason, the research I have done shows a link in improved academic success for athletes versus nonathletes. No one knows if students that naturally have intrinsic motivation in the classroom channel this motivation into athleticism or if athletics teaches and motivates students to perform at the highest level in everything they do. That is a question that can, and will, be debated for years to come. Either way, anything that we, as educators, can do to improve academic performance is a plus.

There are always drawbacks to everything, however. Cost is the biggest hindrance. Most sports are very costly to operate. Some accountants may question whether it is worth it? If you are looking at the price to society, I think it is. Yes, athletic programs are costly, but what are the long-term effects of a society that has a much higher dropout rate or a society where students have no reason to stay in school. Athletics give a lot of these students a reason to stay in school and get educated. I do not think that anyone could argue that point.

In the 3 years that I have been teaching, and speaking to other veteran teachers and administrators, I have come to the conclusion that the general consensus is that

athletics motivates students to do better. Some teachers argue that athletics takes too much time away from studies, but I can find no proof to support that statement. Athletics not only motivates students to do better academically, but it also instills a sense of pride in the school and a sense of belonging. All of these lead to a better, more well-rounded student, and a better, more well-rounded person for society. That is the general consensus that I get from most professionals in the field.

In terms of teacher, or professional development, I would like to see all teachers be involved in an athletic program as either a coach or a booster. I think that this would give the educator a better understanding of the skills and attributes that athletics gives to students. Then, all educators would be able to speak knowledgably about student athletes and what is best for any student, in general. By doing this, teachers could get educated in areas that they may know nothing about. This, as does any professional development, will lead to a more informed educator. As far as grants in the field, there were none that I could find, but most school systems pay supplements to coaches.

If given the time and resources, I would like to see a study done to see if there is any relationship, physiologically and/or neurologically, between academics and athletics. This would take the help of doctors and high tech medical devices, like CT Scans and or MRI machines. This technology could help delve into the question better by looking at the neurological anatomy of an athlete and a nonathlete to see if there is a difference. Is the old adage of “dumb jock” true on a medical basis or is it just another stereotype that society embraces? I could not do this type of research, but I would love to see it done with the help of physicians and modern day medical technology.

In closing, I would like to share a quote from my college coach. He one time said, “You are letting academics interfere with your athletics.” He was implying that I missed too much practice due to classes. My reply was, “Yeah, I am!" I have learned, over the years, that athletics wither with age, but an education lasts you a lifetime.

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The Loss of Student Motivation:

An Inquiry Project

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Fall 2005

The Institutional Review Board of the University of Tennessee at Chattanooga (FWA00004149) has approved this research project 05-242.

Introduction to the Problem

Research has illustrated that motivation affects student academic achievement immensely. For example, “motivation can affect new learning and the performance of previously learned skills, strategies, and behaviors, which has important implications for schooling” (Pintrich & Schunk, 1996, p. 5). In addition, my own personal experience has demonstrated that children are in danger of losing motivation early in their school careers. For instance, my nephew lost motivation in relation to school early in his educational career. This loss of motivation for school has left him in an extremely precarious position as he enters high school and is looking toward the future. He has told me, frankly, that he wishes that he would have “tried harder” when he was younger so that he would not have been grouped in technical classes, or, as he refers to them, “the dummy classes.” A close friend also communicated to me that her son’s middle school math teacher told the class that, “I am tired of teaching and I bet that all of your parents hate their jobs, also!” This statement forced me to question the effects of teachers on student motivation. Thus, the purpose of this study is to identify the factors that cause students, similar to my newphew, to lose motivation during their educational careers.

Review of Literature

Many topics abound in the field of education; one of great significance for teachers to investigate is the motivation of their students. Motivation, which is “conceptualized as students’ energy and drive to learn, work effectively and achieve to their potential at school,” (Martin, 2003, p. 89), plays an essential role in student achievement. Educational motivation has been examined by many of the great

researchers such as Plato, Aristotle, McDougall, and Freud. This substantial amount of research has found that motivation, "is an important quality that pervades all student activities" (Pintrich & Schunk 1996, p. 3). And furthermore, "motivated students display interest in activities, work diligently, feel self-confident, stick with tasks and perform well" (p. 3). Through this inquiry into the motivation of students, an explanation of motivation, relating to education and students, are will be given. Additionally, the various factors that affect the motivation of students will be discussed and the many pedagogical methods teachers can employ to increase motivation will be reviewed.

Initially, we must define motivation, in relation to education. The study of the motivation of students in the classroom is on the forefront of both educational and psychological research. Psychological research has been completed focusing on "the psychological functioning of a student, such as goal orientations, beliefs about ability and beliefs about control" (Wentzel, 1997, p. 411) in relation to motivation. Research has also been completed in behavioral psychology relating to student judgments on task difficulty in relation to motivation, attributes for stress, failure, and evaluations of outcomes (Weinert & Kluwe, 1997, p. 11).

In addition to these various studies, a great deal of educational research has been completed on intrinsic and extrinsic motivation. Intrinsic motivation occurs when "task participation is its own reward and does not depend on explicit rewards or other external constraints" (Pintrich & Schunk, 1996, p. 258). An intrinsically motivated student completes tasks because they have an interest in them and they have a high desire for learning. This desire and interest in learning has an immense impact on student

achievement. Students, who learn for intrinsic reasons, “engage in activities that enhance learning, in turn, learning promotes intrinsic motivation. As students develop skills they perceive their positive progress and feel more efficacious about learning” (p. 258). Furthermore, it has been found that, “the development of intrinsic valuing of intellectual activities stands to provide the firmest of bases for sustaining intellectual motivation through childhood and adolescence through adulthood” (Wentzel,1997, p. 412). Thus, intrinsic motivation is an important factor from early education throughout adulthood.

Extrinsic motivation is described as what students’ focus on, “factors external to themselves and unrelated to the task they are performing” (McDevitt & Ormond, 2006, p. 456). This type of motivation has been described as detrimental to student development and achievement due to the fact that it generally is “a means to an end” (Wentzel, 2002, p. 289). Extrinsically motivated students often “look for performance indicators (e.g., grades and rewards) and social comparisons (e.g., being the best or the worst in the group) for evidence of who they are as students” (Perry, Nordby, & Vanderkamp, 2003, p. 320). An example of an extrinsically motivated student is illustrated through this teacher’s description of a student: “the main thing that seems to motivate Eric is doing better than everyone else. Eric is not content to be second best” (Pintrich & Schunk, 1996, p. 2).

In addition to the previously discussed research, we must also examine the various categories of students, in relation to motivation. The first category is the success-orientated student. These students are tremendously intrinsically motivated, low in fear of failure, and especially engaged in academic activities. A second category of student is the

failure avoider. These types of students are extremely fearful of failure and are low in their confidence for success. These students will employ various techniques such as procrastination to alleviate stress and avoid failure. A third category is the over striver. These students will are mainly extrinsically motivated and will "approach stress but simultaneously fear failure greatly" (Pintruch & Schunk, 1996, p. 73). In the classroom, an over striver will constantly be concerned with achievement and grades. Finally, we see the failure accepter, which is considered the unmotivated student. These students will show "a basic indifference to achievement" (p. 73) through being completely indifferent regarding their education.

Numerous factors have been identified in relation to affecting motivation in students. One factor that has been studied in great detail is social factors in relation to student motivation. Social characteristics can be defined as, "the presence of others motivating behavior" (Pintrich & Schunk, 1996, p. 189). We also find that "interpersonal relationships that provide students with a sense of belongingness can be powerful motivators of children's school related interests" (Wentzel, 1997, p. 418). Research has shown that students are likely to "adopt standards for performance and display academic skills modeled by their classmates" (p. 418). This idea is directly related to the trait theorists' idea of students' need for affiliation. This theory states that students choose others, with similar interests, with whom to affiliate. This need for affiliation changes greatly through a student's academic career. For example, a fifth-grade student may affiliate with other students in an entirely academic context while a high school senior affiliates with others in a social context. (McDevitt & Ormond, 2002, p. 460).

In addition to peer interactions, parental interactions are also influential in increasing motivation. When students have positive relationships with parents, they tend to have a high emotional well-being in the classroom. In turn, this emotional well being influences student interest in school and academic achievement (Wentzel, 1997, p. 418). The need for approval from parents is a major contribution to this aspect of motivation. Need for approval is defined as "a strong desire to gain the acceptance and positive judgments of other people" (McDevitt & Ormond, 2002, p. 461). This need for approval generally is strongest when students are young. As students grow, this approval from parental figures is generally replaced by peer approval (p. 461).

Perhaps one of the most influential aspects of affecting student motivation is teachers. Teachers realize that affecting motivation is a daunting task, and when polled, teachers "list motivating students as one of their chief concerns and seek new ways to accomplish it" (Pintrich & Schunk, 1996, p. 3). In the past, the role of teachers as student motivators was viewed in an extremely narrow sense. The primary way for educators in the past to motivate students was to dispense rewards such as "grades, privileges, praise, prizes and stickers" (p. 328). However, this, as most aspects of modern education, has changed significantly. Now, teachers affect student learning and motivation through every action made within the classroom. It has been proven that teachers affect student motivation through the effective modeling of positive values in the classroom (Wentzel, 2002, p. 287). It has been suggested that teachers provide students with "an intrinsically motivated model with the potential to affect their own motivation to learn" (p. 287). Also, it has also been recognized that effective teacher curriculum planning affects motivation.

When teachers plan effectively, they are concerned “with how much the instruction and activities will appeal to student interests” (Pintrich & Schunk, 1996, p. 330). A third way that teachers can influence motivation in the classroom is through positive feedback. Feedback is divided into four categories: performance feedback, motivational feedback, attributional feedback, and strategy feedback. Performance feedback occurs when a teacher praises a student on effective work but also includes corrective information (p. 336). Motivational feedback provides information on a student’s progress and competence; no reference is made to the degree of correct or incorrect answers (p. 337). Attributional feedback links a student’s performance with positive attributes in order to increase motivation. Strategy feedback allows students to see how well they are applying various strategies taught in the classroom (p. 338). A final way that teachers can influence motivation is through the disbursement of rewards. Bandura discovered that “rewards are effective because people behaving in a given fashion will be rewarded” (p. 340). Motivational rewards in the classroom include grades, privileges, honors, free time, points, tokens, stickers, and stars (p. 340). To curb students from becoming totally reliant on these rewards, thus becoming totally extrinsically motivated, a teacher must be sure to explain the reward system to the class. This explanation allows students to set goals to strive for, which, in turn, increases motivation.

In direct relation to teacher influences on motivation, there has been a great deal of research completed on ways for educators to increase motivation through pedagogical techniques. A major focus in this area of study is teacher attitudes toward instruction. Research has found that “a lesson that is given in a high-energy, dynamic fashion

suggestive of enthusiasm leads students to experience greater interest in and enjoyment of the material and higher levels of energy and vigor" (Patrick, Hisley, & Kemphler, 2000, p. 217). It is also recommended that teachers "display a passion for concepts and topics, your sense of pride in accomplishment, your joy associated with learning" (Powell, 2004, p. 202).

A second major finding is that students are interested, thus increasing intrinsic motivation, in subjects that relate to real-life. A 10th grade student was asked what use his current schoolwork would be to him in his adult life? His answer: "Latin will be helpful for my SAT's." No answer could be initiated for what his schoolwork would afford him after he completes his educational career (Kuhn, 2003, p. 22). To avoid this type of response and to increase motivation for learning, teachers can "link instruction with current events, which is a useful strategy to increase motivation" (Lozanda,1999, p. 26).

A final suggestion made for teachers to increase motivation is to actively involve students in daily lessons. For example, it is suggested that motivation is increased by review of previously learned material. This review of material "shows students what they have learned which enhances motivation for further learning because it validates student's beliefs about their competence" (Pintrich & Schunk, 1996, p. 334). While completing this imperative review, it is recommended that teachers facilitate student motivation by allowing students to participate via group discussions, student lead review sessions and fun, interactive exercises. This demonstrates to students that the teacher values their opinions, which increases motivation (Wentzel, 2002, p. 299).

This extensive review of literature illustrates the importance of motivation in education through explaining what motivation is and how it is related to education. The literature also reflects the factors that affect motivation in students, including teacher influences on student motivation. Finally, a sampling of pedagogical methods that teachers can use to help motivate students is presented.

Definitions of Important Terms

1. Motivation: A “state that energizes, directs and sustains behavior” (McDevitt & Ormond, 2002, p. 456).
2. Pedagogical: The study of the methods and activities relating to teaching (Free Search UK, 2004).
3. Behavioral Psychology: The realm of psychology that deals with behavior as “it is described and explained in terms of specific stimulus-response relationships” (McDevitt & Ormond, 2002, p. 456).
4. Intrinsic motivation: Motivation by “factors within themselves or inherent in the task they are performing” (McDevitt & Ormond, 2002, p. 456).
5. Extrinsic motivation: Factors external to a person which motivates them to do well.
6. Performance indicators: Signs of how students are progressing throughout assigned curriculum.
7. Social comparisons: The comparison of an individual to others in society or peer groups.
8. Need for affiliation: An individual’s need for feeling as one belongs to a peer group or society in general.
9. Modeling: Illustrating important concepts or behaviors via actions.
10. Curriculum planning: Developing activities for students based on the needs of students and the educational standards set forth for each school.
11. Feedback: The process in which a teacher provides students with information on how well tasks are completed.
12. Motivational rewards: Rewards such as stickers, treats, extra points, etc., that are used to motivate students.

Data Collection and Results

Data Collection

This inquiry project consists of three primary categories, data collection, data analysis, and conclusion and recommendations. Data collection consisted of the distribution of two anonymous surveys, both using a Likert Scale, to students who had parental permission to participate in a Hamilton County high school (school 1) and middle school (school 2) science class. The student self-perception survey, "Why Do You Come to School," (see Appendix A), based on the Academic Motivation Scale (Vallerand, Pelletier, Blais, Briere, & Senecal, 1993) relates specific information regarding motivation and factors that affect students' personal motivation in school. The second survey which was distributed, "Your Opinion," (see Appendix B), requested that students to rate their science teacher on a variety of aspects regarding their daily interactions with the students, the presentation of material, and their overall attitude toward the class. Students were asked to record their responses directly on the survey instrument.

The Respondents

The students in school 1 are all members of a preparatory biology one class in grades nine through eleven. A large majority of this class finds themselves as repeat biology students. Additionally, 16 out of the 35 students in this class qualify for special education services. The students in school 2 are all members of a physical science class that allows the students to earn a high school credit. The demographics in this class differ greatly from the demographics of school 1. The students in this class are all first-time,

physical science students and in the eighth grade, and none qualify for special education services.

Data Analysis

Subsequent to all data collection, data analysis occurred. Data analysis of the student self-perception survey consisted of categorizing each student as an intrinsically motivated student or an extrinsically motivated student, according to survey responses. Each question on the survey corresponds to either intrinsically or extrinsically motivated students. Student answers determined a raw score which indicated the category in which each student was placed. Student data was then sorted and graphed via Microsoft Excel for easy interpretation. Data analysis of the teacher-perception survey included dividing the students' perceptions of the teacher into categories. As with the student motivation survey, each question corresponds to specific ideas that are proven motivators and non-motivators in relation to teacher interactions with students. The category the teacher was placed in corresponds to the total score in each category from all surveys. Furthermore, teacher data was then sorted and graphed via Microsoft Excel for easy interpretation. This information will be used to determine the suggested course of intervention for the classroom.

Results

When the data analysis phase of this study was completed, the survey results were quite unexpected. Through the completion of the "Why Do You Come to School" survey, it was found that students who were surveyed, in both school 1 and school 2, are primarily intrinsically motivated. In the high school, school 1, the students responded 78

ti with a definite “How I Feel” (the response found on the survey to indicate a definite yes answer), when asked questions relating to intrinsic motivation. As well, students responded with a “Mostly How I Feel” (the response found on the survey to indicate a majority feeling) response 50 times (26%). Alternatively, students in school 1 responded with “How I Feel” 63 times (32.8%) and “Mostly How I Feel” 23 times (12%), in relation to a question regarding extrinsic motivation factors. These results are illustrated in Figure 1.

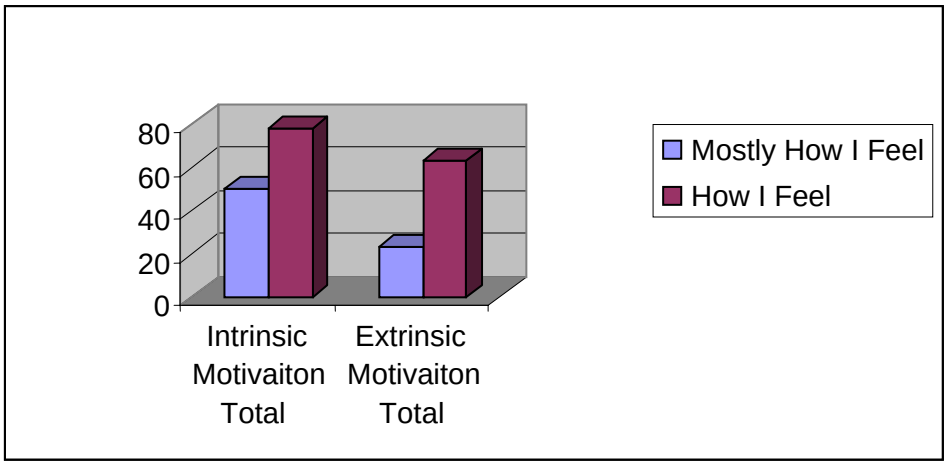

Figure 1. Motivation Comparison School 1.

In the middle school, school 2, the data reflected similar findings to that of school 1. In relation to statements that reflected definite intrinsic motivation qualities, students answered with a “How I Feel” response 58 times (32%). Furthermore, students answered with a “Mostly How I Feel” response 32 times (17%), when presented with intrinsically motivated statements. On the other hand, students provided a response of “How I Feel” 47 times (26%) and “Mostly How I Feel” 26 times (14%), when presented with statements relating to extrinsic motivation. These results are reflected in Figure 2.

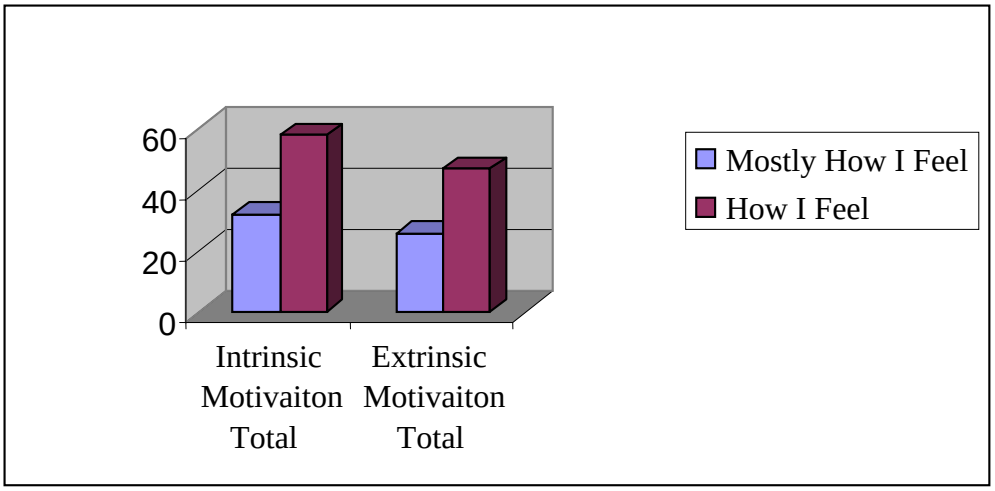

Figure 2. Motivation Comparison School 2.

The completion of the second survey (Your Opinion) reflects how students in school 1 and school 2 feel about their science teacher's motivating behaviors in the classroom. As previously stated, each of the survey questions correlates to either a motivating or non motivating behavior exhibited by the teacher. It was found that, in both school 1 and school 2, the science teachers scrutinized by the respondents exhibit motivating behaviors in the majority of situations. In school 1, students responded with a "How I Feel" response 79 times (54%) and a "Mostly How I Feel" response 35 times (24%), when asked questions relating to motivating behaviors exhibited by their teacher. In contrast, students in school 1 responded with a "How I Feel" response 11 times (6.9%) and a "Mostly How I Feel" response 10 times (6.7%), when presented with questions relating to non motivating behaviors demonstrated by their teacher. These results are illustrated in Figure 3.

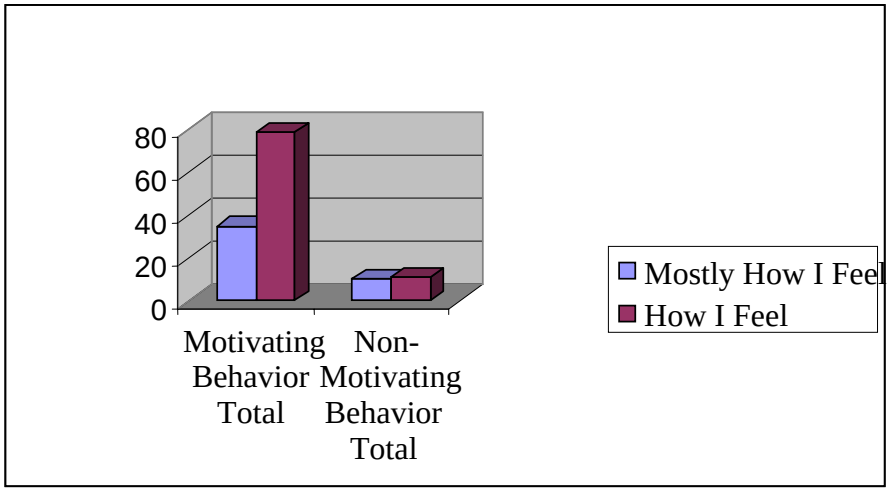

Figure 3. Teacher Behavior School 1.

In school 2, much like school 1, the students responded that their teacher exhibits motivating behavior in the majority of situations. For example, the students responded with a “How I Feel” reply 63 times (48%) and a “Mostly How I Feel” response 34 times (26%), when presented with questions relating to motivating behaviors in relation to their teacher. Conversely, students replied with a “Mostly How I Feel” reply only 13 times (1.0%) and a “Mostly How I Feel” response 17 times (1.3%) when asked to evaluate their teacher in regard to non motivating factors that are exhibited in the classroom. The results of this survey can be viewed in Figure 4.

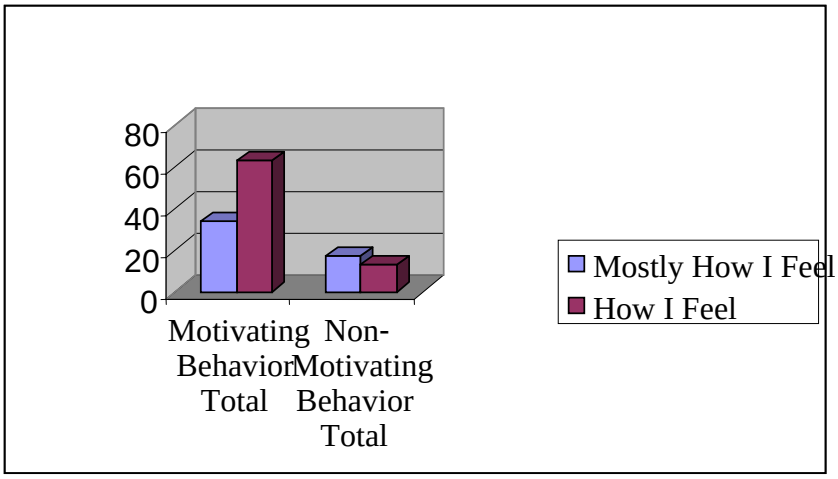

Figure 4. Teacher Behavior School 2.

Conclusions and Recommendations

As a pre-service teacher, the completion of this study was an eye-opening experience. Surprisingly, it was found that the majority of respondents surveyed were intrinsically motivated with regard to school. Many students replied that they were proud and happy when they did well in school. Additionally, a large number of students communicated that they genuinely enjoy coming to school. It was also discovered that a large percentage of the students surveyed view their teacher to have positive, motivating attitudes toward them and the subject matter being discussed. Through the analysis of this data, it can be theorized that teachers that possess a positive, motivating attitude in the classroom help contribute to developing intrinsically motivated students. The National Science Teachers Association (NSTA) concurs with this theory in their publication, *Beyond 2000, Teachers of Science Speak Out*. The following is found in this publication: "Teachers of science must provide their students with inquiries that mentally and physically engage their students with the content and motivation to continue learning"

(NSTA, 2003). Thus, there is a direct correlation between teacher attitudes regarding instruction and motivation in the classroom.

Learning to develop into this positive, motivating influence upon students is a potential obstacle for many educators. Thus, professional development is an excellent way for educators to expand this skill. NSTA further supports the growth of motivated practitioners by providing an abundance of professional development opportunities. Some of these opportunities include the Professional Development Institute (PDI), regional and national conferences, web seminars and NSTA recommended publications such as SCIGuides and the NSTA newsletter, *NSTA Express* (NSTA, 2005). Additionally, an innovative concept, Comprehensive Professional Development (CPD), is on the forefront of educational professional development. This method focuses on, "strategies for facilitating teacher growth through professional dialogue with colleagues, collaborative curriculum development, peer supervision, peer coaching, and action research leading to school wide change" (North American Association of Educational Negotiators, 1999). Educators who wish to research student motivation as a method of professional development have numerous opportunities, some of which provide funding intended for the completion of the research. For example, the William T. Grant Foundation (2005 a) provides funding for educators wishing to study the correlation of motivation at school and Latino successes. This foundation also provides a substantial grant to explore the patterns of motivation in relation to student achievement in school (2005 b). Finally, the United States Department of Education (2005)has a wealth of resources online, regarding research-based grants.

The integration of technology in the classroom is a final aspect that must be discussed when considering teacher and student motivation. The use of technology in the classroom is an invaluable tool for increasing both teacher and student motivation. For example, students who are intrinsically motivated will complete assignments such as WebQuests for the personal satisfaction of completing the assignment. On the other hand, a student who is extrinsically motivated may be motivated to complete the WebQuest due to the fact that they get to complete their assignment by using the computer. Technology is also a motivating factor for teachers and proves to be an invaluable tool in teaching today. From the use of computers to maintain grades and records, to the use of PowerPoint software to conduct lectures, technology is integrated throughout the classroom. Perhaps, teachers who rely heavily on technology may be disposed to include more interactive, technology-based activities in their curriculum that engage and motivate both intrinsically-motivated and extrinsically-motivated students.

The study of motivation in the classroom has proven to be an invaluable experience. Data results reflect that, unpredictably, students are intrinsically motivated in relation to school. This study also revealed that students are motivated by teachers that display positive attitudes. It was also discovered that there are numerous techniques for teachers to expand their knowledge of this subject through professional development and grant writing opportunities. Finally, the integration of technology proves to be an essential factor when discussing motivation in the classroom.

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Appendix A

Why Do You Come To School?

Answer the following questions by circling the number that matches how you ***FEEL*** about school.

1	2	3	4
Not How I Feel	Sometimes How I Feel	Mostly How I Feel	How I Feel

I come to school:

1. Because I'm happy while learning new things.

1 2 3 4

2. Because school will help me get a good job one day.

1 2 3 4

3. Because I *really* like coming to school.

1 2 3 4

4. Because my parents make me.

1 2 3 4

5. Because I am happy when I do well in school.

1 2 3 4

6. Because I want to prove to myself that I can earn good grades.

1 2 3 4

7. Because I'm happy when I find out new things.

1 2 3 4

8. Because I have fun at school.

1 2 3 4

9. Because when I do well in school, I feel important.

1 2 3 4

10. Because it makes me happy to learn about subjects I enjoy.

1 2 3 4

11. Because school will help me decide a career.

1 2 3 4

12. Because I want to talk to my friends.

1 2 3 4

13. Because it makes me happy to finish hard assignments.

1 2 3 4

14. Because I want to prove to others and myself that I am smart.

1 2 3 4

15. Because I will get in trouble if I don’t come to school.

1 2 3 4

Appendix B

Your Opinion

Answer the following questions by circling the number that matches how you ***FEEL***.

1	2	3	4
Not How I Feel	Sometimes How I Feel	Mostly How I Feel	How I Feel

I FEEL that my teacher:

1. Likes Science.
1 2 3 4

2. Makes me feel bad for not doing my homework.
1 2 3 4

3. Grades fairly.
1 2 3 4

4. Has told us what classroom rules to follow.
1 2 3 4

5. Tries to make Science fun for me.
1 2 3 4

6. Gets mad at me for not trying in class.
1 2 3 4

7. Shows me why learning Science is important.
1 2 3 4

8. Calls on me to answer questions.
1 2 3 4

9. Treats others better than me.
1 2 3 4

10. Is excited to be teaching me.
1 2 3 4