Culminating Experience Action Research Projects, Volume 1, Spring 2002

Edited by
Deborah A. McAllister, Peggy S. Moyer, and Susan M. Bothman

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 now 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, has been renumbered (from Education 598) and redesigned to meet a known gap in the degree program: No formal project was seen to completion in which the student planned and revised a project based on newly-acquired knowledge and reflection throughout the licensure process.

Since 1997, the beginning of graduate teacher licensure program for all elementary and secondary majors aside from exceptional student education, the student has completed a prescribed set of eight, 3-semester-hour courses, followed by Education 598 (now 590) Culminating Experience (3 hours) and Education 596 Induction Experience (9 hours). Undergraduate courses are also required to meet specific content area needs for licensure, as determined by the Tennessee Department of Education. The eight courses include the following:

Education 500   Introduction to Inquiry

Education 508   Collaboration and Consultation

Education 514   Teaching in Diverse Classrooms

Education 520   Social and Historical Foundations of Education

Education 521   Human Development Applied to Education

Education 522   Instructional Planning and Evaluation

Education 562   Literacy Instruction for Elementary School Learners, Grade 2 through 5

Or Education 563 Literacy Instruction for Middle/High School Learners

(renumbered from Education 560 Literacy Acquisition and Reading Development)

Education 575   Educational Technology.

During Education 500, which must be completed within the first 9 semester hours, along with Education 520 and Education 521, the student designs an action research project, roughly consisting of the first three chapters of a thesis (introduction, review of literature, and methodology), but geared to a specific problem that has been discussed in a course, encountered in a field experience, or learned about through reports in the media, and that may be researched while completing the Induction Experience.

For the first 7 semesters that the M.Ed. Licensure students completed the Induction Experience (fall 1998 through fall 2001), the project had been designed for Education 500 but went uncompleted in Education 598. During that time, two sets of requirements had been used to meet the 3-semester-hour requirement of the Culminating Experience (M. Farrell, personal communication, 2001):

1.   During the last week of the semester, students met with faculty for on-campus seminars and/or school site visits on topics such as classroom management, portfolios, curriculum standards, school law, and grant writing. Grading was largely by participation. This set of requirements was used from fall 1998 through spring 2000.

2.   Throughout the semester, each student wrote and documented 10, two-page reflective papers on topics such as classroom management (mediation, specific management techniques, sources of help); legal/governance aspects of teaching (school board meeting, how to obtain services, ethics, liability/safety, school funding, teacher organizations); special education (classroom management for students with behavior problems; inclusion in practice; characteristics, needs, and behaviors of special need

students; continuous assessment of students served in several settings; differentiating instruction; alternative settings); school programs (magnet schools, Core Knowledge, Paideia, charter schools, home schooling, school vouchers, character education); and miscellaneous topics (grant writing, technology use by students, interview techniques/conference techniques, community resources, review of journals and textbooks, curriculum development, programs for parents, extracurricular organizations—academically related, research project for school, other topics). Grading was by the UTC professor-in-residence at the second school placement for the Induction Experience for each student. This set of requirements was used from fall 2000 through fall 2001.

The course was not well-received by students. It was viewed as something that had to be done, rather than as a reflective experience, and students felt that many of the topics had been covered previously through readings, discussion, requirements, and field placements for other courses. The course also lacked ownership by faculty. During fall semester 2001, Dr. McAllister was given permission to revise the course to the current action research requirement. The course was being renumbered as Education 590 to differentiate it from Education 598 Research, which was required of M.Ed. students in nonlicensure programs (in general, for students who had received teacher licensure through an undergraduate program). The originally-intended catalog description had also been re-sent for approval: Directed research or development project under faculty supervision. *Prerequisite: Admission to candidacy, approval of M.Ed. committee.*

Despite early problems associated with a change in the course, each student was able to complete a project. Some students had not retained a copy of the project submitted for Education

500; neither had the instructor(s) for the course, if the course had been taken more than 1 semester previously.

The student is prepared to conduct action research through the requirements of the Education 500 course. Action research is defined by Mills (2003, p. 5) as "any systematic inquiry conducted by teacher researchers, principals, school counselors, or other stakeholders in the teaching/learning environment to gather information about how their particular schools operate, how they teach, and how well their students learn." In working through Mills' four-step process in Education 500, the area of focus is determined (step 1) and presented as the introduction to the study; preliminary data is collected, analyzed, and interpreted (steps 2 and 3) and presented as the review of literature; and an action plan is developed (step 4) and presented as the methodology. During Education 590, the project, or action plan, is implemented, results are reported, conclusions are drawn, and recommendations are made. Projects contain both qualitative and quantitative measures, though the focus of Education 500 is on inquiry, rather than educational research and statistical procedures.

The course syllabus, and allowed project modifications, for Education 590 Culminating Experience, are presented in the next section, followed by action research projects from spring semester 2002.

Deborah A. McAllister

Peggy S. Moyer
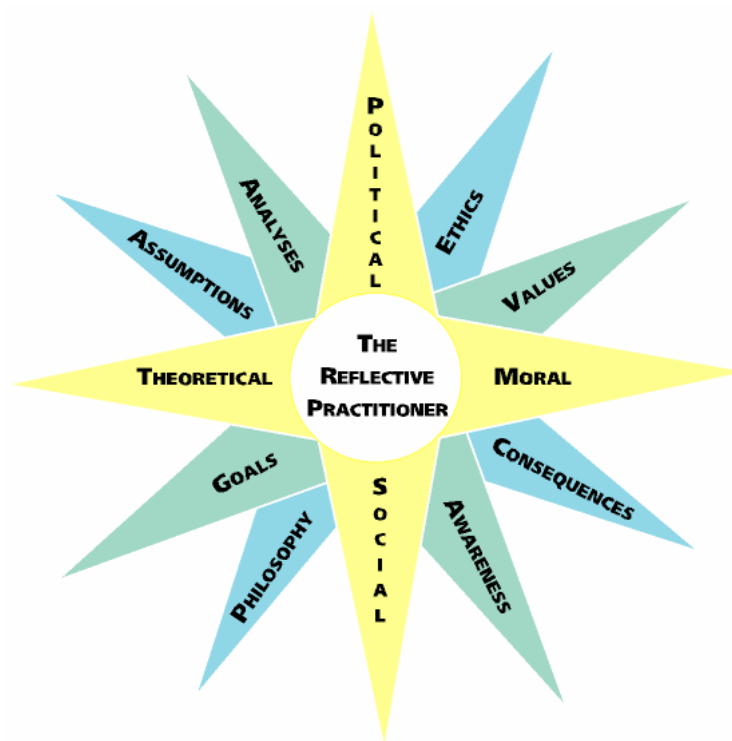
Susan M. Bothman

November 2005

Reference

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

River, NJ: Prentice-Hall, Inc.

Table of Contents – Spring 2002 EDUC 590

Educ 590 Section 001 – Culminating Experience - Spring 2002
3 credit hours – By Appointment

ATTENTION: If you are a student with a disability (e.g., physical, learning, psychiatric, vision, hearing, etc.) and think that you might need special assistance or a special accommodation in this class or any other class, call the Office for Students with Disabilities/College Access Program at 755-4006 or come by the office, 110 Frist Hall.

Educ 590 Section 001 – Culminating Experience - Spring 2002
3 credit hours – By Appointment

Instructor

Dr. Deborah A. McAllister
Office: Hunter 310C. Phone: (Office) 423-755-5376, (Home) 423-842-1607
Office hours: Tu 12:00 p.m. to 4:00 p.m., W 3:00 p.m. to 5:00 p.m.,
           Th 10:00 a.m. to 2:00 p.m., or by appointment
Email: dmcallis@cecasun.utc.edu or Deborah-McAllister@utc.edu
Graduate Assistant:Peggy Moyer

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. (2001). *Using APA format.* Retrieved December 30, 2001, from the Purdue University OWL Web site:
http://owl.english.purdue.edu/handouts/research/r_apa.html

Degelman, D., & Harris, M. L. (2001, December 3). *APA style essentials.* Retrieved December 30, 2001, from the Vanguard University Web site:
http://www.vanguard.edu/faculty/ddegelman/index.cfm?doc_id=796

Dewey, R. (n.d.). *APA publication manual crib sheet.* Retrieved December 30, 2001, from the College of Wooster, Psychology Department Web site:
http://www.wooster.edu/psychology/apa-crib.html

University of Wisconsin - Madison Writing Center. (2001). *Writer's handbook: APA documentation style.* Retrieved December 30, 2001, 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. Submission of a graded copy of the project outline completed for Educ 500. If a graded copy is unavailable, an ungraded copy will be accepted. If no copy is available, you must rewrite the project outline.

2. Modifications to the project, if necessary, based on knowledge gained since the completion of Educ 500. May be sent through email in narrative or list form, and later incorporated into the project outline.

3. Execution of the project, to be completed during the Induction Experience (Educ 596).

4. Use of 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 at tables and figures. See Microsoft Excel [spreadsheet] software, used in Educ 575.

5. Completion of the written project, in APA style, including the following elements, as both disk and paper copies:
   a. A clean copy of the original project outline completed for Educ 500, including any suggested changes from Educ 500 and/or Educ 590, and any modifications made, incorporated into the document.
   b. Copies of the instrument(s) used for data collection. Instrument(s) are placed in individual appendices. Retype instruments from the Web, books, etc., but place a citation on the page and in the reference list. May be sent through email for approval. If you cannot guarantee conditions set forth in UTC's research protocol, you must gain prior approval for the project through UTC's Human Subjects Committee. See http://www.utc.edu/CECA/research/humsub.html
   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. Charts and graphs are imported and labeled as tables and figures.
   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?

6. Communication:
   a. Email address for communication between student and instructor.
   b. Web access to check course announcements on Blackboard. See
      http://utconline.utc.edu/
   c. I will be available to visit with you at your placements and/or in my office.

7. All work is to be computer-generated. Please purchase at least one 3.5-inch high-density
   computer disk or one 100 Mb zip disk for the project. 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 another disk so that it can be accessed, if needed. Reminder: You will need
   a student ID card to use the university student labs in the University Center.

8. Please note:
   a. This project is not the same as either learning assessment completed for Educ 596.
      Provide a statement of learning assessment topics; may be sent through email.
   b. Ask another person to proofread your work for correct syntax and semantics before
      submitting it.
   c. The Writing Center is located in 119 Holt Hall. See http://www.utc.edu/~scribble/ for
      hours and information.
   d. Case studies may be displayed at a professional meeting and/or gathered for a
      publication.

Grading Rubric

Criteria	A	B	C	F
Project outline	Submitted.	Submitted.	Submitted.	Not submitted.
Project modifications	Submitted in narrative or list form; if none are required, a statement is provided.	Submitted in narrative or list form; if none are required, a statement is provided.	Not submitted.	Not submitted.
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 agreement, citations, references, abbreviations, commas, semicolons, lists, tables, figures, appendices, etc.	APA style elements present, with minor errors.	Ideas are understandable; acceptable writing style, though not APA.	Written style is inconsistent; difficult to follow 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	Response time is	Response time is	Response time is

	communication between student and instructor.	greater than 1 week.	greater than 2 weeks.	greater than 4 weeks.
Case study differs from both learning assessments	Yes; statement of learning assessment topics provided.	Yes; statement of learning assessment topics provided.	Somewhat; statement of learning assessment topics provided and they are marginally related.	No; there is little difference. Or statement of learning assessment topics not provided.
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**

First placement

1   Week of 01/07/02   **Please note: Work submitted is due**
     UTC campus-based meetings - MT 01/07-01/08   **by Friday, 5:00 p.m.**
     Explanation of syllabus - T 01/08, 12:15 p.m.
     Schools open - W 01/09

2   Week of 01/14/02   Project outline submitted

3   Week of 01/21/02   Modifications to project submitted
     M. L. King Holiday - M 01/21 (UTC and HCDE)

4   Week of 01/28/02   Instruments submitted

5   Week of 02/04/02   Begin data collection

6   Week of 02/11/02   Continue case study
     Parent-teacher conference (1/2 day) - F 02/15

7   Week of 02/18/02   Continue case study
     Presidents' Day Holiday - M 02/18 (HCDE)

8   Week of 02/25/02   Statement of learning assessment topic, 1st placement
     First placement ends - W 02/27
     UTC campus-based meetings - TF 02/28-03/01

Second placement

9   Week of 03/04/02   Continue case study

10   Week of 03/11/02   Continue case study
     Teacher professional development - TF 03/14-03/15
     UTC spring break

11   Week of 03/18/02   Continue case study
     Out of town for NOVA LDC (tentative)
     Teacher recruitment day - W 03/20

12   Week of 03/25/02
     HCDE spring break
     Good Friday Holiday - F 03/29 (UTC)

13   Week of 04/01/02   Continue case study

14   Week of 04/08/02   Statement of learning assessment topic, 2nd placement

15 Week of 04/15/02   **Completed project due on paper and disk**

16 Week of 04/22/02
   Second placement ends - F 04/26; UTC campus-based meeting - M 04/29
   Out of town for NCTM conference (tentative)

W 05/01/02 - Grades due
Su 05/05/02 - Commencement

APA style (general guidelines from the 5th ed.)

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. On-line source (this is not exact form, but a compilation of several situations; use n.d. in
   place of year if no date is given.)
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 for the Social Studies. (1994). *Expectations of excellence*. Retrieved January 1,
   2002, from http://www.ncss.org/standards/stitle.html

   (Omit the period '.' at the end so it will not be confused in the address.)

Rubrics (examples)

Barnard, P. (2001, September 22). *Paula Barnard's educational resources for a global community of learners: Rubric resources.* Retrieved January 3, 2002, from http://www.asd.wednet.edu/EagleCreek/Barnard/sites/ed/rubric.htm

Chicago Public Schools. (2000). *The rubric bank.* Retrieved January 3, 2002, 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 January 3, 2002, from http://intranet.cps.k12.il.us/Assessments/Ideas_and_Rubrics/Create_Rubric/create_rubric.html

Coxon, E. (2001, November 16). *Rubrics from the staff room for Ontario teachers.* Retrieved January 3, 2002, from http://www.odyssey.on.ca/~elaine.coxon/rubrics.htm

LessonPlanZ.com. (2002, January 1). Retrieved January 3, 2002, from http://lessonplanz.com/ (use 'rubric' as a search term)

South Dakota State University. (n.d.). *Rubric template.* Retrieved January 3, 2002, from http://edweb.sdsu.edu/triton/july/rubrics/Rubric_Template.html

Teach-nology. (n.d.). Rubric, rubrics, teacher rubric makers. Retrieved January 3, 2002, from http://teachers.teach-nology.com/web_tools/rubrics/

The Landmark Project. (n.d.). *Rubric construction set.* Retrieved January 3, 2002, from http://landmark-project.com/classweb/rubrics/4x4rubric.html

Surveys (examples)

The International Consortium for the Advancement of Academic Publication. (2001, December 19). *Resources for methods in evaluation and social research.* Retrieved January 3, 2002, from http://gsociology.icaap.org/methods/

University of Southern Indiana Sociology Department. (2001). *Social research and statistical links.* Retrieved January 3, 2002, from http://www.usi.edu/libarts/socio/stats.htm

Professional Organizations (examples)

American Council on the Teaching of Foreign Languages. (2001). Retrieved January 3, 2002, from http://www.actfl.org/

Council for Exceptional Children. (2002, January 3). Retrieved January 3, 2002, from http://www.cec.sped.org/

International Reading Association. (2001). Retrieved January 3, 2002, from http://www.ira.org/

International Society for Technology in Education. (n.d.). Retrieved January 3, 2002, from http://www.iste.org/

National Art Education Association. (n.d.). Retrieved January 3, 2002, from http://www.naea-reston.org/

National Association for Music Education. (n.d.). Retrieved January 3, 2002, from http://www.menc.org/

National Association for the Education of Young Children. (2001). Retrieved January 3, 2002, from http://www.naeyc.org/

National Council for the Social Studies. (2001). Retrieved January 3, 2002, from
http://www.ncss.org/

National Council of Teachers of English. (2001, November 29). Retrieved January 3, 2002, from
http://www.ncte.org/

National Council of Teachers of Mathematics. (n.d.). Retrieved January 3, 2002, from
http://www.nctm.org/

National Middle School Association. (n.d.). Retrieved January 3, 2002, from
http://www.nmsa.org/

National Science Teachers Association. (n.d.). Retrieved January 3, 2002, from
http://www.nsta.org/

Bibliography

American Association for the Advancement of Science. (1993). *Benchmarks for science literacy*.
Retrieved January 1, 2002, from http://www.project2061.org/ (choose Benchmarks On-
line).

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.

Hamilton County Department of Education. (2000). *Standards- grademarkers- benchmarks*. Retrieved
January 1, 2002, from http://www.hcde.org/standards/stindex.html

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

McAllister, D. A. (1998). *Teacher Preparation Academy*. Retrieved January 1, 2002, from
http://cecasun.utc.edu/~tpa/tpa.html (also see
http://cecasun.utc.edu/~tpa/mcallister/mcapage.html).

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

Microsoft Corporation, Inc. (1994). *In and out of the classroom with Microsoft Works v. 4.0.*
Redmond, WA: Author.

National Council of Teachers of Mathematics. (2000). *Principles and standards for school
mathematics*. Retrieved January 1, 2002, from http://standards.nctm.org/

National Council of Teachers of Mathematics. (2000). *Principles and standards for school
mathematics* [On-line]. Available: http://standards.nctm.org/

National Research Council. (1996). *National science education standards*. Retrieved January 1,
2002, 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.

Poppe, B., McAllister, D., & Richardson, L. (1998). *Science on the web: Web activities using
scientific data.* Boulder, CO: Space Environment Center/National Oceanic and
Atmospheric Administration.

Poppe, B., McAllister, D., & Richardson, L. (1998). *Science on the web: Web activities using
scientific data*. Retrieved January 1, 2002, from http://sec.noaa.gov/Activities/index.html

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

Roblyer, M. D. (2001). *Ten first steps on the Internet.* Upper Saddle River, NJ: Prentice-Hall, Inc.

Roblyer, M. D., & Edwards, J. (2000). *Integrating educational technology into teaching* (2nd ed.). Upper Saddle River, NJ: Prentice-Hall, Inc.

Tennessee Department of Education. (2000). *Curriculum frameworks*. Retrieved January 1, 2002, from http://www.state.tn.us/education/ci/cicurframwkmain.htm

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.

An Action Research Project

"How Can the Challenges Caused by inclusion, on the Instructional Techniques of Teachers and Student Participation, be overcome in the Discipline of Science at the Secondary Level?"

Micha Anez

Spring 2002
The University of Tennessee at Chattanooga
EDUC 590

Introduction

The issue of inclusion in the secondary sciences has been of interest to me for many years. During high school, I had a few friends that had physical or learning disabilities that limited their participation in some science activities. There were very few teachers that made the effort to adapt the activities, so they could actively participate. One of those students is now in medical school, because these teachers helped him to realize that he could succeed in science and other related courses. Overall, my high school did not have an inclusion program, even in the sciences. However, some of the students thrived when they were placed into those classes. I developed a high respect for both the students and teachers that were willing to make the effort so all students, despite possible limitations, could participate in all class activities. The experiences in high school gave me some exposure to situations that I would later encounter during my field experiences. During my graduate field components, I was able to work with hearing-impaired students, students with learning disabilities, and teachers that enjoyed working with students with various special needs. Also as an undergraduate, I taught two young boys will mental disabilities and found that I enjoyed "connecting" with them. Finally, I have noticed that more emphasis is being placed on inclusion in the sciences. Personally, I want to be prepared to effectively meet the needs of all of the students that I will be teaching. I think that all students deserve a good education and should be actively involved in all possible class activities. Therefore, my joy of teaching has lead me to the realization that I want to teach my classes so that all students will benefit and succeed.

Literature Review

        The inclusion of students with various disabilities into regular education classrooms has become an increasingly important issue in recent years. The amendments made, in 1997, to the Individuals with Disabilities in Education Act (IDEA) have greatly impacted the educational treatment of students with special needs (Conn, 2001). Students that are considered for inclusion and special needs services may have one or more difficulties, which may affect their learning. Some of these disabilities may include various learning disabilities, ADD, ADHD, visual impairments, auditory/speech problems, behavioral issues, and physical disabilities (Alexakos, 2001). The IDEA requires that students with disabilities receive an appropriate education in the "least restrictive environment." For most disabled students, this environment is the regular or general education classroom (Conn, 2001). Many general education teachers think that the inclusion of disabled students into their classrooms will take away from the nondisabled students and require an extensive amount of their already limited time (Norman, et al., 1998). Science classes have become one of the most popular types of general education classes for the purpose of inclusion. These types of courses allow for hands-on activities and experience in group situations (McCann, 1998). The inclusion of special needs students into secondary science classes tend to challenge the teachers' instructional techniques and the participation of all students in the class. Researchers and educators have spent a tremendous amount of time focusing on methods and strategies that will benefit all types of learners in science classes. Many educational studies and related research has recommended strategies that have been shown to help teachers and the disabled and "typical" students in inclusion science classes (Alexakos, 2001; Lovett & Horton, 1994).

In the past, research has shown that it is difficult to classify some students with disabilities, especially ones that are not easily observed. Studies have shown that learning disabilities are the most common type of disability among students in our schools (Milone, 2000). There was little evidence to support the benefits of either inclusive or non-inclusive classrooms (Baker, et al., 1995). However, more recent research has shown that students with various disabilities (from learning disabilities to physical impairments) seem to thrive more socially and academically in an inclusive environment. Students with disabilities or special needs tend to flourish in an environment where the focus is on their strengths more than their weaknesses (Norton, 1996). Interactions between disabled and non-disabled peers allow for personal growth and real-world experiences for all individuals involved (Baker, et al., 1995). Two important factors of influence to the effectiveness of inclusion in general education classes, especially the sciences, are teacher preparation and attitude (Norman, et al., 1998).

Many science teachers, as well as other content teachers, feel that they are ill-prepared to effectively teach students with disabilities. Based on a survey by Norman, et al (1998), most science educators believe that they could have had better preparation courses that dealt with teaching students with special needs. However, most of the science education professors that were surveyed felt that graduates from their teacher programs were efficiently prepared. The results from their study revealed that elementary school science teachers felt better prepared to teach disabled students than middle and high school science teachers. Secondary science teachers stressed that their education was more content oriented, rather than more strategy based like those in elementary education (Norman, et al., 1998). Many teachers agree that communications with parents, coworkers, and the disabled students are among the areas that make them feel the most uncomfortable. However, science teachers can find the best methods to use in helping each

of these students meet their full potential by discussing their needs with parents and special

educators (Helmke, 1994). Special educators and professionals from non-educational fields can

usually assist general education teachers in preparing to meet the needs of students with various

disabilities. These individuals may include carpenters, audiologists/speech therapists, physical

therapists, and counselors (Keetay, 1996; Conn, 2001). Teacher preparations and expectations

lead to the other major factor of influence, teacher attitudes toward inclusion (Norman, et al.,

1998).

The attitudes of teachers in an inclusion classroom can greatly affect students' attitudes

and achievement, especially those with disabilities. Results from a survey, of three hundred

disabled adults by AAAS (American Association for the Advancement of Science), affirmed that

a teacher was usually a major influence of either encouragement or discouragement in their

science classes. Studies have also concluded that teachers that involved disabled tend to show

that they value their attitudes and maintain higher expectations for them (McCann, 1998). The

opposite has also been proven true: educators that fail to make an effort to include their disabled

students tend to alienate them further. Attitudes have been proven to be a more serious

impediment than most physical barriers for those students with impairments (Bernhard &

Bernhard, 1999). One of the main concerns of science teachers is lab safety, when including

students with disabilities. They feel that their time is monopolized by assisting these students and

that takes time away from the general education students (Helmke, 1994). Teacher attitudes are

usually influenced by the assistance or lack of in trying to meet the needs of their students. Many

strategies and various instructional methods have been shown to benefit all students, including

students with disabilities. If teachers are willing, these various techniques can help to lessen the

strain that most teachers feel teaching an inclusion science class (Baker, et al., 1995; McCann, 1998).

Adaptations that can be used in science classes that may benefit students with special needs tend to benefit all students. These techniques or methods include multi-sensory activities, collaboration, chunking of material, graphic organizers, and other instructional adaptations (Alexakos, 2001). Learning strategies are some of the easiest techniques to incorporate into science instruction that will be beneficial to all students, especially those with special needs. Students that have language impairments and behavioral issues respond well to activities that incorporate the use of various senses and modalities. This approach is relatively simple, because science teachers have access to multiple resources that can add interest to many lessons. Kinesthetic activities allow students with speech and auditory problems to actively participate. The use of pictures and physical representations are effective ways of teaching students with sensory disabilities (Alexakos, 2001). Group collaboration is a beneficial strategy that works well for most students that are involved in the activity. This instructional model emphasizes group interdependence and mastery of the material being studied. This approach de-emphasizes errors as definite wrongs and focuses on using them as stepping-stones for achievement and learning. Laboratory activities are usually good opportunities for group collaboration. This allows for students of varying academic levels to work as a team. Another useful method of presenting material to students is "chunking;" the teacher presents a small amount of information on a concept and continues to build on it. Students are usually more able to manage, comprehend, and use information when it is presented in smaller segments and in shorter time frames. Graphic and notebook organizers are popular tools used by teachers to keep students on task and organized. These organizers, as well as vocabulary drills, study guides, and computer

software, are useful and simple to use for adapting textbooks. This is useful when a science

textbook is either too difficult for students to understand or too unorganized for comprehension

(Lovitt & Horton, 1994). These few instructional strategies allow students with special needs to

excel better in their classes, especially science. However, they have been proven to be beneficial

for students at all academic levels (Alexakos, 2001; McCann, 1998).

Course specialization, inclusion of technological devices, authentic assessment, and

adaptation of lab experiments and the classroom environment are some other techniques and

adaptations for meeting the needs of disabled students (Milone, 2000; Keetay, 1996). Many high

schools throughout the nation are now offering science classes that prepare students for life after

graduation. Many students with disabilities were being included into science classes that failed to

appeal to them personally. Therefore, educators at some of these schools developed a science

course that focused on concepts that the students would encounter on a daily basis. There are

more than twenty-five major health concepts and other concepts like weather that allow students

to develop an understanding of useful information. An example of such a course is the *Science*

for Living class offered in the Dubuque, Iowa area high schools. This course is offered for

students with disabilities or those that need to learn scientific concepts that relate to daily needs;

these are mainly health related issues (Helmke, 1994). The integration of technological devices

into classroom instruction is another popular form of adaptation for meeting the various needs of

students, especially those with disabilities. Computers are the most common technological tool

used by most teachers in inclusion situations. They are usually incorporated into lessons by the

use of simulations, Internet research, and word processing. Audio and visual computerized

devices are also used for students with specific impairments (Milone, 2000). Educational

research has shown that disabled and remedial students may tend to benefit more from the use of

authentic and multiple assessments, as compared to traditional forms of evaluation. Student

achievement can be better monitored by using so many forms of assessment (McCann, 1998).

The final accommodation techniques that are mentioned in the literature are adaptations for

laboratory exercises and to the classroom environment. Bernhard and Bernhard (1999)

performed research on the use of wheelchairs and other required equipment used by disabled

students in physics lab experiments on friction and velocity. Students with disabilities seemed to

respond well to the experiments that they could physically participate in (Bernhard & Bernhard,

1999). Other lab equipment can be adapted to assist students, as well. Stickkeyboards, joysticks,

and sensory pads are common communication devices used during lab activities for students

with special concerns or difficulties. Audio lab equipment can be fixed with visual aids and

visual instruments can be switched to have an audio output. This allows students the chance to

actively participate in science class (McCann, 1998). Teachers can positively influence students'

participation, also by making just minor or major adjustments to the class setting. This may

include simple alterations or adjustments, such as curtains and carpets for the hearing-impaired,

overhead projections for the visually impaired, end booster blocks and extra space for physically

disabled students. For the learning disabled students, visual aids and charts can be added to the

periphery of the room. Tactile objects are good for ADD and ADHD students, so that their

behaviors remain non-disruptive. If teachers are willing to take the time and make the effort,

special needs students will usually respond positively to the efforts made. In turn, the time spent

to help these students will be evident in the increase of their academic achievement (Keetay,

1996; Milone, 2000; McCann, 2001).

    The literature stresses that all students can benefit from the use of the strategies and

methods mentioned for assisting students with disabilities. They not only learn new studying and

organizational strategies; they develop social skills and learn how to work with diverse individuals. The non-disabled students may become study buddies or peer tutors for the classmates that need assistance. Studies have also shown that if the class is involved in the adaptations and solutions to a complication, they feel important and work as a team. Therefore, techniques that help build the esteem of particular students succeed in that it works for most students (Baker, et al., 1995; Lovitt & Horton, 1994).

Inclusion has become an important issue in our public schools, especially since the amendments were made to the IDEA in 1997. The idea of including students with various learning styles and difficulties into one class has caused a lot of anxiety among many teachers, especially those in the science discipline. However, the fact that many teachers at the secondary level feel ill prepared to teach students with disabilities has caused many universities to reevaluate their teacher education programs. Researchers and educators have also found many strategies that can be effective in teaching students with various special needs. Some of these are collaboration, multi-sensory activities, and adaptation of textbooks. These and other students thrive in an environment where the teacher is considerate and takes the time to make the appropriate changes. The changes could be lesson or environment related. Teacher and fellow classmates' attitudes can greatly affect the success of students with disabilities. If the attitudes are positive, the reaction is usually positive, the opposite has been proven true, too. Therefore, the effectiveness of inclusion in the science class depends greatly on the experiences of all individuals involved.

Description of Problem

Inclusion has become a more important issue, during recent years. Many educators have stressed that students with special needs tend to thrive in general education classes. However, the

issue of inclusion tends to cause mixed reactions among educators. The main concern that many teachers have, when dealing with special needs students, is that the efforts to help them will take away from the other (non-disabled) students. Inclusion into secondary science classes poses challenges to the teachers' instructional techniques and student participation. Educational researchers and concerned teachers are finding strategies and techniques that are helping frustrated educators and students to meet the challenges that they face, as a result of inclusion into their science classes. Some of the most popular and effective resolutions are technology, collaboration and team teaching, multi-sensory instruction, and environmental adaptations. The challenges that science teachers and their students face depend, greatly, on the types of disabilities that the students with special needs in the class have. For example, the changes or adaptations required for a student with a hearing impairment are vastly different from those needed for a student with a learning disability. Therefore, the need for understanding effective and useful strategies that help meet theses various challenges are extremely important to all teachers, especially those in the sciences. It is so important, because science is one of the most popular subjects for students with special needs to be mainstreamed into. Therefore, as a future educator, I am interested in researching the following question: How can secondary science teachers and their students meet the challenges that occur, as a result of the inclusion of students with special needs into their classroom?

A Plan of Action

Population

Population Defined

Two different populations will be used in completing this educational inquiry. The first focus population will be the head biology teacher and her two tenth grade general biology classes

at a suburban high School. There are two inclusion students in the second block Biology class and there are five in the fifth block class. All seven of these students have been diagnosed with some form of learning disability, ADD, or ADHD. During the fifth block, the science inclusion teacher comes into the class on a daily basis. She also consults on the two students in the second block class. The second population of focus will be two of the four seventh grade science classes at a suburban middle school. The sixth and seventh block classes, both, have approximately four inclusion students in them. These eight students have also been diagnosed with various learning disabilities. This team has an inclusion teacher. However, he is relatively busy and does not come to the classes on a regular basis or share information about the students with the fellow teachers. These two populations were chosen because of availability, due to student teaching placements.

Sampling of Study

This study is based, largely, on the attitudes and actions of students and teachers in these particular classroom situations. Therefore, the sampling for this inquiry will be an opportunity sample. This inquiry is based on observing and finding resolutions to the problems caused by the inclusion of special needs students into general science classes. Therefore, this research is more a quasi-experiment.

Study Limitations

The method of using opportunity samples may cause some variation, when trying to generalize the findings to other similar populations. The population, itself, may also cause complications in the generalization of the results of this study. Since this study is based on methods that can be implemented into secondary science inclusion classes to meet possible challenges, the different needs of students may vary between similar populations. Some

generalizations could be made between this study and similar ones. On the other hand, because there are so many types of disabilities the results of this study may not be completely useful to other similar populations.

Measurement

Instruments used in the Study

The most logical methods of data collection for this inquiry are observations and practice, since I am carrying this research out during my student teaching placements. I will also consult with the two different inclusion teachers during each placement. The observations will include the types of learning disabilities that the students in the classes have been diagnosed with and the adaptations required to meet the students' needs. I will be using a check sheet to for noting purposes, during the data collection (A sample is included). These are the best methods of data collections, for this opportunity sample and the given time frame. The main drawback of these techniques is their intrusiveness. Sometimes, it is difficult to maintain a comfortable and relaxed environment when the students and teachers feel that they are being "judged."

Procedure

Necessary Approval

For this study, I needed to get the approval of the cooperating teachers that I was working with. It is important that I discuss my plans and expectations with each of these educators, so they could express any possible concerns. However, the intrusiveness would be minimized because I would be making my observations while I did my teaching. I decided to avoid surveying the students, to maintain a relaxed environment. I also needed to ask for the cooperation of the inclusion teachers that I would be working with. The cooperation of these four teachers helped greatly, in my being able to collect data for my educational inquiry.

Method for the Formation of Study Groups

Since my study is to be based on classroom activities, strategies, and changes, the formation of the study groups is dependent on the class assignment of the students. Therefore, I do not have any control over how the study groups for my inquiry are formed. Since my study is more an observation of an issue, I do not need to be overly concerned with random sampling and control groups, like in an experiment.

Measuring Procedure

This study was performed over a period of approximately 12 weeks. This time frame was based on opportunity and the given time allowances for this study. The data collection began at the high school, during my first placement. I had initial consultations and conversations with the science teacher and the science inclusion teacher concerning my study and possible ways of collecting data. In these conversations, I learned that most of the inclusion students in these biology classes had learning disabilities of some type. Second, I started making observations based on the needs of the inclusion students and the adaptations that were done during class (for example, the inclusion teacher would write main concepts on the board during an activity). Finally, I used modification charts to compare the modifications needed by each student. I used each sheet to develop a sheet for each class block with inclusion students.

I continued my data collection at the middle school. Again, I had initial conversations with the science teacher and inclusion teacher. I was quickly informed that the inclusion teacher was supposed to be present during the two inclusion science classes; however, he rarely was present in the room or for consultation. I was required to discover the needs and learning disabilities of the eight inclusion students by teaching them and communicating with other

teachers. Therefore, I used the same modification charts to keep track of their needed adaptations and compare them to one another.

My observations were done from the point of view of an educator, because I was required to implement the necessary modifications for each student. I was able to observe these classes in both traditional class settings and lab or activity settings. There were many instructional strategies and methods incorporated into the lessons taught to these classes. Some of these strategies include cooperative learning, hands-on activities (like labs and painting), lectures from the overhead, video clips, and modified lecturing. The collected data was compared on a class basis for this study, since all sample populations in this study may vary greatly**.**

Timeline

This study was completed during a twelve-week period of my 4 months of student teaching, in the spring of 2002.

WEEK 1 - Reexamine related Literature Review   (1/14/02)
WEEK 2 - Initial Conversations with Biology Teacher and Inclusion
Teacher (1/21/02)
WEEK 3 - Find/Develop Instrument (observations) (1/28/02)
WEEK 4 - Collect Data by Observation (2/4/02) -HS
WEEK 5 - Collect Data by Observation (2/11/02) -HS
WEEK 6 - Collect Data by Observation (2/18/02) - HS
WEEK 7 - Collect Data by Observation (2/25/02) - HS
WEEK 8 - Collect Data by Observations (3/04/02) -MS
WEEK 9 - Collect Data by Observations (3/11/02) - MS
WEEK 10 - Collect Data by Observations (3/18/02) - MS
WEEK 11 - Collect Data by Observations (4/1/02) - MS
WEEK 12 - Finish up data collection and make conclusions. (4/8/02).

Data Collection

At the high School, I observed and taught two biology classes that had inclusion students. There were two inclusion students in the second block class. Also, there were five inclusion students in the fifth block. The inclusion teacher came in daily into the fifth block class and

assisted with instruction. The following is a combined chart of the modifications needed to meet

the needs of the inclusion students in both biology classes. The modifications for the students

were relatively similar, with the exception of the ADHD student in fifth block. In second block,

there was one ADHD student and one with basic reading difficulties. In fifth block, there were

three with learning disabilities, one with ADHD, and one with behavioral and attention issues.

Disability	LD	ADHD	OTHER	TOTALS
Total students	4	2	1	7
Modification				
Ext. Time	3	2	0	5
Modified Assign.	0	1	0	1
Modified Materials	0	1	0	1
Peer Support	0	1	0	1
Study Sheets	2	1	0	3
Frequent Breaks	0	1	0	1
Calculator	1	1	0	2
Word Processor	0	1	0	1
Preferential Seating	4	1	1	6
Non-Credit	1	1	0	2
Compacting	0	1	0	1
Access WP	2	1	0	3
Dictate	0	0	1	1
Proofread	1	1	1	3
Thesaurus/Dict.	0	1	1	2
Use Calc.	1	1	1	3
Use Manipulative	0	1	0	1
Read Test	3	2	1	6
Extra Time/Test	3	2	1	6
Alt. Format Test	0	1	0	1
Asst. from LT	1	1	0	2
Visual/Hands on	0	1	0	1
Decrease Stimuli	0	1	0	1
Increase Attention To	0	1	0	1

Figure 1. 2nd Block (two inclusion students) and 5th Block (five inclusion students).

This study at the high school went extremely well; I found out numerous, simple ways to modify lessons for students in my class that have various learning disabilities. The inclusion teacher was extremely helpful.

NOTES: Many of the students with learning disabilities needed to be praised often; this tends to encourage them. Also, some of the students thrived when there was more than one teacher available to help with assignments. Teachers were warned to watch for inclusion students that tried to leave class when the material became too difficult.

One positive aspect, of this portion of the study, was the involvement and help that I had from the Science Inclusion Teacher.

At the middle school, I observed four seventh grade science classes; however only the sixth and seventh block classes contained inclusion students. All eight of the students, within both classes, were diagnosed with learning disabilities and one with ADD. The modifications for each student were relatively the same.

Disability	LD	ADD	TOTALS
Total students	7	1	8
Modification			
Ext. Time	7	1	8
Modified Assign.	4	1	5
Modified Materials	0	1	1
Study Sheets	1	0	1
Calculator	3	1	4
Preferential Seating	7	1	8
Proofread	6	1	7
Thesaurus/Dict.	5	1	6
Use Calc.	3	1	4
Read Test	0	1 (needed)	1
Extra Time/Test	5	1	6
Asst. from LT	1	0	1
Decrease Stimuli	0	1	1

Figure 2. 6th Block and 7th Block (both with four inclusion students)

The portion of the study done at the middle school was more difficult than the first one. The inclusion teacher was rarely in the classroom during either of these classes and failed to share IEP information on these inclusion students. However, I was able to collect information on the students' disabilities and needs by working one-on-one with each of them and talking to the other team teachers.

Notes: Most of these students benefited from one-on-one instruction and many of them do better on assignments that are read to them. However, this became a problem, because there was not enough time for me to work with each student and provide instruction for the rest of the class**.**

Results

In this study, I found that a science teacher must modify and adapt many aspects of his/her lessons in order to meet the needs of all the students in a class; especially those with learning disabilities. The main modification needed by the students, in all of the science classes that I observed and taught, was extended time on assignments and exams. Many of the inclusion students at the high school were allowed to go to the lab to have tests read aloud to them. On the other hand, many of the students at the middle school that would have benefited greatly from such an adaptation are not given such a choice, despite teacher encouragement. The students with learning disabilities (usually basic reading, math, or written expression) typically only required minor adjustments and nothing that changed the environment of the classroom. Some of the other most common modifications observed during this study were preferential seating, the use of organizers or copied notes, and access to reference materials and proofreaders. All of these modifications seem to take minimal time from the teacher, but may greatly help meet these students' needs and keep them from becoming too frustrated. The comparison between the

studies at the two different locations is relatively simple. The inclusion students at the high

school appear to have more options open to them and possibly a more supportive inclusion

teacher.

Conclusion/Recommendations

Inclusion into the secondary sciences is not a new problem, but it is still one that causes

mixed reactions among educators. My inquiry into this issue was based on the fact that I will be

confronted with it, on a daily basis, when I start teaching full-time. Researchers have discovered

and found many strategies and instructional methods that can be incorporated into classrooms

that will benefit all students. When the term inclusion is used, it refers to mainstreaming of

students with numerous types of disabilities (not just learning disabilities). This study focused

mainly on the modifications made in secondary science classes for the learning disabled students,

because it was performed with opportunity samples. In order for this study to be more valid,

there need to be more observations done over a longer period of time. Also, I would be interested

in studying secondary inclusion science classes that have some students with other disabilities

(such as physical disabilities, hearing impairments, etc.). Research continues to be done on this

issue, therefore, hopefully in the near future educators can answer the question: "How can the

challenges caused by inclusion, on the instructional techniques of teachers and student

participation, be overcome in the discipline of science at the secondary level?"

References

Alexakos, K. (2001). Inclusive classrooms. *Science Teacher, 68*(3), 40-43.

Baker, E. T., et al. (1995). The effects of inclusion on learning. (*Studies Summary*). *Educational Leadership, 52*(4), 33-35.

Bernhard, K., & J. Bernhard. (1999). Mechanics in a wheelchair. *The Physics Teacher, 37*(9), 555-556.

Conn, K. (2001). Supporting special students. *Science Teacher, 68*(3), 32-35.

Helmke, L. M. (1994). Life skills programming: development of a high school science course. *Teaching Exceptional Children, 26*(2), 49-53.

Keetay, V. (1996). Hearing-impaird children in the classroom: why some stories have sad endings and what can be done about it. *Contemporary Education, 68*(1), 31-35.

Lovitt, T.C., & S. V. Horton. (1994). Strategies for adapting science textbooks for youth with learning disabilities. *Remedial and Special Education, 15*(2), 105-106.

McCann, W. S. (1998). *Science classrooms for students with special needs.* Retrieved May 2002 from http://www.ed.gov/databases/ERIC_Digests/ed433185.html

Milone, M. (2000). Special teachers for special needs. *Technology & Learning, 20*(9), 40-44.

Norman, K., et al. (1998). Teaching students with disabilities in inclusive science classrooms: survey results. *Science Education, 82*(2), 127-146.

Norton, S., et al. (1996). The learning disabled/gifted student. *Contemporary Education 68*(1), 36-40.

Physical Fitness

EDUC 590 Project

Ryan Cooper

Spring 2002

The University of Tennessee at Chattanooga

Introduction

This study focused on the issue of physical fitness. The obesity of American youth has been a serious issue for many years. The fact that it has been directly linked to increased risk of diabetes, cancers of the prostate, colon and uterus, difficulties after surgeries, and to aggravation of symptoms of osteoarthritis, is reason enough for this issue to be addressed (Mayo Clinic, 2001). One of the possible risks is that of cardiovascular disease. Evidence suggests that obesity that occurs earlier in life has a greater influence on cardiovascular disease than does late-onset obesity (Lifshitz, 1991). This is one reason that it is so important that the issue of fitness be discussed. There are risks attached to being overweight. Hypertension is also related to obesity. This is a major health problem in the United States involving over 50 million people (Powers & Howley, 2001). Hypertension, which is abnormally high blood pressure, places an individual that is overweight at risk, due to the excess work the heart is being called upon to do. Weight loss is directly associated with the reduction of blood pressure, therefore reducing the risk of coronary heart disease. These factors that are related to weight issues and health are all too real, and need to be addressed early in a child's development. It has been noted that obesity may decrease one's tendency for muscular activity (Pangrazi, 1998). If this is true, then this may lead into a lifetime cycle of inactivity. What can be done to prevent the condition? Maintaining normal body weight through healthy eating and other lifestyle habits can have a major impact on the prevention of obesity (Wolfe, 2001). This being the case, the overwhelming importance of childhood obesity and possible health related issues must be addressed at an early age.

Psychological health is also important for an overall quality of health. The greatest health hazards to the obese child are considered to be psychological and social (Lifshitz, 1991). The world is simply not set up for the unfit individual. Clothing, bicycles, and school desks are just a

few of the things that obese individuals may have a hard time adjusting to due to their weight. The television shines images of thin, "pretty people" at every turn of the dial. How does this affect a child who is trying to define himself during these years? Another major concern is that of discrimination; this could lead to the exclusion from activities, friendships, and relationships with others. Obesity is not only a physical health issue, but also one of total health. This aspect of health is very instrumental, and more importantly, controllable through education and understanding.

Fitness and flexibility have been directly linked to many chronic and acute back disorders. Many people, from all walks of life, have been affected by such disorders. In fact, back pain is the second most common cause of missed workdays due to illness and the most common cause of disability. This condition leads to $50 to $80 billion dollars annually that is spent on healthcare (Ullrich, 1999). There are some in the health field that look toward a regular exercise routine as the most important weapon against back problems (Mayo Clinic, 2001). A lack of exercise may lead to muscular inflexibility, which can restrict the back's ability to move, rotate, and bend (WebMd, 2001).

These are important facts to examine as our society, overall, seems to be becoming more sedentary. Time is rarely spent foraging for food, hunting, or even splitting wood for the winter. Instead, we stop by the produce market, swing by the meat department, or simply turn up the thermostat to stay warm for the winter. As our lifestyles change and adapt to modern times, so too must our outlooks into health and wellness. Fitness is one of the issues that is directly affected by these changes, and we must be aware of the need for activity to aid in its advancement.

There are many reasons that the issue of fitness deserves attention. The possible future health problems that may arise are important issues to examine. The topic of monetary expenditure is also something that affects our society as a whole. The general and overall health, wellness, and quality of life are also extremely important issues when discussing fitness. This study is aimed at addressing these issues, and beginning to look into the overall issue of health and wellness.

Purpose

The major purpose of this study was to determine if the participation in a middle school physical education class had any effect upon fitness.

Statement of Problem

This study was designed to answer the following questions:

1. Does participation in a middle school physical education class improve an individual's general fitness?

2. Is there a significant difference in the general fitness of males and females?

3. What type of fitness activities are incorporated in the physical education program?

Hypothesis of the Study

The null hypothesis for this project was as follows: there was no change in the students' general fitness as a result of participation in a middle school physical education class.

Method of Measurement

The following page is a description of the method of measurement that was used for this particular study. The definitions of the exercises used as measurement tools are also included in this section:

Student Performance Data
Pre-/Post-Test

During each 8-week student teaching placement, it was required to gather statistics to measure student learning. The design for the pre- and post-test activity, was for a lifelong fitness activity. The activity included five different exercises that were to be performed at 30-second intervals. The number, or amount, of the exercises correctly completed was then recorded on a Student Fitness Card. The following is an example:

Name	Pre-test	Post-test
Jumping Jacks	_____	_____
Burpees	_____	_____
Lateral Jumps	_____	_____
Mountain Climbers	_____	_____
Laneslides	_____	_____
Totals	_____	_____

Definitions:

Jumping Jacks-during the action phase, the arms, and legs are abducted on the initial movement, and are adducted in the return movement.

Burpees-individual squats to a catcher's position, places weight on hands, extends legs behind until full extension is reached, returns feet to catchers position, and stands erect.

Lateral Jumps-with two feet together, the individual jumps from side to side in order to clear a two-inch wide line on the gym floor.

Mountain Climbers-individual starts on all fours with weight on hands, the feet are brought up one at a time to just behind the hand of the same side of the body, to simulate "climbing a mountain." The counting is done on a four count: 1-2-3-1, 1-2-3-2, 1-2-3-3…

Laneslides-the number of times a student can "side slide" in a basketball lane touching the lane lines with their opposite hand.

The following information will be included in this section: summary of literature reviewed, conclusion, and recommendations. The summary of literature simply states why and how the current information aided in this project. The conclusion will incorporate either the acceptance or rejection of the hypothesis. The last section will refer to any recommendations that may be made to future researchers of this topic.

Summary of Literature

Several pieces of information were gathered from the review of the related literature regarding the issue of fitness. The information began to lay the foundation of the purpose of the study, the need for the study, and the procedures to follow throughout the research process itself.

The review of the related literature lead to the purpose of the study. There was little information found that showed that participation in middle school physical education classes had a positive effect on overall fitness. The general purpose of this study was to look directly at the effects of participating in a middle school physical education program.

The literature also helped in determining the need for this study. The question of the quality of programs that are offered at the secondary school level was central to the theme of this project. Are the middle school classes effective in health promotion? The literature found did not seem to offer a direct answer to this question, therefore pointing to a need for the inquiry itself.

The procedures that were followed throughout the investigation were taken directly from the literature reviewed. The review of the related literature set the very foundation of the project itself. It guided and steered the project at every turn. The literature pointed to not only the purpose of, the need for, and the procedures for the project, but all the aspects that were needed to carry out the project as a whole.

Conclusions

From the results of this project, the following conclusions were made:

The null hypothesis, that there would be no change in fitness after the participation in a middle school physical education class, was rejected.

The participation in a middle school physical education class did increase all of the subjects' fitness scores.

This activity was designed to determine and monitor the student's level of physical fitness. Each physical education class was started with a similar series of exercises to further the idea of lifelong physical fitness skills. Although there was a grading scale associated with this activity, the students were encouraged to compete with their own previous score. This self-improvement will be taken into consideration during the student's final evaluation.

The activity incorporated three distinct phases: pre-pre-test, pre-test, and a post-test. The pre-pre-test was given in order for the students to fully understand the exercises, testing procedures, and the self-scoring process. The pre-test was given, for a grade, to determine the student's level of fitness and to indicate the overall level of fitness to the instructor of the physical education class. The post-test was given after 4 weeks of classes and each student's results were discussed individually with the student. This activity can be used as a one time pre- and post-test activity, or could be used several times throughout the semester or school year, in order to monitor fitness levels.

The scores of this class did improve down to the lowest scoring individual in the class. This improvement showed that every student's fitness level did increase to some degree. Again, the results of this type of testing can be used to either zero in on an individual's progress, or to

rethink the overall class activities, in order to reach a higher fitness goal for the entire class as a whole.

Recommendations

From the results of this research, the following points are recommended:

1. The researcher might choose a larger number of subjects. The results may be more valid if more subjects were tested for this type of study.

2. The use of more than one method of measurement may increase validity. The implementation of different testing procedures and comparing the different results may improve the overall validity of this type of study.

3. Using a sample group from more than one middle school may also improve the external validity of the study.

4. Gathering the sample from more than one part of the country may also improve external validity.

5. The researcher should be aware of comfort and safety issues in determining what type of tests to use. Different tests may be better suited for different age groups.

6. The research should last longer than 4 weeks. The treatment period was limited due to time restraints. The increase in treatment duration may further influence the results of the study.

7. The treatment program could be more regimented.

8. The subjects out of class physical activity could be recorded in a fitness journal. This would help to determine if out of class activity had any affect upon the testing results.

Reference List

Lifshitz, F., Finch, N., & Lifshitz, J. (1991). *Children's nutrition.* Boston, MA: Jones and

　　　Bartlett Publishers.

Mayo Clinic. (2001). *Back pain: Guide to prevention.* Retrieved 2/25/02, from

　　　http://www.mayoclinic.com/home?id=HQ00298&bucket=staged

Mayo Clinic. (2001). *Childhood obesity- A big problem.* Retrieved 2/25/02, from

　　　http://www.mayohealth.org/home?id=Fl00057

Pangrazi, R. P. (1998). *Dynamic physical education for elementary school children.* Needham

　　　Heights, MA: Allyn and Bacon.

Powers, S., & Howley, E. (2001). *Exercise physiology.* New York, NY: McGraw-Hill

　　　Companies.

Seefeldt, V. (1987). *Handbook for youth sport coaches.* Reston, VA: American Alliance for

　　　Health, Physical Education, Recreation, and Dance.

Ulrich, P. F. (1999). *Introduction to back pain and neck pain.* Retrieved 2/25/02, from

　　　http.//www.spine-health.com/topics/intro/top01.html

WebMD. (2001). *What are the effects of exercise on muscles, bones, and joints?* Retrieved

　　　2/25/02, from wysiwyg://141/http://my.webmd.com/content/article/1680.52888

Wolfe, K. (2001). *Obesity.* Retrieved 2/25/02, from

　　　http://health.discovery.com/diseasesandcond/encyclopedia/1658.html

How Academic Attitudes Affect Academic Performance

Jeremy Hall
Spring 2002

EDUC 590
The University of Tennessee at Chattanooga

INTRODUCTION

Student teaching has opened my eyes to a world in dire need of aid. Before my student teaching experience, I enjoyed the luxury of writing perfect lesson plans with students in mind. The problem with this scenario is that teachers and future teachers alike forget to include motivational activities for all the academic attitudes. I believe that three academia attitudes exist: initiative, necessary evil, and apathetic. Teachers must keep these academic attitudes in mind when they write lesson plans because teachers are to teach the entire class, not just the few students who really want to learn.

PROBLEM

When I was a substitute teacher, I was assigned to a long-term assignment at Seqouyah Vocational Center. During this time, I taught Shakespeare, Julius Caesar, and Macbeth to sophomores and seniors. I clearly remember that a small percentage of the class seemed interested in the topic. One afternoon, a student asked a question concerning the upcoming test. Then, he informed me that he just wanted to pass the class and that he was not interested in the topic. I thanked him for his honesty and pondered the idea of academic attitudes. This student viewed Macbeth as a necessary evil that he had to pass to graduate high school. It is much the same in middle school.

My first student teaching placement was at an urban magnet middle school. During this placement, I taught seventh grade language arts. My unit was based on a novel, *A Year of Impossible Goodbyes*, and I noticed the three academic attitudes previously mentioned 2 days into the unit. Several reasons could account for these attitudes. First, the two blocks or classes read on a fifth grade-level. Therefore, reading is not their strong subject. Secondly, my teaching style sharply differed from my cooperating teacher's. Lastly, I firmly believe that academic

attitudes are determined by the academic success of the student. In most cases, students' academic attitudes are a direct reflection of the success in the classroom, good or bad.

ACTION PLAN

I choose to perform my study on seventh graders at an urban middle magnet school. During my placement, here, I surveyed a social studies/language arts class for the three previously mentioned academic attitudes. I further based my study on the unit test scores and the pre-/post-test assessment) of each respective academic group.

CHARTS

The first chart simply provides the reader with a visual breakdown of the academic attitudes. It helps to see what percentage of the class is proclaiming what academic attitude.

The second chart displays the unit scores according to letter grades. As a whole, the necessary evil and the initiative group faired better than the apathetic and no response groupings.

CONSIDERATIONS AND FOLLOW-UPS

After I finished this study, I realized several things I would have changed. First, a chart of their daily work would better assess a student's everyday attitude towards learning, because the fact remains that not all students are good test takers. Secondly, for this study to be effective, aim academic survey should be taken in all the student's subjects, not just one subject. Then, a team of teachers could better assess academic attitudes.

I would also propose two follow-up programs. First, the same survey should be taken in the next grade of that student's academic career. Secondly, if the student is in the apathetic or necessary evil grouping, that student should receive help to enjoy the learning process or realize the importance of passing the current grade in their academic career.

TITLE: How can Teachers Develop Students' Motivation - and Success?

AUTHOR: Interview with Carol Dweck

SOURCE: Education World

REVIEW: Carol Dweck, a Columbia University psychology professor, leads the educational field in motivational and personality development. Education World asked her several questions concerning students' motivation in the following interview.

Education World first asked Dweck if she had been able to link students' abilities or intelligence to the development of mastery-oriented skills? She responded by saying that there is no real link (between the two ideas. However, the "smart" students usually shy away from the difficult challenges, while the plain students are the workhorses. These "plain" students surpass their expected goals. According to Dweck, this scenario proves that academic success is a state of mind, not natural intelligence.

The second question asked was: How can teachers promote mastery-oriented skills that allow students to face difficult challenges? The advice that she gave was to center the attention on effort; not ability, so that, when the students fail in an assignment the focus is on how they can do better. She also said to provide constructive criticism (i.e., strategies and praises for effort). In turn, the teacher should praise the effort for tackling the difficult task. This way the student will learn the joy of academic trials.

Dweck shared a story of two college students that were struggling in a computer science class. In fact, one student was in his second try of the class. Dweck was amazed to hear that these students were debating on making their major computer science. She noticed that effort was the driving force for their decision, not intelligence. This characteristic is

common in learning-oriented students. Dweck suggests that a good balance of value on grade and a value on learning produce the best student.

The next question concerned the concept of intelligence. Is it fixed or is it variable? For the most part, variable or changing intelligence can be taught, but some students see intelligence as a fixed trait. Her studies show that students who see intelligence as a variable entity perform better in school. The reason for this result is because academic eagerness can be taught through hard work and the practice of facing one's fears.

The next question asks if fixed intelligence classrooms can learn to face new challenges? This topic is crucial in learning, because these students perform task very well. But, if these same students fail at a task they lose all academic confidence. In turn, the joy of learning is crushed, probably because the present task only measures present skills, but mistakes and failures can refocus the student's aim if the teacher is careful.

The next question deals with the fact that most students do well in elementary school, but die academically in middle school. This is easily explained. The fixed intelligence student sees a new challenge, tries it and fails. If this scene is not remedied the student will withdraw academically. The downward spiral follows shortly after. However, the variable intelligence students adjust to the new challenges of middle school.

Dweck was asked if there was a connection between academic success and the ability to face new challenges. She replied by saying that there is no relation between the two ideas She said it comes down to the attitude of the student.

The interviewer asked her if teachers were to make the students feel smart or educated. Dweck stated that most of the low self-esteem problems are the fixed intelligence students. In six studies, she proved that praising students for their "smarts" served a short-term success as

opposed to the long-term effects of praising effort. In fact, her studies showed that praising intelligence focused the attention on intelligence, not effort. In turn, these students set low goals and shied away from difficult challenges. So, failed challenges to the fixed intelligence student was seen a sign of ignorance. On the other hand, the plain students saw failure as a learning process and a sign to work harder. Also, the plain students preferred the harder tasks, because more had to be exerted. Therefore, the plain student in the long run outscored and out performed the fixed intelligence students. Overall, fixed intelligence is judged by IQ tests and variable intelligence is measured by daily challenges.

Dweck closes the interview by saying that motivation outweighs primary ability when it comes to academic success in the years to come.

TITLE: Student Motivation To Learn

AUTHOR: Lumsden, Linda S.

SOURCE: ERIC Clearinghouse on Educational Management

REVIEW: In this article, Lumsden suggests that students lose interest in the learning process as they grow older. These students view learning as a necessary evil rather than an awakening process. Our job as educators is to minimize this academic apathy.

What exactly is student motivation? In plain terms, student motivation is a desire to involve oneself in the learning process. Personal reasons for motivation varies depending on the student. For example, the motivation for performing a task or passing test will differ, from student to student. One student may perform the task so that the student can learn about the topic for personal reasons. On the other hand, one student may learn the material to pass the test for the grade and gain approval from the teacher.

Many factors influence student motivation. First, students have a natural curiosity and will ask questions to fully understand the concept. These students see the learning process as an adventure. This learning adventure will allow the students to take chances and learn to think independently. But, some students lack this confidence and will trudge through their studies. These students are easily discouraged and unmotivated.

These learning habits are formed early in one's life. In the early years of school, the reaction to successes and failures will determine their path of learning. This starts with the teacher. Teachers who hold goals for students foster an adventurous learning process. The policies, procedures and goals of a school will also determine later learning habits. Once again, high standards usually promote better learning habits. Danger falls to the student that sets lofty goals, though. Too many failures or setbacks might shake their academic confidence. This unfortunate incident may send an academic star into a downward spiral.

Students that love to learn usually exert more effort into their studies. Their study methods demand more time and energy, but the results are worth the effort. For example, these students use more logic-based thinking skills and decision-making skills, so these students prefers, challenging activities that stimulate the learning process.

Motivation can be swayed either way depending on the classroom environment. A successful and uplifting classroom environment should support the student both socially and academically. The teacher should also make the information relevant to the students. This practice allows the students to personally connect with information.

Another good practice is setting small goals; these goals will ensure success and confidence. Beware of rewards, such as praise and treats; they may spoil the learning process.

Unmotivated students are in dire need of self-worth. Lumsden suggests a process called attribution retraining. This process models proper socialization and uses practice exercises to motivate at-risk students. The process has three goals. First, the student needs to learn to focus on the task and forget about their failures. Second, the students need to learn to avoid frustration. The student should explore other methods of solving the problem. Hereby, the student learns to think independently and acquire problemsolving skills. Lastly, if the failure occurs, the student should question why failure occurred, not question the student's intelligence.

TITLE: General Principles of Motivation

AUTHOR: unknown

SOURCE: unknown

REVIEW: This article suggests some practical motivational tips to use in the everyday classroom. Also included is a list of techniques and strategies to guide the most unmotivated student. The motivational tips are discussed first.

The first motivational tip mentioned is to create a positive learning environment. This would include a classroom that invites the student into an efficient, but fun learning world. This classroom can be obtained by using visual aids and the like that focus the student's discovery. Furthermore, the second tip enhances this environment by the use of incentives (i.e., praise and Coke passes). Also, the teacher should remember to reinforce the learning process with continued praises. But, all teachers must beware of the pitfalls of incentives.

By this token, the author cautions that too much incentive kills the independent learner. In this case, the teacher should monitor the students for their time to learn. An effective teacher will notice these teachable moments and use them wisely. The previous advice is enhanced if the teacher is organized and can relate the information to the daily life of the student.

The author goes on to state that the previous tips are helpful, but null and void if the goal is aimed too high. In fact, the majority of the students will choose the intermediate task over the difficult or easy task. Therefore, it is pertinent to discuss techniques that reassure the student of their academic ability. For instance, the learning process will cause some natural stress. The way a student responds to stress, mild or severe, will determine their academic success. In the case of a student that responds severely to stress, this student will shut down academically. By this

token, it is crucial that teachers set small goals to build upon. Then, the teacher can edify the student with positive feedback and constructive criticism.

      Constructive criticism from other students might help, as well. Study groups with their comparable peers, both socially and academically, will most likely decrease the heightened anxiety levels. The author strongly suggests that all the mentioned techniques are most effective when mixed together in practice.

ACADEMIC ATTITUDES SURVEY

1. Circle the academic attitude that fits you best.

   Initiative (motivated to learn)

   Necessary evil (motivated to pass)

   Apathetic (don't care either way)

2. Depending on your academic attitude that you chose. Please, answer yes or no to the set of questions for your academic attitude.

INITIATIVE (MOTIVATED TO LEARN)
A. Are you grade-driven?

B. Do you have a personal interest in the lesson?

C. Are you encouraged often? If so, by whom?

D. Are you encouraged at all? If so, who often?

E. In this classroom, do you experience consistent teaching or inconsistent teaching?

NECESSARY EVIL (MOTIVATED TO PASS)
A. Are you grade-driven?

B. Are you sports-driven?

C. Are you encouraged often? If so, by whom?

D. Are you encouraged at all? If so, who often?

E. In this classroom, do you experience consistent teaching or inconsistent teaching?

APATHETIC (DON'T CARE EITHER WAY)
A. Are you encouraged often? If so, by whom?

B. Are you encouraged at all? If so, who often?

C. Were you ever aided with your schoolwork at home? If so, how often?

D. Why don't you care about your grades?

E. In this classroom, do you experience consistent teaching or inconsistent teaching?

An Examination of Differentiated Instruction as Used in the

Secondary Science Classroom

Daniel Towers Lewis

Presented to

Dr. Deborah A. McAllister
In Fulfillment of the Requirements for
EDUC 590 Culminating Experience

The University of Tennessee at Chattanooga

Chattanooga, Tennessee

April 28, 2002

An Examination of Differentiated Instruction as Used in the

Secondary Science Classroom

Abstract: Educational research indicates that students learn better when the instruction they receive incorporates aspects of multiple intelligence theory. One method of incorporating the multiple intelligence involves using graphic organizers and other visuals associated with the Spatial intelligence. Utilizing Gardener's theory of multiple intelligences, while celebrating diversity among the students, allows teachers to equate the way they teach students in the way the students learn.   At the same time, incorporation of multiple intelligence theory affords students the opportunity to fully develop all of their intelligences to their fullest potential. Students enjoy using the theory of multiple intelligences in learning. Being given a choice of how to learn evokes a positive response among students, and makes learning science enjoyable for them (Goodnough, 2001).

In today's job markets, knowledge of science is becoming more and more important. Unfortunately, minorities are not learning science very well (Schwartz, 1987). As a result, minorities are underrepresented in careers in science, mathematics, and engineering (Marinez, de Montellano, & Bernardo, 1988). For these reasons effective science instruction among minorities is of paramount importance.   The study discussed in this paper looks at both the cognitive and affective results of using multiple intelligence theory in instructing minorities in science. The subjects in this study attend a school which has historically produced low cognitive achievement. They are what are commonly called "at-risk" students. Reaching these students in all academic areas is essential, and the key to achieving that must be discovered.

Methodology: The importance of reaching minorities with effective science teaching makes it an obvious choice to study how minority students learn using multiple intelligence

theory. The school examined in this report in an inner-city high school in Chattanooga,

Tennessee. At this school research was conducted among a group of physical science students.

These students represented the entire range of high school grade levels.   The study was

conducted over a period of one and a half weeks.

Research began by determining the multiple intelligence and preferred learning style of

each student. Teachers' knowledge about the learners in their class should include a

consideration of "… differences in interest, learning style, disability, language and culture…"

(Goodnough, 2001, p. 181). Initial data was also collected on the students' attainment of

cognitive and affective objectives related to the subject being taught.

Effective science teachers know about the students in their class and use this knowledge

to personalize learning. Knowledge about learners may be divided into personal and technical

knowledge (McCombs, 2001).   In-depth knowledge about personal issues lays the foundation

for knowledge about technical issues. Through the process of differentiated instruction, teachers

reach out to individual students and optimize their learning experience (Tomlinson, 2000).

A learner's motivation dictates what is learned and the extent of learning that occurs.

Students especially find science instruction irrelevant, and consider their involvement in the

learning of science as passive (Sunal, Whitaker, Freeman, & Odell, 2001). For this reason the

affective domain of learning was emphasized as well as the cognitive.

Students received instruction in a variety of styles during the study. Some research

indicates that matching instruction to the learning style of the students will increase academic

performance (Claxton & Murrall). Additionally, students were given an opportunity to complete

an authentic assessment of their learning in the form of a short student created portfolio

assignment.   The intent of the portfolio assignment was to allow students to learn material in a

way compatible with their learning style while also allowing them to demonstrate learning in a way that was meaningful to them. Leading students through an inquiry, which genuinely interests them, allows teachers to engage their students (McCombs, 2001).

The portfolio was to function as a tool for individualizing instruction (Grace, 1990). At the conclusion of the study, students were also given a standard assessment of the advances they had achieved in both the cognitive and affective learning domains. This allowed the researcher to compare achievement in these domains by students throughout the study. It also functioned as a measure of the effectiveness of the instruction offered during the study.

For clarification purposes, this study presents both statistical data on the whole population and data about specific students. The data is presented in statistical formats (tables and graphs) and narrative formats. The specific data presented is from the students showing the lowest affective pretest scores and the highest affective pretest scores from each of the three blocks in which instruction occurred. These subjects were selected because they represent a fringe of the whole population. They represent those who would rather have almost nothing to do with the subject matter covered during the unit of instruction as well as those claiming to be eager to learn the subject matter.

Study Group Demographics: The study school's 2001 Tennessee State Department of Education Report Card shows that it has a student population of 886 students. Of this student population 95.3% are African American, 3.7% are Caucasian, 0.9% are Hispanic, and 0.1% are Asian. At this school 76.4% of the student population is on a free or reduced lunch program. Academic performances at this school are low, as evidenced by performances on the ACT test. In 2000 the school's average ACT score was 14.9. In 2001 there was a slight improvement as the average ACT score was 15.1. National and state averages on the same test are scores of 20.0.

The State Department of Education regards the school's performance for both years as deficient. The expectations of the Tennessee State Department of Education would be that students graduating from their secondary schools achieve ACT scores at the minimum level required for a student to enter a Tennessee public institution of higher education without having to take remedial work. This is expressed as an ACT composite score of 19 (Tennessee Department of Education, 2001).

The ethnic, economical, and academic data about the school in which the study was conducted show that its student population is clearly an at-risk population. Ultimately at-risk students have a very high chance of failing academically and dropping out of school (Pallas, 1989). For these very important reasons teachers of at-risk students must develop the most effective ways of teaching their students. The problems facing American education are greatly magnified among at-risk learners. It is important to consider these factors as one looks at any performance data collected at this school.

All of the students in the class studied were African American. The class was divided into three groups that met in separate blocks. The students in each block may be divided in the following manner (See Table 1):

Table 1 Breakdown of the Study Population by Gender and Grade Level

Block	Males	Females	9th	10th	11th	12th
1	09	20	17	03		1
2	08	10	11	05		2
3	07	23	19	06	1	1
Totals	24	53	47	14	1	3

The group consisted of a majority of ninth graders and females. Fifteen students among the whole population were repeating the course because of a previous failure. The Tennessee Department of Education requires the successful completion of physical science for graduation

form high school. This is why the class also contained some eleventh and twelfth grade students.

None of the students in the eleventh or twelfth grade was repeating the class.

Learning Styles Among the Study Subjects:

An essential component of this study was the assessment of the students' learning styles

and multiple intelligences near the beginning of the study.   This data about students would be

used to help guide them in selecting the nature of their portfolio. Additionally it was hoped that

the data collected during this phase of research would make explicit the best way for this student

population to learn (Claxton, & Murrell, 1988).   The researcher administered a student survey

on which students selected phrases that described how they like to learn (see Appendix 1). The

phrases on the survey were divided into the three broad categories of tactile kinesthetic learning,

visual learning, and auditory learning.   Each category allowed the student to select from 15

statements.   Scores are based on the number of statements checked in each category.

Information on learning style preference was collected from 43 of the students in the population.

This portion of the student population scored average scores of 7.9 in the tactile kinesthetic

category, 7.0 in the visual learning category, and 6.7 in the auditory learning style. Figure 1
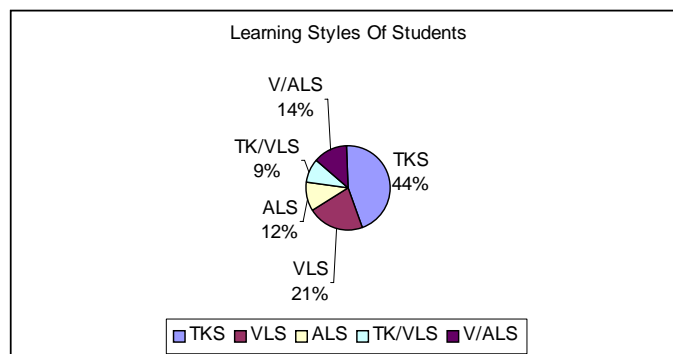

Figure 1. The pie chart shows the presence of learning styles among subjects within the study

population.

shows the number of students who selected each category as their dominant learning style. On Chart 1 TKS represents tactile kinesthetic learners, VLS represents visual learners, ALS represents auditory learners, TK/VLS represents tactile kinesthetic/ visual learners, and V/ALS represents visual/auditory learners. The chart displays percents of the population evaluated.

Any statistical representation of students' learning styles is limited in the information it presents. True assessment of learning styles requires that one look at the scores of individual learners in great detail. This is illustrated by looking at our six specific case studies. Recall that these students represent the highest and lowest pretest affective scores within their block. Table 2 gives a breakdown of learning style among six subjects from within the whole population.

Table 2 Learning Styles of Six Specific Subjects

Subject	Gender	Grade	TKS	VLS	ALS
A2	F	10	11	09	10
A20	F	09	07	08	08
B14	F	09	14	09	06
B18	F	09	06	05	08
C6	M	09	03	07	06
C16	M	10	13	03	07

A subject such as A2 would be regarded as a tactile kinesthetic, although her scores show very little difference in her preference for learning style. A subject such as A20 would be regarded as a visual/auditory learner, although her scores show very little difference in her preference for learning style. In the case of subject B14 one observes a definite preference for the tactile kinesthetic learning style. In the case of B18 auditory learning would be indicated as her preferred learning style, but visual and tactile kinesthetic learning play a significant role in how she enjoys learning. C6 would be classified as a visual learner, although his preference for auditory learning is also very important in how he learns. These test results indicate that tactile

kinesthetic learning is not significantly important to C6.   Subject C16 exhibits a high preference

to learning in a tactile kinesthetic learning style.   A more detailed examination of how one's

students say they prefer to learn is helpful for any teacher (Claxton, & Murrell, 1998).

multiple intelligences among the Study Subjects

Along with learning stiles, students were also evaluated in their use of the multiple

intelligences. Gardner defined intelligence in broad terms as "the capacity to solve problems or

to fashion products that are valued in one or more cultural setting." Gardner concluded that

multiple intelligences arise from both biological and cultural sources.

In the biological domain, learning results as synaptic connections between cells become

modified.   Each type of learning results in synaptic connections forming in different parts of the

brain.   Within the cultural context, the value imposed upon the ability to accomplish certain

tasks provides the driving force to become masterful at performing those skills.   The emphasis

culture palaces on various skills will determine which skills flourish within that culture (Brualdi,

1996).

For this evaluation students were once more given a survey (see Appendix 1). The

survey asked students to rank statements (from 1 to 9 with 1 being the most dominant and 9 the

least dominant) which described their preferred way of learning. In the process of collecting this

data, some anomalous data was obtained. The anomalous data will first be considered separately

and then combined with other multiple intelligence data.

Anomalous multiple intelligence Data

Nine of the subjects simply marked applicable selections with a check mark as they had

been instructed to do on the learning style inventory. Confusion arose among students between

how the learning style survey was completed and how the multiple intelligence survey was to be

completed. Interestingly, all subjects that used check marks rather than numbers had indicated a preference for a tactile kinesthetic learning style, however not all tactile kinesthetic learners used check marks.   Of the nine subjects that used the check marks only one indicated a preference for the linguistic or mathematical intelligence.

Table 3 presents the data set collected from subjects using the check marks. In following series of tables and figures, the following abbreviations are used: Ling = Linguistic, Mat = Mathematical, Spat = Spatial, Mus = Musical, Kine = Kinesthetic, Inter = Interpersonal, Intra = Intrapersonal, Nat = Naturalist, and Ex = Existentialist.

Table 3 Anomalous Multiple Intelligence Data Collected from Subjects

Subject #	Gender	Ling	Math	Spat	Mus	Kine	Inter	Intra	Nat	Ex
A11	F						v	v		
B8	F				v	v		v		
B9	F			v	v			v	v	
B14	F					v	v			
C1	M				v	v	v			v
C7	M	v			v	v	v			
C16	M				v	v	v			
C23	M				v	v				
C30	M	v	v		v	v	v	v	v	v

The researcher interprets this data set as a representation of ways the subjects believe they enjoy learning. Since the theory of multiple intelligences is based on learning in "out-of-the-box" ways, one should look at this data as truly representing a preference in how to learn. Each student truly represents a composite of different ways of learning, as is evidenced by the data presented above. Table 3 best represents the composite nature of multiple intelligences in these subjects.   The trend, in the group as a whole, shows a dominance of the musical and kinesthetic intelligences (77%) closely followed by the interpersonal intelligence (67%) among the group providing this data set.   This trend may be observed in Figure 2.

Nine Students Making Several MI Choices
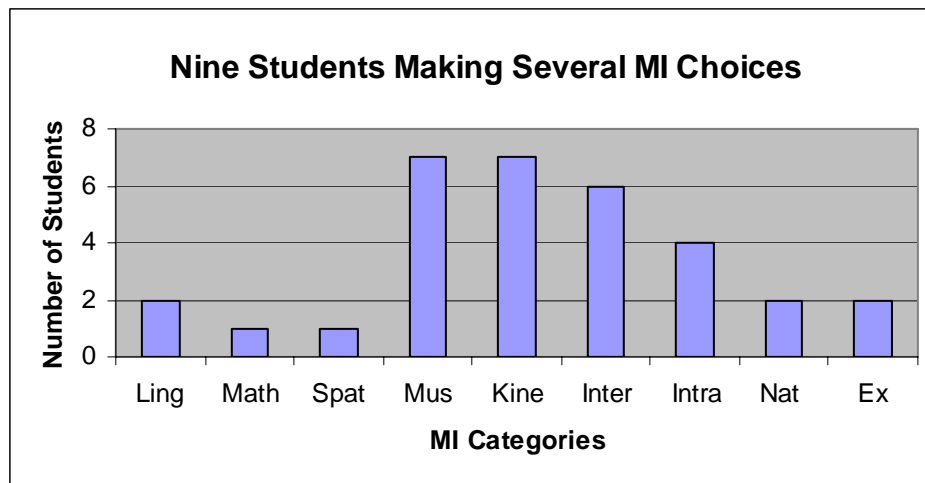
Figure 2. The musical and kinesthetic intelligences appear dominant among students who selected more than one of the intelligences as dominant. The trend present in this chart was repeated in the entire population.

Among subjects surveyed another anomalous data set was obtained. This set of data set consists of students who did not number the items sequentially from 1 to 9. Some of the subjects, such as a female C22, used only 9s and 1s to indicate her preferred intelligence. However, most of the subjects that produced this anomalous data set used a range of numbers occasionally ranking two or more intelligences at the same level.

This data set resembles the data set collected from students who used the check mark to mark dominant intelligences, in that the subjects using this system indicated the dominance of more than one of the intelligences. As with the data set just presented, it is advantageous to look at what each student in this group reported. Data on individual students is presented in a chart listing students and their rankings of dominant intelligence. Table 4 indicates the intelligences that were marked as most dominant others have been left blank. Subjects B18 and B10 did not mark any of the intelligences as a 1.

Table 4 Data Obtained from Subjects Marking Several Intelligences

Subject #	Gender	Ling	Math	Spat	Mus	Kine	Inter	Intra	Nat	Ex
A2	F			1	1	1				
A3	F		1	1	1	1	1		1	1
A5	M			1		1				1
A10	F	1				1			1	
A16	F	1		1			1			
B10	F	2	2							
B18	F	2	2						2	
C6	M				1		1			
C19	F					1	1			1
C22	F	1		1	1	1	1	1		1
C25	F	1			1				1	
C27	F				1	1	1			1

As with the subjects that used the check mark, trends in the data collected from these subjects may be seen by a graphical representation of the data collected. Figure 3 once more shows a dominance of the musical (50%) and kinesthetic (58%) intelligences closely followed by the interpersonal intelligence (50%) among the group providing this data set.
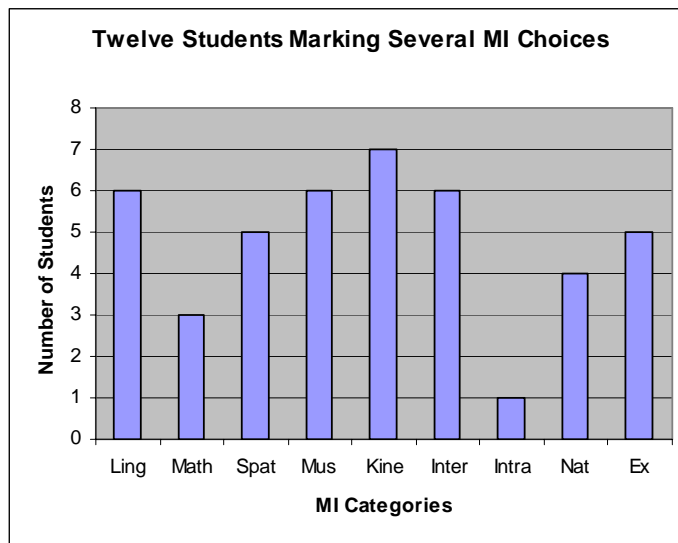

Figure 3. The dominance of interpersonal, musical, and kinesthetic intelligences appears among subjects that ranked several intelligences as dominant.

Unlike the subject that used a check mark to indicate dominance of multiple intelligences, this group also contained a significant preference for the linguistic intelligence (50%).   The

disregard for using a strict numerical ranking system among this group might be a reflection of the fact that only 25% (three subjects) of this group showed a preference for the mathematical intelligence.

The rankings obtained from both sets of anomalous data may be combined in a single graphic representation. Figure 4 shows the total of number of subjects submitting anomalous data that selected each of the multiple intelligences. The group submitting anomalous data consisted of a total of 21 subjects. Any examination of this data must consider that it represents the selection of several intelligences as dominant by the subjects, and is therefore limited in its application by the nature of what it represents.

Composite of Anomalous MI Data
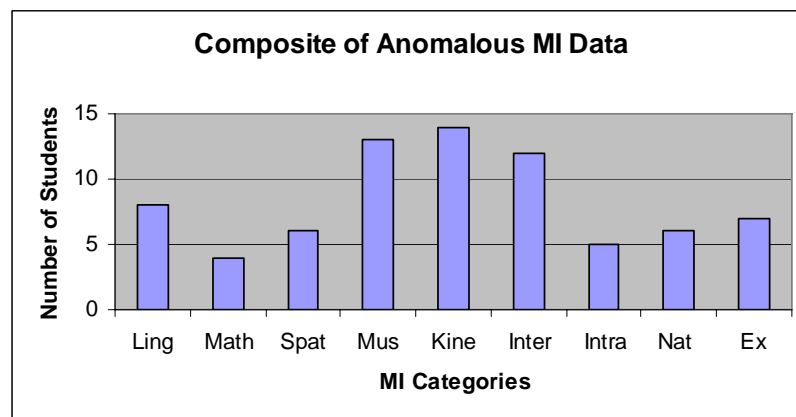
Figure 4. A composite of anomalous MI Data.

The composite of anomalous multiple intelligence data shows that the musical (62%) and kinesthetic (67%) intelligences, closely followed by the interpersonal intelligence (57%), are dominant among the group providing this data set. Only 19% (four subjects) showed a dominance of the mathematical intelligence, the lowest represented intelligence in this population. Among the subsets of anomalous data collected percentages of students representing each of the intelligences varies, however the dominance of the musical, kinesthetic,

and interpersonal intelligences appears to be consistent among subjects providing anomalous data.

Non-anomalous multiple intelligence Data

The population that decidedly ranked at least one of the intelligences as dominant is considered to have submitted a non-anomalous data set. This group included 18 subjects. Two subjects within this group did not rank their dominant intelligence with a 1. Subject C14 ranked the spatial intelligence as dominant (ranking of 2), while subject C15 ranked the mathematical intelligence as dominant (ranking of 3). The remainder of subjects in this group ranked their dominant intelligence with a ranking of 1. Among this group, none selected the linguistic, naturalist, or existentialist intelligences as being dominant. These are not included in the graphical representation of this data set. The selection of a dominant intelligence by the subjects allows for the data submitted by the group to be examined as a whole in a graphical format (see Figure 5).

Non-anomalous MI Data Set from 18 Subjects

Intra 11%
Math 11%
Inter 6%
Spat 22%
Kine 22%
Mus 28%

Math   Spat   Mus   Kine   Inter   Intra
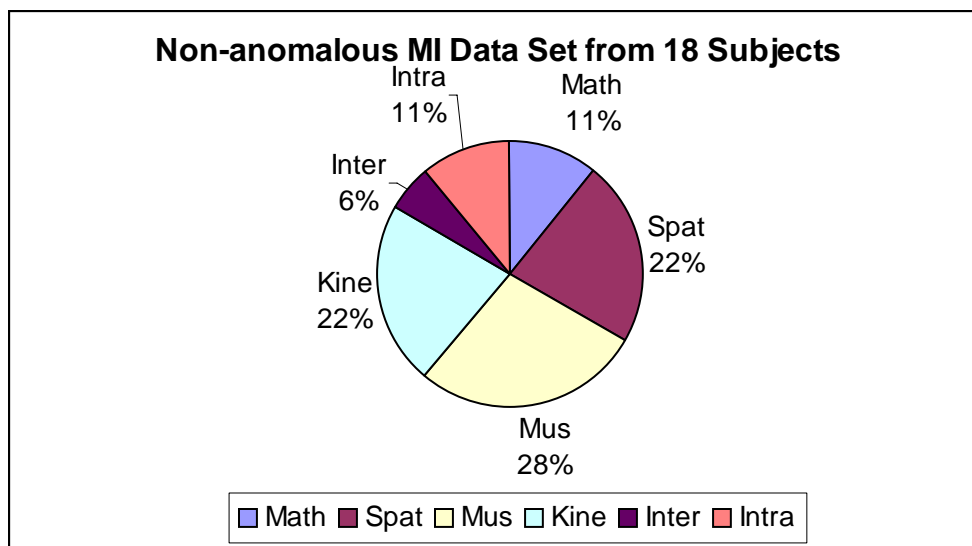
Figure 5. The non-anomalous MI data set.

Among subjects submitting non-anomalous data, three intelligences (musical 28%, spatial 22%, and kinesthetic 22%) appear to most dominant. Only 6% of this group show a dominance of the interpersonal intelligence. Among subjects presenting anomalous data the interpersonal intelligence was dominant among 57% (composite) of this population subset. The spatial intelligence was dominant among 22% of subjects submitting non- anomalous data and dominant among 29% (composite) of subjects submitting anomalous data.

Having looked at both the anomalous and non-anomalous data collected about the dominance of multiple intelligences among the subjects, a composite of this data may be constructed. The construction of a composite of this data is essential to understand the class as a whole. Instruction of the class occurs to the class as a whole, and therefore must be based upon a serious consideration of the occurrence of multiple intelligences throughout the whole class.

The composite of all multiple intelligence data will be presented in the same graphical format as the composite of anomalous multiple intelligence data (see Figure 6). In compiling this data, subjects who marked more than one of the intelligences as dominant were counted for each of the intelligences that they marked. This allows for the group to be examined as a whole. Any analysis of the composite data must consider the nature in which anomalous and non-anomalous data was manipulated to allow for its combining.
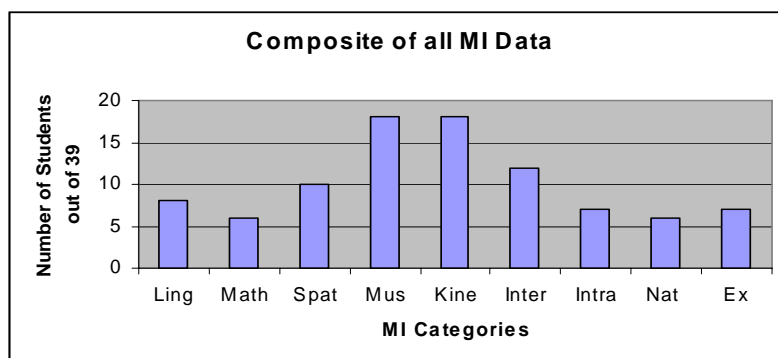
Figure 6. Composite of all MI data.

Among all of the subjects submitting data about their dominance of multiple

intelligences, the musical (46% of composite) and kinesthetic (46% of composite) appear as

being the significant intelligences in influencing how these students learn.   The interpersonal

intelligence is the next most highly ranked (31% of composite) intelligence among this group of

subjects.

The intrapersonal and mathematical intelligences rank the lowest (15% of the composite

for each) among this group of students.   Only 21% (of the composite) of the whole population

showed a dominance for the linguistic intelligence. This means that only 36% (of the composite)

of the population showed a dominance of the mathematical/ Linguistic intelligences -- the

intelligences traditionally emphasized in schools as the mode of instruction and assessment of

student learning.   This makes the students in the population being studied ideal subjects for a

study about the impact of instruction using multiple intelligence theory (Brualdi, 1996).

The multiple intelligence data collected from this group allows the researcher to gain an

understanding of how the group as a whole learns.   This understanding only begins to emerge as

one analyzes and interprets the multiple intelligence data collected from the group.

Analysis of multiple intelligence Data

Data about the dominance of multiple intelligences among students allows one to

comprehend how the students will best learn and best be evaluated. The analysis of the multiple

intelligence data begins by looking at the data collected from the six subjects examined for

preferred learning style along with the mode of responses provided by the entire population (See

Table 5).

Table 6 MI Data Collected from Six Select Subjects

Subject #	Gender	Ling	Math	Spat	Mus	Kine	Inter	Intra	Nat	Ex
A2	F	5	7	1	1	1	5	7	2	5
A20	F	9	7	6	5	1	2	8	3	4
B14	F					v	v			
B18	F	2	2	5	9	7	8	9	2	7
C6	M	9	9	9	1	3	9	1	9	9
C16	M				v	v	v		v	v

Some of the anomalous data discussed above appears among the six subjects selected for a closer examination. Subjects B14 and C16 used the check marks.   The other three subjects provided non-anomalous data. Only A20 precisely followed the direction for ranking multiple intelligences. The remainder of the subjects provided useable rankings of their use of multiple intelligences (as discussed above).

Looking at these samples one can begin to see the complexity of the multiple intelligences as they are manifested in individuals.   This particularly may be observed in subjects such as C6.   C6 considers the musical and intrapersonal intelligences to be dominant. Interestingly this subject fails to list intelligence as second most dominant, but instead ranks the kinesthetic as third most dominant. This subject then ranks all other intelligences as a 9, or in a totally inferior position. Indeed subjects such as C6 prove that all learners have a unique way of learning.   It appears advisable to look at the multiple intelligence pattern of each student. A teacher in assigning individual work may use such determinations in the selection of appropriate assignments for their students.

Although individual student work specifically tailored to how students learn is good idea, teachers must often instruct the whole class as a singular unit. When this need arises the teacher should consider basic trends in multiple intelligences manifested by the entire class population. For this reason we shall now look at the multiple intelligence ratings of the group as a whole.   It

is valuable to look at the mode of the group in rating the various multiple intelligences. The

mode for ranking multiple intelligences by the group is presented in the table below.

Table 7 The Mode of MI Data Collected from the Whole Population

	Ling	Math	Spat	Mus	Kine	Inter	Intra	Nat	Ex
Mode for Population	9	2	1	1	1	3	9	2	6

Since the mode shows the most common answer in each category, an analysis of the

mode allows the researcher to see how the subjects most often ranked each of the intelligences.

This allows for a determination of the way the group overall ranks all the intelligences. The

mode for the ranking of the multiple intelligences by the subjects closely mirrors the actual data

obtained. Beyond just seeing what the subjects ranked as their dominant intelligences,   the

mode allows us to see how the group, as a whole, rated all of the intelligences. The group most

often selected to rank the spatial, musical, and kinesthetic in the 1 position. The superior ranking

of the musical and kinesthetic intelligences appears as a verification of the data collected from

individual students and discussed in the previous sections of this paper.   However, the

appearance of the spatial intelligence in the top ranking of the mode justifies a closer

examination of the data supplied about the dominance of the spatial intelligence.

Figure 7 shows that although the spatial intelligence was most frequently ranked in the 1

position, it was only so ranked by 25% of the whole population.   For this reason the spatial

intelligence was ranked third (with the musical and kinesthetic being tied for first) in the

composite rankings.   The mathematical and naturalist intelligences were most frequently ranked

as the 2 position.   For similar reasons as cited with the spatial intelligence, the mathematical and

naturalist intelligences were ranked lower in the composite of responses gathered from all

subjects.   The interpersonal intelligence was ranked as the 3 position most frequently.

According to the data collected from the entire group, the interpersonal intelligence was ranked

second after the musical and kinesthetic (being tied for the first position). The Existentialist

intelligence was most frequently ranked in the 6 position. Finally, the Linguistic and

Intrapersonal intelligences were most frequently ranked as the 9 position. Among the entire

population, these intelligences were constantly rated very low. Only 15 subjects from the whole

population rated either the linguistic or intrapersonal intelligence as their dominant intelligence.
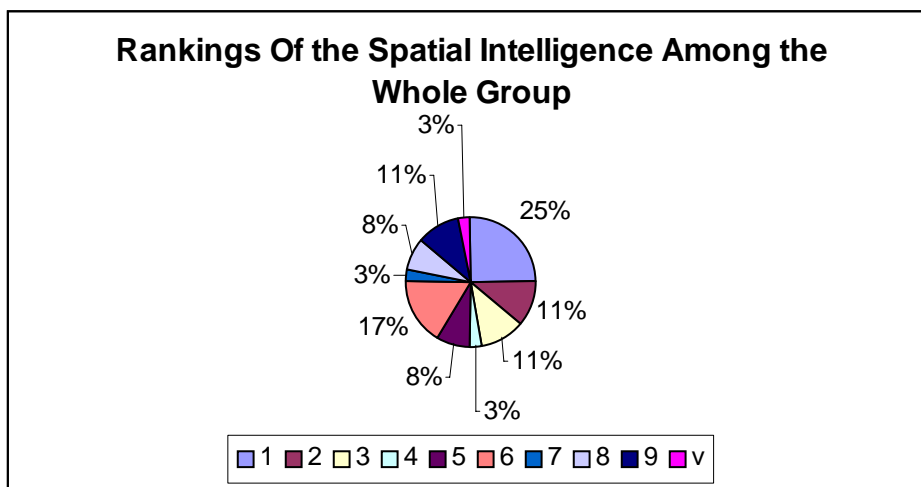
Figure 7. Ranking of the Spatial intelligence among the whole population.

From this data it appears as though the population shows a dominance for musical and

kinesthetic intelligences. The interpersonal and spatial intelligences closely follow these

intelligences in their dominance among the population being studied. The linguistic,

mathematical, intrapersonal, naturalist, and existentialist intelligences are not very prevalent

among this population.

Implications of the multiple intelligences upon Student Learning

Observation of the students during the study confirmed their preference for kinesthetic

learning. For example, on one occasion the researcher had placed items to be used for lab on the

tables at which students sat during instruction. It did not take long for many of the students to begin handling these items. Additionally some students would get up from their seats and begin to walk around the room while the lesson was being presented.

The dominance of the musical intelligence was demonstrated when the subjects would sing. One of the female students, who had taken the class once before, would frequently sing a song about Newton's First Law of Motion, which she had learned while taking the class before. The researcher did not incorporate much music into his instructional strategies, since he intended for students to use their dominant multiple intelligence in the completion of a portfolio project.

Examples of students exhibiting their interpersonal intelligence abounded to the point of disrupting the orderly course of instruction.   The researcher gave students several opportunities to work as groups. The students appeared to enjoy these opportunities, which may be construed as yet another manifestation of the dominance of the interpersonal intelligence among the subjects.

Students demonstrated their dominance of the spatial intelligence during a PowerPoint presentation.   The presentation was a rather lengthy presentation of Newton's First Law of Motion.   During the presentation students were given visual cues that they could associate with the content being presented.

For example a picture of a horse and wagon had arrows drawn on it to show the directions that forces would be applied for motion of the wagon to begin. Students appeared more engaged than normal. Some of the engagement of the students might have been due to a fascination with technology and the novelty of seeing a PowerPoint presentation. The use of technology is not very wide spread in America's schools. In those schools where teachers

incorporate technology into their instruction student performance generally appears to improve (Glennan & Melmed, 1996).

The linguistic, mathematical, intrapersonal, naturalist, and existentialist intelligences were not very dominant among the population as a whole. However among the whole population several students selected each of these as dominant. It must also be remembered that among those who selected these as dominant, a number of subjects selected more than one of the intelligences as dominant.

Perhaps the non-dominant intelligences among a student population are as significant in determining how the students should learn as are the dominant one. Most certainly the recessive nature of certain intelligences have social implications. Among at-risk students, an external locus of control is very common. Students with an external locus of control will experience changes in their expectations for success depending on the outcome of an attempted task. Failure at a task will cause them to expect failure in the future, while success will motivate them to succeed (Wise, 1999). When teachers use methods emphasizing an intelligence which is not dominant in their students they might condition these students to failure. Traditionally, most teachers encourage this by working from the perspective of what a student cannot do (Elfers-Wygand, 2000).

A low intrapersonal and existentialist intelligence ranking might be connected to this phenomenon. As students find it difficult to relate to others (low intrapersonal intelligence), they might begin to think that they cannot work with others on the factors that determine their status in life. The sense of helplessness associated with the external locus of control might manifest itself in a low desire to help others (low existentialist intelligence).

Low rankings in mathematical and linguistic intelligences have very obvious implications for educators. Studies have shown that minorities often avoid courses of study that emphasize math (Haury, 1999). On standardized tests this group of students has shown low performances in these areas. The measure of achievement in these two intelligences is the traditional measure of educational success (Justiniano & Wang, 2001). More will be discussed about this as the performance of the students during the study is examined.

An examination of the learning style and multiple intelligence data collected from this group shows that they are mainly kinesthetic and musical learners. First hand observations of the group showed that the students were very kinesthetically oriented in their learning. These facts led the researcher to emphasize kinesthetic activities during instruction. Research has shown that through kinesthetic activities students can learn scientific concepts that would be difficult for them to learn from traditional instruction (Morrow & Zawaski, 2001). Kinesthetic learners are the most difficult students to engage in the traditional classroom setting. Optimal learning occurs for them when they are moving and actively involved in the learning process (Zimmerman, 2001). The precise methods of instruction will be discussed in the next portion of this paper.

The Nature of Instruction during the Study

The unit of instruction covered the subject of forces and Newton's three laws of motion. The unit consisted of four lessons. The first lesson introduced students to the concepts associated with forces. The remaining lessons each covered one of the three laws of motion.

The first lesson used a version of the concept attainment model of instruction. This model allows students to develop the big picture of a concept from a list of specific examples (either negative or positive) of that concept (Armstrong, 1998). To begin the lesson the

researcher showed the students demonstrations of what forces are. The researcher also showed the students pictures the results of geologic activity that were caused by forces. The researcher included demonstrations or labs in all of his lessons to help students visualize otherwise abstract concepts. With 44% of the subjects favoring visual learning (or some combination of another learning style with visual learning), the researcher felt it was very important to include visual components in his lessons. Furthermore, demonstrations offer a way to show students how science is done. Often demonstrations can lead students to ask questions about what they are seeing (Lewis, 1992).

The teacher led the students in developing a list of characteristics and items that are related to forces. These were written on the board to assist students with a visual learning style. Visual learners tend to see concepts as pictures rather than a series of words. They see things a scheme or big picture and often lose sight of details (Silverman, 2001).

The teacher then helped the students group these items according to possessing similar characteristics. The students then labeled the groups. Next, the students created a general statement about forces. Even when led by a teacher, the process of categorizing teaches higher order thinking. Through this process, students take what they are learning and place it into a structure. Then they quickly break down this structure into its more elementary components (Marquis, 1997). Unfortunately time constraints did not allow for students to be autonomous during this lesson, as the model suggests they should be. Because of this the researcher had to provide quite a bit of guidance during the instructional process. Research has shown, that teachers directly guiding instruction is one of the most efficient ways for students to learn (Grossen, 2001).

In an effort to broaden instruction beyond the limits of linguistic and mathematical learning, the researcher decided immediately to give an assignment allowing for the use of the spatial intelligence and the visual learning style. The researcher showed the subjects example of concept maps (the researcher had prepared two concept maps on the life of Isaac Newton), and assigned them the task of completing a concept map about forces. The subjects were already familiar with the mapping material they had learned, for in their last unit they had completed a mind map about measurements.   Most of the concept maps produced by the students were found to be of a satisfactory quality. The creating of a concept map allowed visual and spatial learners to convert their verbal learning into a more visually usable form (Silverman, 2001).

The second lesson covered Newton's First Law of Motion. The lesson began with demonstrations of Newton's First Law of Motion, catering to the visual learning style.   Since the U.S. Department of Education and the National Science Foundation and the National Committee on Science Education Standards and Assessment recommend a hands-on approach to teaching science in 1992 (Haury, 1993), these methods were employed whenever possible.   Additionally the researcher constantly kept in mind the dominance of the kinesthetic intelligence among the subjects.   The dry subjects of science become interesting to students when they get up out of their seats and demonstrate the concepts they are to learn. The inclusion of kinesthetic demonstrations of science gives students a real sense of what they are to learn. Once they have this sense then they can even begin to understand the mathematical explanations of those concepts (Dawson, 2001).

During this lesson the researcher included a hands-on demonstration for the students to complete at their individual tables.   During the demonstration the students placed a coin on a 3' x 5' card that was resting on a beaker. The students then flicked the card from under the coin.

The students observed that the coin stayed in place until the force of gravity caused it to drop

into the beaker. This demonstration shows the basic principles of Newton's First Law of Motion

in a way that students could easily visualize and touch. This allowed the kinesthetic learners a

chance for movement during instruction (Elfers-Wygand, 2000; Dawson, 2001) while giving

visual/spatial learners a "picture" to place in their mind of what they were learning (Silverman,

2001). With this activity, the researcher was differentiating instruction to reach a significant

number of his students.

The lesson itself was primarily in the format of a direct instruction lesson. The

presentation of the instructional material was done through a PowerPoint presentation. The

researcher used this type of presentation to help students visualize what they were learning.

Through this technology the researcher was able to clearly illustrate how forces act to cause and

stop motion.   The main advantage of using PowerPoint is that it presents lecture material in a

way that is engaging to students. Since the information is presented in a series of slides, students

receive it in small chunks. The nature of PowerPoint forces the teacher organize content into a

logical sequence (Cole, 2002).

About midway through the presentation, students performed a mini-lab about the effects

of friction. The mini-lab consisted of students dragging a block of wood, attached to a spring

scale, across three different surfaces. The surfaces included the tabletop, a sheet of waxed paper,

and a sheet of sandpaper. During this demonstration lab the students could observe that more

force was required to move objects over surfaces that applied a greater force of friction on the

wooden blocks.   The lab portion allowed for kinesthetic learning as the students moved around

the room and preformed tasks that demonstrated the basic concepts of friction (Thomson &

Mascazine, 1997).   The remainder of the lesson was conducted using the direct instruction

model and a PowerPoint presentation. The independent practice portion of the direct instruction model was given in the form of a unit portfolio assessment. The teacher first guides the students in how to use the material being taught. The students then practice independently. The teacher assesses the products of the independent practice, and then gives the students corrected feedback, if needed (Huitt, 1998). This portion of direct instruction is important for learning to become personalized for each student.

The researcher intended the unit portfolio assessment to become the main method by which the students could learn using their dominant intelligence. This assignment was the researcher's attempt to individualize instruction. In this case the instructor individualized the process whereby the students learn (Tomlinson, 2000). In preparation for the unit, the researcher had evaluated the preferred learning styles and dominant intelligences of the subjects (producing the data discussed earlier in this paper). Based on this assessment, the researcher asked the students to complete a unit portfolio that used their dominant learning style and intelligence, about each of Newton's three laws of motion. By this process, the students became proactive participants in their learning process. They were given the choice of selecting a product that best showed what they had learned using their own learning style (Robotham, 1999). The researcher assigned a high point value (200 points) for the completion of the portfolio. The grading rubric of that assignment will be discussed in greater detail in the assessment portion of this paper.

The third lesson of the unit covered Newton's second law of motion. This lesson began with a modified Suchman inquiry and lab exercises. During this portion of instruction the researcher gathered the subjects around a demonstration bench. The researcher set up an

apparatus consisting of a block of wood and mass attached to each other with a string and suspended over a pulley (see Duffy, 1998).

During the demonstration the researcher showed the students how the acceleration of the wooden block would change as different masses (forces) were attached to the string. In this way the students were able to see a practical demonstration of Newton's Second Law of Motion. The demonstration allowed for visual learning to occur. Students showed that they were engaged in the demonstration when they asked the researcher if he could reverse the apparatus (i.e., have the mass on the table and the block of wood suspended over the pulley). This was an equally valid demonstration, and it allowed the instructor to explain that if a constant force is applied to varying masses, the acceleration will also change. This proposed question from the students represented the movement of their thinking into the realm of critical thinking. When learners suggest a modification to an inquiry, they are beginning to perform tasks associated with higher order or critical thinking. This is precisely what the National Academy of Science intended when they wrote in the National Science Education Standards (1995, Chapter 6 Inquiry):

> For students to develop the abilities that characterize science as inquiry, they must actively participate in scientific investigations, and they must actually use the cognitive and manipulative skills associated with the formulation of scientific explanations.

After the demonstration the researcher stated the lesson objectives to the students. The researcher used previous material learned about Newton's First Law of Motion as a springboard for instruction about Newton's Second Law of Motion. This was a way of scaffolding student learning and preparing them for further inquiry. When educators use problem based learning

(inquiry in which students seek an answer to a question), early scaffolding becomes an important part for successful learning (Greening).

The researcher had pre-selected the topic of "What causes changes in motion" as the subject of student inquiry. Students gathered information for their inquiry as they completed a lab on how changes in motion are caused. The lab mainly consisted of making observations about how spheres made of different materials (brass, steel, wood, and cork) changed their motion under various conditions. Once more the emphasis was placed upon kinesthetic learning. Student could feel the differences in the spheres and make first hand observations about how they moved. They could see in a hands-on approach how mass, force, and acceleration are related. Through the completion of this lab the kinesthetic learners could begin to understand the concepts of physics they would soon encounter in a lecture format (Dawson, 2001).

The researcher followed the hands-on experience with Newton's Second Law of Motion with a session of direct instruction about Newton's Second Law of Motion. During the direct instruction, the researcher projected a copy of lecture notes on overhead transparencies. The transparencies were used to accommodate visual learners among the subjects. The transparencies helped these learners in two ways. The transparencies provided a visual display of the material being taught. Many visual learners also find it beneficial to take detailed notes of lectures. The notes provide a picture of what they are learning and helps them absorb the information (Nalanda Institute, 2001).

As the instructor verbalized the lesson content he was teaching in the auditory learning style. Auditory learners receive little meaning from seeing written text. They must hear the text

being verbalized. Lectures and hearing others discuss a topic are two of the best ways for them

to learn (Bogod, 2002).

The direct instruction concluded with the researcher assigning independent practice of

mathematical problems related to Newton's Second Law of Motion.   Math educators continue to

debate about the usefulness of students practicing math problems. In assigning independent

practice, an instructor must be careful that students do not end up practicing error. When

students do math problems the wrong way over and over again they can easily become

accustomed to these faulty methods. For these reasons a teacher must make sure that students

understand how to do the problems before independent practice is assigned (Kaul). To insure

that student understood the material, the researcher led the students in completing every variety

of the problems they could encounter.

The final lesson of the unit covered Newton's Third Law of Motion. The instruction for

this lesson took the form of an exercise in improving reading comprehension. Instruction in

reading comprehension strategies is very limited in grades beyond elementary school especially

in the content areas. Post-elementary language arts instruction apparently lacks the use of

expository texts (Ivey & Broaddus, 2000).   As many of the subjects show a low aptitude of

verbal-linguistic learning, the improvement of reading comprehension among these students is a

paramount educational goal. Specifically these students must become familiar with how to read

science texts. "All but the most severely limited students should be able readers" both generally

and in the content areas (Armour, 2000, p. 2).

The researcher first reviewed what the students had learned about Newton's Second Law

of Motion. It was essential that the students understood the relationship between forces, mass,

and acceleration for them to understand Newton's Third Law of Motion. Teachers must always

make sure that their students understand the prerequisite material essential for understanding the current lesson. Research has shown the review of previous learning to be one of the best ways of insuring that one's students possess the cognitive tools required for learning to continue (Huitt, 1998). The review portion of the lesson was followed by demonstrations of Newton's Third Law of Motion. Demonstrations acted as a method for the visual learners in the group to develop a mental picture of the concepts they would be soon learning about through Newton's Third Law of Motion (Dawson, 2001).

The researcher had prepared a short (two-page) text on Newton's Third Law of Motion. The subjects made predictions of the text content by turning headings into questions.   The theoretical basis of using student developed questions to improve reading comprehension lies in that we remember things about which we become curious. The students also develop a purpose for their reading as they seek answers to the questions they developed from headings (Hardy, 1996).

The students' predictions were verbalized to the whole class. The verbalization of predictions allowed for learning in the auditory learning style (Bogod, 2002).   Next, students read the text silently to check their predictions. When the students have questions to answer from the text they become active readers. They must concentrate to locate the answers and verify their predictions (Hardy, 1996). The researcher then read the text aloud. As a class, students discussed the process of the lesson. Both having the text read allowed and discussing the reading comprehension process were activities that benefited the class's auditory learners (Bogod, 2002).   Discussion included how the students looked for verifications of predictions and answers to their questions developed from text headings.

The researcher asked students if they gained anything from the second reading of the text. Research has shown that good readers use reading to help them understand the text. Some readers may use other strategies to increase their comprehension of the text as they reread to help them see different aspects of the text (Musick). A survey was taken of the accuracy of the students' predictions about the text and how predictions about the text could be improved. Through the process reviewing the accuracy of their predictions and examining ways of improving predictions the researcher was moving the students to domains of higher order thinking. Research has shown that processes such as this, which are known as metacognition, improve learning and retention of learned material (Livingston, 1997).

Students completed the lesson by completing a worksheet in which they matched statements of physical actions to the three laws of motion. This activity served both as a review of this lesson and the entire unit. A study of the American Psychological Association (2001) has shown that students learn better when they practice skills in the context of related skills. When students practice skills in isolation and learned in small blocks of material only short term retention is improved. Long term learning occurs most often when skills are practiced within the context in which they are useful

Instruction during this unit was differentiated to meet the need of diverse learners in the classroom. This has been found to be the best way to reach the diverse learners in one's classroom (Tomlinson, 2000). Special emphasis was placed on the hands-on method of teaching science so that the large number of kinesthetic learners could develop an idea of what they were supposed to be learning (Dawson, 2001).

Evaluation of Learning among the Subjects

During this study the researcher wanted to determine the results of employing differentiated instruction in his class. The research question concerned itself with two areas of student achievement. First and most paramount was the matter of cognitive achievement among the students. Cognitive achievement was measured in two ways. First, cognitive achievement was measured through a pre-test/post-test comparison. This method of research is called a one group before-after (pre-test-post-test) design. In this experimental design a treatment condition is interjected between a pre- and post-test. In the case study presented in this paper, the treatment was differentiated instruction based on the theories of multiple intelligences and varying learning styles. Among the dependent variable, there is no control for the passage of time or the effects of the pre-test (Jazwinski, 1996). Cognitive pre-test/post-tests administered during this study differed from each other in some significant ways that must be considered before one looks at any of the test results. The cognitive pre-tests were administered over several days in the form of just a few questions. The cognitive pre-tests were given to students at the beginning of the class in which the topics assessed by the pre-test were to be covered. The cognitive pre-tests were all in a short answer format that called upon the students to generate original answers. It should also be noted that on some occasions students became frustrated with the pre-test process and turned in blank papers. Blank papers were recorded as zero grades. The cognitive post-test was administered in a single session. The post-test consisted of multiple choice questions. For comparison purposes, averages of pre-test scores were compared to averages on post-tests.

A written cognitive test only lets teachers know what their students can recognize or plug into a given scenario. An authentic assessment requires students to proficiently perform a task. In this way, it provides a deeper view of a student's cognitive achievement (Grant, 1990).

Cognitive achievement was also measured through the completion of student portfolios. The

portfolios were assigned to allow students to learn and show their learning in a style that best fit

how they learn (LeBlanc).

The portfolios were limited in covering Newton's three laws of motion. The researcher

considered this adequate, as a majority of the unit covered the topics associated with Newton's

three laws of motion.

Students were given the choice of completing the portfolio in a manner that best matched

their learning style. The students used the data collected about their multiple intelligences and

learning styles at the start of the unit as a criteria for determining the nature of their portfolio.

This selection process empowered students to decide what type of product best matched the

purpose of the portfolio and what evidence best demonstrate the student's talents and progress in

meeting the cognitive objectives set by the teacher (The Pennsylvania Coalition for Public

Education, 1997).

The portfolio was graded using a grading rubric (Table 7). With this scheme students

could achieve a total of 200 points. The specific content was addressed by the categories of

accuracy, completeness, and clarity of communicating the concepts central to a study of

Newton's three laws of motion.

Table 7 Unit Portfolio Grading Rubric that was Used to Grade Student Portfolios During

This Study

Unit Project Grading Rubric						
Points	50	40	30	20	10	0
Criteria/ Grade	A	B	C	D	F	F
Completeness	Covers more than 95% of topics in the project subject area.	Covers more than 85% of topics in the project subject area.	Covers more than 75% of topics in the project subject area.	Covers more than 70% of topics in the project subject area.	Covers less than 70% of topics in the project subject area.	Covers none topics in the project subject area.
Your Points						
Accuracy	More than 95% of information in the project is accurate.	More than 85% of information in the project is accurate.	More than 75% of information in the project is accurate.	More than 70% information in the project is accurate.	Less than 70% information in the project is accurate.	None of information in the project is accurate.
Your Points						
	planning and organization.	adequate planning and organization.	planning and organization.	planning and organization.	lacks planning and organization.	planning and organization.
Your Points						
Communication of Ideas	More than 95% of ideas are clearly communicated.	More than 85% of ideas are clearly communicated.	More than 75% ideas are clearly communicated.	More than 70% ideas are clearly communicated.	Less than 70% ideas are very clearly communicated.	None of the ideas are clearly communicated.
Your Points						
Total points of 200						

The cognitive post-test (See Appendix 2) consisted of thirty multiple choice questions that covered the objectives prescribed during the lesson planning process. The validity of the post-test was established with a table of specifications (See Table 11). This table dealt with the content validity. The table identified the domains to be tested by assigning to each objective a numerical rating from one to five on how much emphasis was given to that domain during instruction. These were placed into the table of specifications, a test blueprint. The researcher then selected representative sample questions from each of the domains in which the students had received instruction (Jones, 2001). The post-test also contained a measure of student achievement in the affective domain using a Likert scale survey. The survey calls upon subjects

to evaluate phrases describing their feelings and attitudes toward the subject in which they

received instruction in two ways. First the subject must decide if they agree or disagree with the

statement made in each survey item. Then secondly, the subjects must decide to what degree

they agree or disagree. For validity purposes, the survey was constructed with a 1 to 6 scale, not

allowing for an uncommitted response (Siegrist, 2002).

Recent research has shown that increasing students' affective response to learning,

especially in science, improves student attainment of cognitive objectives. This educational

hypothesis is based on concepts developed by Piaget that connected cognition with affect.   The

idea is that students will do better in subjects that interest them and that they find to be of value.

Harlan has specifically tied the development of scientific genus with curiosity a passionate desire

and drive for gaining understanding of the natural world. Thus the affective domain is essential

to cognitive achievement in science (Stone & Glascott, 1998).

Additionally when a teacher teaches with objectives from the affective domain in mind,

the teacher moves students to higher orders of thinking. The researcher included objectives from

the responding and valuing levels of Blooms Affective domain. In responding the students begin

higher order thinking about the information in which they are being instructed. The students

begin to know how it connects with other information they have previously learned. While

responding the student is interacting with the material being learned in a way that benefits the

student and others. First the student participates because it is expected, but then they participate

to improve their own condition and because they have a desire to participate. Once the students

move up to the valuing level they recognize the importance of the learning process and the new

information.   They begin to realize the ability of the information to be used separately or with

other previously learned information. Not only are students at this level involved in the learning

experience, but they desire others to be involved and help facilitate their involvement (Bergman, 2002).   As students attain the responding and valuing levels, they seek out the learning process to improve their own condition and the condition of others. For the students who were the subject of this study such a shift might have more than academic implications. Such a shift represents movement from an external locus of control to an internal locus of control. Ultimately affective achievEment in science will lead these learners to academic success in science.   The positive reactions (more affective domain attainment) associated with this success can well lead to further academic success both in science and other subjects (Wise, 1999).   For these reasons the researcher included an affective component to his instruction.

Both pre-test and post-test measures of affective responses of subjects were obtained. The researcher used a Likert scale survey consisting of 10 questions to measure affective responses of subjects. The questionnaire is included as a part of the post-test in Appendix 2. The instruments outlined above provided the researcher with a quantitative measure of student learning. Quantitative data obtained about student learning is limited in how accurately it reflects student learning. It assumes that the knowledge gained by the students is either correct or incorrect. Furthermore the assumption is made that the knowledge can be broken down into distinct segments that all have the same value (Biggs, 1994). Quantitative research is employed to show the causality of variables, in this case differentiated instruction. Quantitative research allows the researcher to measure outcomes of administering a given treatment. A qualitative description only shows researchers an association between variables and the observed behaviors (Hopkins, 2000).

The Measure of Learning among Subjects

The effectiveness of instruction which students receive is always ultimately measured in some sort of assessment. Assessments provide a numerical evaluation of student learning. In this case study the researcher used a table of specifications (see Appendix 2 Table 11) to establish the validity of the assessment administered on the students. A pre-test and a post-test were used to measure the actual learning achieved as a result of the instruction outlined above. The differences between these instruments were discussed above. A comparison of these results for individual subjects is interpreted as a measure of student learning (Boehner). The pre-test and post-test measured both cognitive and affective learning among the subject.

Looking at the group as a whole one can observe some very obvious learning trends. Beginning with the extremes of the scale, one observes that on the pre-test 27 subjects scored a zero, while on the post-test this number was cut to 7 subjects. Next it can be observed that no students passed the pre-test. On the post-test 49 students failed the test, while 10 passed the test. The percentages of students passing and failing this test approximately match results obtained by the National Assessment of Educational Progress (NAEP). NAEP reported for 2000 that in Tennessee 78% of African Americans obtained scores that were below the basic level of performance and 22% achieved scores at or above the basic level of performance. Only 6% of African Americans in Tennessee were rated as performing at or above a proficient level (NAEP, 2000). Unfortunately the type of instruction received by these students statewide is nearly impossible to ascertain. The highest score achieved on the pre-test was 52%. The highest score on the post-test was 79%. As a whole the group only demonstrated marginal learning as a result of instruction. Some of the lack of achievement among students may have been due to the researcher being an inexperienced teacher. Although, it should be noted that the first test given by the subjects' regular classroom teacher yielded 100% failures. Research appears to indicate

that nationally science learning is not improving. Up to the eighth grade, science learning has

remained about the same since 1996, but above this grade level, science learning has slightly

declined (Leath, 2001).

Looking at the students' raw test scores most easily shows student learning in the

cognitive domain. However, one must be aware of differences in the pre-test and post-test, as

discussed above. Some of the changes in the raw scores may be attributed to chance and

differences in the test instruments (Michael, 2000).   A graph of the number of students receiving

each percentage grade is in Figure 8.
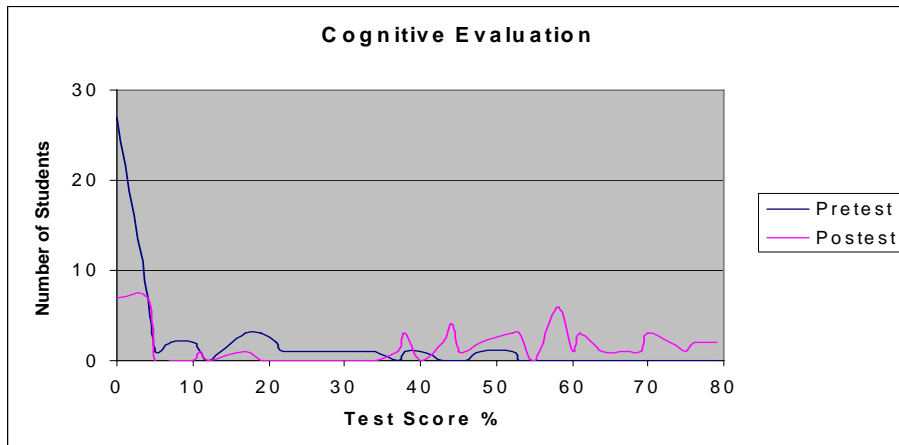
Figure 8. Changes in cognitive evaluation of student learning as recorded on pre-test and post-

tests.

The graph shows the general trends discussed above.   Increases in scores in the forties

through fifties become very obvious in the graph.   Of importance is the increase in scores above

the 52% level. On the pre-test 52% represented the highest grade. On the post-test, the highest

score was a 79%.

On the post-test, the most abundant score, attained by seven subjects, was a zero, which

in many cases indicate students simply leaving their test blank or for some other reason not

taking the test. The next most abundant score on the post-test was a score of 58%, attained by

six subjects. This appears in the range of 40 – 60% where scores increased the most. The mean

score on the post-test was 41.94 %. Most of the changes in test scores may be attributed to a

statistical phenomenon known as regression toward the mean. First of all, the scores recorded by

these tests are a combination of the subjects score plus any error in measuring that score.   For

this reason, subjects who score at extremes of the score scale will tend to have their scores move

toward the mean (Martin, 1997).

  Ultimately a teacher must be interested in the achievement of every student receiving

instruction (Sunal et al., 2001).   Among the subjects, only two (A12 and C1) showed a decline

in their performance on the pre-test and post-test. Since declines occurred among such a small

segment of the population, these declines should probably be considered as resulting from

variations between the pre-test and post-test (Michael, 2000) and a regression toward the mean

(Martin, 1997).

  The rest of the population showed an increase in performance on the post-test versus their

performance on the pre-test. Some of the improvement may be considered a result of instruction,

while no doubt a portion of it is simply a regression toward the mean (Martin, 1997). A table of

test achievement among six of the studies' subjects (Table 8) shows the general trend among all

population members to increase their performance on the test after receiving instruction.

Table 8:   Changes in Cognitive Test Scores Among the Three Highest and Three Lowest

Pre-test Affective Domain Scorers.

Subject #	Pre-test Average Score %	Post-test Average %	Change in Score %
A2	4	44	40
A20	0	40	40
B14	0	61	61
B18	0	70	70
C6	0	52	52
C16	37	58	21

The trend present in these six subjects may be seen in the population as a whole.   The

average gain among subjects was 37.28%, while the mode was 48%. Chart 9 shows the actual

changes in scores among the whole population. On this graph the score change of each subject is

represented with a bar. One can readily note the two subjects that experienced a decline in test

scores.
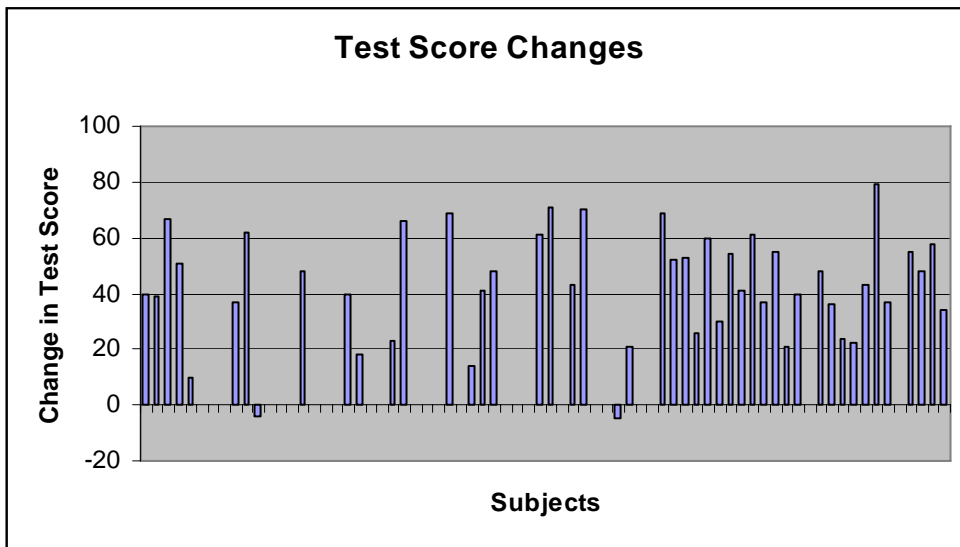
Figure 9 Test score changes among the study population

The affective domain of learning moves students to higher levels of thinking and

improves attitudes about learning (Stone & Glascott, 1998). Unfortunately in today's world of

high stakes standardized tests, measuring primarily cognitive objectives, the affective domain is

often not explored by teachers (Kaufhold, 1998). In this case study the affective domain was measured using a Likert Scale survey of student feelings about what they were learning (Siegrist, 2002).

The survey had the subjects rate each of 10 statements within the range from strongly agree (1) to strongly disagree (6). Statements were worded so that an agreement with the statement (scores trending toward 1) indicated a highly positive attitude about the subjects covered in this unit. Scores trending toward 6 indicated a negative attitude toward the subject matter of the unit. A **decrease** in affective scores therefore represents the development of a **positive attitude** toward the content being studied in the unit.

Among the six specific subjects examined throughout this study, one may observe patterns of change in affective scores on an individual basis (See Table 9). Among this group of six subjects, those with the highest affective scores on the pre-test became more interested (saw a reduction in their score) in the topics being covered in the unit, while those with the lowest affective scores became less interested (saw an increase in their score). Of course these subjects, by the criteria for which they were selected, represent the extremes of the affective spectrum among the study's population, so what one is no doubt observing is a regression of subjects toward the mean (Martin, 1997).

Table 9 Affective Score Changes Among Six Subjects Selected as Samples from the Whole Population Because of High and Low Affective Scores on the Pre-test

Subject #	Pre-test Affective Score	Post-test Affective	Change in Score
A2	4.00	2.30	-2.20
A20	2.20	4.30	+2.10
B14	1.30	4.90	+3.60
B18	5.40	5.30	-0.10
C6	5.90	5.80	-0.10
C16	2.00	4.80	+2.80

Among the students in the study, four experienced no change in their affective scores on the pre-test versus post-test. Fifteen subjects saw a decrease in their affective scores, signifying that they had become more interested in learning about the topics being covered in the unit. About 53% of subjects seeing a reduction in their affective scores had begun with a pre-test affective score of over 3. The same percentage of subjects had post-test scores over 3. Of those that saw a reduction in their score 11 saw a reduction of less than 1 point.

Thirteen subjects saw an increase in their affective scores, signifying that they had became less interested in learning about the subjects being covered in the unit. Of these, six saw an increase of less than 1 point. Among subjects seeing an increase in their affective scores 38% began with an affective score below 3. The researcher doesn't consider changes of less than 1 point to be significant. A graph of the changes in affective scores of all students is presented in Figure 10.
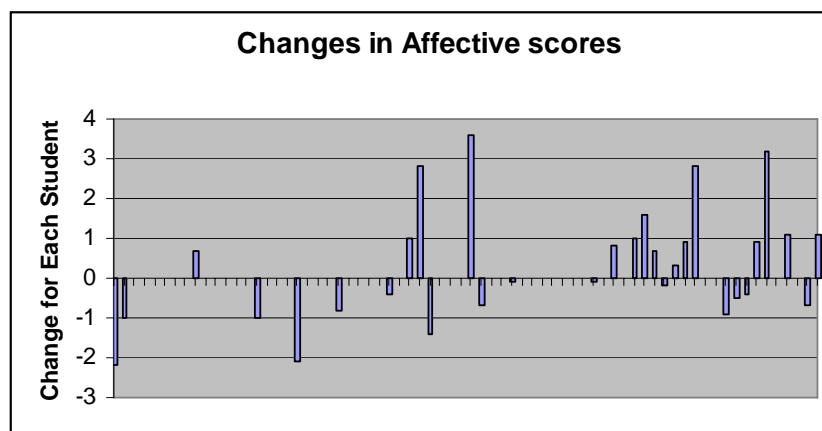
Figure 10. Affective score changes among the whole population.

Overall, 46% of subjects that experienced any change in their affective scores migrated toward the center of the affective spectrum. One may interpret this migration as a result of students becoming more familiar with the subjects being covered in the unit, and as a result

becoming more able to determine their interest in the subject matter. This is also another example of regression toward the mean (Martin, 1997).

Cognitive portfolio assessment

All of the subjects were offered the opportunity to complete a portfolio assessment of their learning during this unit. A study by Goodnough (2001) showed that when students were given a choice of how to complete a project a majority chose to complete it in a verbal-linguistic format. The researcher of that study suggested that this trend occurred because of student familiarity with the verbal-linguistic format of assessment. In this study the portfolios received by the researcher contained significant verbal-linguistic elements. Among the group of subjects of this study only seven completed their portfolio assignment. A student not completing assignments is a common educational problem that may be linked to psychological problems with students (Sheppard, 2002).

As the projects were only completed by such a small number of subjects, the overall scores obtained by each of these subjects is presented in Table 10. The researcher had given the project a total point value of 200 points. This high point value was given to encourage students to complete the project.

Table 11 Scores of Subjects Completing the Portfolio Assignment

Subject #	Score on Portfolio	% Equivalent	Score on Post-test %
A16	200	100	52
B8	188	094	45
C2	200	100	73
C13	195	098	61
C19	180	090	48
C27	200	100	55
C30	193	097	34

The use of the portfolio in assessing student learning is a natural outgrowth of the theory of multiple intelligences.   The portfolio allows students to tackle learning the way that they best learn. Additionally, the portfolio prepares students to use their dominant intelligence to solve problems they will face later on in life (Walters, 1992).   The portfolio projects showed the unique ways in which the students learned about Newton's three laws of motion.

The musical intelligence was dominant among many of the subjects. Research has shown the use of music to an activity that involves using the entire brain. The left brain (language, logic, mathematics, "academics") processes the lyrics, while the right brain (rhythm, rhyme, pictures, emotions, "creativity") processes the music. For these reasons music and musical products can be one of the best ways for students to learn (Moran, 2002).   One of the subjects, a female (C27), produced a rap about Newton's three laws of otion for her portfolio assignment (See appendix 3)..

The mean score of students completing the portfolio on the cognitive post-test was 45.43 %.   The mean on the post-test for students that did not complete the portfolio was 46.22%. Research has shown that students perform about the same on teacher-prepared exams after receiving multiple-intelligence-based instruction as after receiving standard instruction. However, other forms of assessment yielded more superior results after multiple-intelligence-based instruction than after receiving standard instruction (Goodnough, 2001). The results of previous research appear to be validated by this present study.

Conclusions and Recommendations

The use of multiple intelligence theory can make instruction more interesting and engaging for the students (Christison, 1999).   Students can become very engaged in producing original products for "authentic" assessment purposes (North Central Regional Educational

Laboratory, 1994). Teachers can gain understanding about their students when they evaluate

their learning styles and dominance of multiple intelligences (McCombs,2001). With this theory

education can move toward reaching out to all students in an equitable manner. For the theory to

become fully integrated in education, educators must reevaluate how they measure student

learning. The results of research that suggest students do about the same on verbal-linguistic

tests with or without multiple intelligence instruction appear to be valid (Goodnough, 2001).

The only way to accurately measure what students learn in non-verbal-linguistic or mathematical

ways is through products that emphasize the other intelligences. The current dependence upon

standardized (verbal-linguistic or mathematical) tests requires that subjects be masters in these

formats.

The National Science Teachers Association (NSTA) advocates that science teachers

should "embrace and model diversity through equity, respect, and opportunity for all" (NSTA,

2001). This broad statement would appear to encourage the use of both multiple intelligence

theory and differentiated instruction. Technology should be used as a tool of inquiry. Students

may extend their senses through technology. Technology also provides an easy way for students

to access and work with real scientific data. In obtaining and working with such data, students

actually engage in work similar to that preformed by real scientists (Szesze, 2001).

Teachers should begin to explore how they can reach the students in their classes.

Knowledge of math and science will be essential in the 21st century (Goodnough, 2001).

American math and science teachers must do something to improve math and science learning.

Unfortunately America has experienced a dumbing-down of science and math instruction. This

has become most obvious in the textbooks now being produced and how they differ from

textbooks of just a few years ago (Bennetta, 1997). Funding for further research is available

through groups such as NSF. Extending the duration of the study would be a good project modification. Incorporating more use of multiple intelligence theory in actual classroom teaching and more methods of authentic assessment would greatly enhance the study. It might also be worthwhile to collect statistical data on the actual percentages of classroom time that is spent in different activities and instructional methods. Such information would allow the researcher to determine how specifically the learning style needs of the students are being met. Researchers should also work on ways to supplement textbooks that dumb-down their content so students receive a good education (Cummings, 2000).

Appendix 1

Evaluation of your Learning Style

Name: _____   Date:_____

Block:_____

Introduction:

Everybody has a preferred learning style. Knowing and understanding our learning style helps us to learn more effectively.

Directions:

Place a check next to all the phrases that describe you.

1.   ___ reaches out to touch things   TKL
2.   ___ collects things
3.   ___ talks fast using hands to communicate what they want to say
4.   ___ constantly fidgeting (e.g., tapping pen, playing with keys in pocket)
5.   ___ good at sports
6.   ___ takes things apart, puts things together
7.   ___ prefers to stand while working
8.   ___ likes to have music in the background while working
9.   ___ enjoys working with hands and making things
10.   ___ likes to chew gum or eat in class
11.   ___ learns through movement and exploring the environment around them
12.   ___ may be considered hyperactive
13.   ___ good at finding their way around
14.   ___ comfortable touching others as a show of friendship (e.g., hugging)
15.   ___ prefers to do things rather than watching a demonstration or reading about it in a book
16.   ___ asks for verbal instructions to be repeated   VLS
17.   ___ watches speakers' facial expressions and body language
18.   ___ likes to take notes to review later

19. ___ remembers best by writing things down several times or drawing pictures and diagrams

20. ___ good speller

21. ___ turns the radio or TV up really loud

23. ___ gets lost with verbal directions

24. ___ prefers information to be presented visually (e.g., flipcharts or chalkboard)

25. ___ skillful at making graphs, charts, and other visual displays

26. ___ can understand and follow directions on maps

27. ___ feels the best way to remember something is to picture it in their head

28. ___ follows written instructions better than oral ones

29. ___ good at solving jigsaw puzzles

30. ___ gets the words to a song wrong

31. ___ good at the visual arts

32. ___ follows oral directions better than written ones   ALS

33. ___ would rather listen to a lecture than read the material in a textbook

34. ___ understands better when reads aloud

35. ___ struggles to keep notebooks neat

36. ___ prefers to listen to the radio than to read a newspaper

37. ___ frequently sings, hums or whistles to themselves.

38. ___ dislikes reading from a computer screen especially when the backgrounds are fuzzy

39. ___ When presented with two similar sounds, can tell if sounds are the same or different

40. ___ requires explanations of diagrams, graphs, or maps

41. ___ enjoys talking to others

42. ___ talks to self

43. ___ uses musical jingles to learn things

44. ___ would rather listen to music than view a piece of artwork

45. ___ uses finger as a pointer when reading

46. ___ likes to tell jokes, stories and makes verbal analogies to demonstrate a point

This assessment was modified from a similar assessment at http://www.ldpride.net/learning stylles.MI.htm

Multiple Intelligence Inventory

Below are listed the nine intelligences that a learner may have and a description of each. Each of us has most of these intelligences, but in each of us some are more dominant than the others are. Please place a number before each one of the intelligences (from 1 to 9 with 1 representing the most dominant and 9 the least dominant) to rate how dominant it is in how you enjoy learning.

____ **Linguistic**

You like to play with words in reading, writing, and speaking.

____ **Mathematical**

You like to experiment with and explore numbers and patterns.

____ **Spatial**

You like to put visualizations into drawings, buildings, designs, and creations.

____ **Musical**

You like to sing hum, play instruments, and respond and learn to music.

____ **Kinesthetic**

You like to move, touch, dance, play sports, do crafts, and learn through movement and touch.

____ **Interpersonal**

You like to share and compare ideas, cooperate with others, have lots of friends, and learn from others.

____ **Intrapersonal**

You like to work alone, at your own pace, and produce original and unique work.

____ **Naturalist**

You enjoy observing nature, seeing how things work, and taking things apart.

____ **Existentialist**

You like to do things to help others and the community.

Appendix 2

Unit III Test

Name: _____   Date: _____   Block:

_____

Instructions: For questions 1 - 30 place the letter of the best choice in the blank. Each question

is worth 3 points.

1.   Newton's First Law of Motion describes what occurs when _____ forces are
        acting on a single object.

        a. varying   b. reflexive   c. resilient   d. balanced   e. unbalanced

2.   Newton's Second Law of Motion describes what occurs when _____ forces are
        acting on a single object.

        a. varying   b. reflexive   c. resilient   d. balanced   e. unbalanced

3.   Newton's Third Law of Motion describes what occurs when equal, but _____
        forces are acting between several objects.

        a. unbalanced b. balanced   c. reflexive   d. resilient   e. varying

4.   Objects _____ when they experience a change in their motion due to unbalanced
        forces acting upon them.

        a. expand   b. accelerate c. contract   d. evaporate e. sublimate

5.   An example of a _____ pair is that a rocket engine pushes on a rocket with
        5000N and that the rocket pushes on the rocket engine with 5000N.

        a. distance-time   b. mass-volume   c. action-reaction
        d. cause-effect   d. acceleration-velocity
6.   Scientists call the push or pull that acts in the opposite direction that an object is moving
        _____.

        a. inertia   b. weight   c. specific gravity
                d. mass   e. friction

7.   Scientists call a push or a pull on or between objects a _____.
        a. force b. bailment   c. mover   d. disturbance   e. detractor

For questions 8 – 10 select the terms that best complete the numbered **space on the concept**
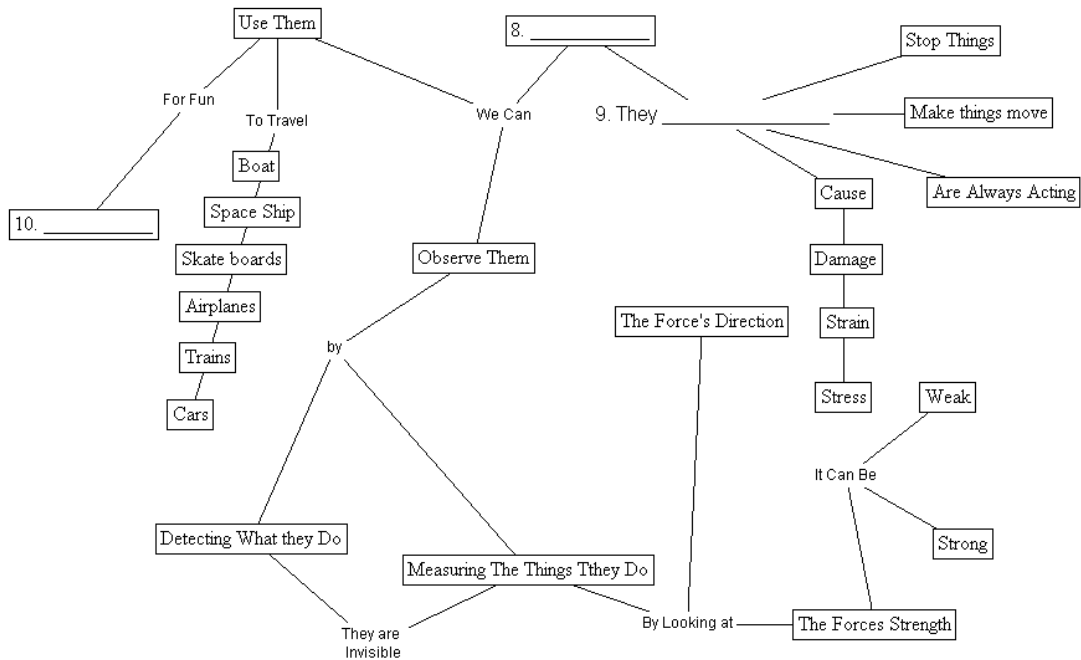
map pictured below.

8.   The best heading for this concept map is _____.
        a. forces   b. inertia   c. amusement park rides
        d. push and pull e. fade and oscillate

9.   Forces _____, allowing them to accomplish the items listed to the right of the
        blank numbered 9.
        a. forces   b. inertia   c. amusement park rides
        d. push and pull e. fade and oscillate

10.   _____ are fun applications of the topic of this concept map.
        a. forces   b. inertia   c. amusement park rides
        d. push and pull e. fade and oscillate

11.   The resistance of an object to changes in motion is called _____.
        a. friction   b. inertia   c. acceleration   d. velocity   e. gravity

12.   The _____ of an object is the quantity of matter present in an object.
        a. weight   b. load   c. density   d. volume   e. mass

13.   Newton's _____ states that objects at rest remain at rest and objects in motion
        remain in motion until acted upon by a push or a pull.

        a. 1st Law of Motion   b. Law of Gravitation   c. 2nd Law of Motion
        d. Law of Momentum e. 3rd Law of Motion

14.   Newton's Second Law of Motion may be expressed as _____.
        a. $F = \dfrac{a}{m}$ b. $F = \dfrac{m}{v}$ c. $\dfrac{F}{m} = a$ d. $\dfrac{m}{F} = a$ e. $\dfrac{g}{F} = a$

15.   Newton's _____ states that for every action of a push or pull there is an equal
        and opposite reaction of a push or pull.

a. 1st Law of Motion   b. Law of Gravitation   c. 2nd Law of Motion
d. Law of Inertia   e. 3rd Law of Motion

16.   Scientists describe the universal attraction between objects as the _____ force.

a. magnetic   b. gravitational   c. strong nuclear
d. weak nuclear e. static electrical

17.   A driver going 70 km/h comes to a stop in 5 seconds. While her car is stopping, she is thrust forward. This happens because of Newton's _____.

a. 1st Law of Motion   b. Law of Gravitation   c. 2nd Law of Motion
d. Law of Momentum e. 3rd Law of Motion

18.   When astronauts travel on the space shuttle they have less weight than they do on earth, because _____.

a.   The astronauts are closer to the earth's gravity and the shuttle has more mass then the earth.

b.   The astronauts are further away from the earth's gravity and the shuttle has less mass then the earth.

c.   The astronauts are further away from the earth's gravity and the shuttle has more mass then the earth.

d.   The astronauts are closer to the earth's gravity and the shuttle has less mass then the earth.

e.   The stress of space flight makes the astronauts lose weight.

19.   The _____ is the SI unit for force.
a. radian   b. gauss   c. newton   d. parsec   e. angstrom

20.   A force of _____ will accelerate a mass of 100 kg to 20 m/s^2.
a. 80 N   b. 5 N   c. 120 N   d. 2,000 N   e. 0.2 N

21.   When a force of 50,000 N is applied to a car with a mass of _____ it accelerates at 50 m/s^2.

a. 1,000 g   b. 1,000 kg   c. 250,000 g   d. 250,000 Kg   e. 50,050 Kg

22.   What is the acceleration of a soccer ball having a mass of 0.5 kg if it is kicked with a force of 75 N?
a. 150   m/s^2 b. 37.5 m/s^2 c. 0.0067 m/s^2
d. 75.5 m/s^2 e. 74.5 m/s^2

23.   What is the weight of a 50 kg girl on earth?
a. 50 kg.   b. 5.10 N   c. 490 N   d. 50 N   e. 50,000 g

24.   What is the mass of 75 kg man on Jupiter's moon Io, where the acceleration due to gravity is 1.95 m/s^2?

        a. 146.25 kg   b. 146.25 N   c. 38.46 kg   d. 75N   e. 75 kg

25.   What is the mass of a basketball, if Michael Jordan applies a force of 15 N to get it to accelerate to 30 m/s^2?

        a. 2.0 N b. 450 N   c. 450 kg   d. 0.5 N   e. 0.5 kg

26.   According to Newton's Third Law of Motion, if a fly, with a mass of 0.001 kg accelerating at 50 m/s^2, hits the windshield of a car, with a mass of 1,000 kg accelerating at 30,000 m/s^2, the force applied by the fly to the car will be
        _____ than the force applied by the car to the fly.
        a. larger and in the opposite direction   b. larger and in the same direction
        c. smaller and in the opposite direction   c. smaller and in the same direction
        e. equal and in the opposite direction

27.   Jordan pushes a wagon on the playground. Jordan comes to a stop, but the wagon continues to move. Newton's _____ explains why this happened.

        a. 1st Law of Motion   b. Law of Gravitation   c. 2nd Law of Motion
        d. Law of Momentum   e. 3rd Law of Motion

28.   On Earth Shantè weighs 735 N, but on the moon she weighs 122.5 N. How is the reduction of her weight explained?

        a.   The moon has a larger mass than the earth. According to Newton's Second Law of Motion that gives her a greater weight on the Earth.

        b.   The moon has a larger mass than the Earth. According to Newton's Second Law of Motion that gives her a greater weight on the moon.

        c.   The moon has a smaller mass than the Earth. According to Newton's Second Law of Motion that gives her a greater weight on the earth.

        d.   The moon has a smaller mass than the Earth. According to Newton's Second Law of Motion that gives her a greater weight on the moon.

        e.   The moon has a greater orbital acceleration than the Earth. According to Newton's First Law of Motion that gives her less weight on the moon.

29.   A coin is placed on a 3' x 5' card over a beaker. The card is quickly flicked. According to Newton's First Law of Motion the coin will _____.

        a. move with the card   b. stay in place and drop into the beaker

        c. prevent the card from moving   d. slow the movement of the card

e. move in the opposite direction of the card

30. A block of wood has a string attached to it, which is placed over a pulley. A mass of 50g is attached to the opposite end of the string, and the acceleration of the block of wood is observed. Next, a mass of 200 g is attached to the opposite end of the string, and the acceleration of the block of wood is once more observed. The acceleration of the block of wood with the 200 g mass is found to be far greater than acceleration with the 50 g mass. Why was the acceleration with the 200 g mass greater than the acceleration with the 50 g mass?

a. mass divided by force = acceleration   b. mass times force = acceleration

c. acceleration times force = mass   d. force = mass times acceleration

e. mass = force

The following questions have **NO RIGHT OR WRONG** answers. You will receive 1 point for each question that you answer. Your teacher wants to know what you think and how you feel about the topics covered in these questions. On questions 31 through 40 select the answer that best describes your thoughts and feelings. For each question on the next page the numbers below represent your choices for answers.

Marking **1** indicates that you **strongly agree** with the statement.

Marking **2** indicates that you **agree** with the statement.

Marking **3** indicates that you **slightly agree** with the statement.

Marking **4** indicates that you **slightly disagree** with the statement.

Marking **5** indicates that you **disagree** with the statement.

Marking **6** indicates that you **strongly disagree** with the statement.

The questions have been printed on a separate page (the next page) from this answer sheet so you

can look that the questions and answers side by side.

31. I enjoyed learning about physical forces.

1   2   3   4   5   6

32. Physical forces play an import role in my daily life.
1   2   3   4   5   6

33.   I would enjoy reading a book about physical forces.

        1   2   3   4   5   6

34.   I would enjoy looking for information about physical forces on the Internet or in the library.

        1   2   3   4   5   6

35.   I believe the studying forces will help me become a better person.

        1   2   3   4   5   6

36.   I would enjoy a job that would involve working with physical forces.

        1   2   3   4   5   6

37.   I see a real advantage in learning about physical forces.

        1   2   3   4   5   6

38.   I would enjoy researching and preparing a report on physical forces.

        1   2   3   4   5   6

39.   I would enjoy hearing someone talk about physical forces.

        1   2   3   4   5   6

40.   I believe knowing about physical forces can help me stay healthy.

        1   2   3   4   5   6

Key For Unit III Test

	Version 1	Version 2
1.	d	b
2.	e	e
3.	a	a
4.	b	c
5.	c	d
6.	e	e
7.	a	c
8.	a	a
9.	d	d
10.	c	c
11.	b	b
12.	e	a
13.	a	c
14.	c	d

15.	e	b
16.	b	a
17.	a	c
18.	b	b
19.	c	a
20.	d	c
21.	b	e
22.	a	b
23.	c	b
24.	a	a
25.	e	d
26.	e	e
27.	c	e
28.	c	b
29.	b	e
30.	d	a

Table 11. Table of Specification For Unit III Test

Content									
Vocabulary	III.Kn.1. 3 3								
	III.Kn.2. 3 4								
	III.Kn.3. 3 5								
	III.Kn.4. 1 6								
	III.Kn.5. 5								
	7, 8, 9, 10								
	III.Kn.7. 1 11								
	III.Kn.8. 3 12								
	III.Kn.9. 3 19								
Laws	III.Kn.10. 4								
	1, 13								
of Motion	III.Kn.11. 4		III.Ap.1. 3	III.An.1. 3					
	2, 14		26	27					
	III.Kn.12. 4		III.Ap.2. 3	III.An.2. 4					
	3, 15		21, 22	17,					
			III.Ap.3. 4	III.An.3. 5					
			20, 23, 24, 25	29, 30					
Gravity	III.Kn.6. 1 16	III.Co.1. 1 18	III.Ap.4. 2 28						
Forces					III.Rs.1. 5	III.Pe.1. 4*	III.Nc.1. 2 **	III.Tw.1. 3*	III.Ce.1. 2*
					31 - 40				

Appendix 3: Typed Transcript of a Student Rap (as submitted)
Once I knew this man that

made some laws he called it

Newton's Motion laws, I walked

up to him slowly and said I know

you don't no me but could you

tell me the first law of motion

two or more balanced forces

or acting on a single object

I said but if that's true then

then tell me the second law he said

"tells what happen when two or

or more unbalanced forces are

acting on an object I said

man, man, if you no those

two then could you tell me

the last third law by he said

of course I'll tell you the third

law girl and let you remmeanse

on the second and the first yo heard

he said tells what happen when forces

interact on object + are equal, but not

balanced, because each force

acts on a separate object.

Bibliography

American Psychological Association. (2001). *Practicing different skills in concentrated blocks not the most efficient way to learn, according to new research*. Retrieved April 19, 2002, from http://www.apa.org/releases/retention.html

Armour, K., et. al. (2000). *Report of the NEA Task Force on Reading 2000.* Retrieved April 19, 2002, from http://www.nea.org/readingmatters/experts/tfrfinal.pdf

Armstrong, T. (1998). *Jerome Bruner: Concept attainment overview.* Retrieved April 19, 2002, from http://ivc.uidaho.edu/mod/models/bruner/

Bennetta, W. (1997). *A dumbed-down textbook is a textbook for all students.* Retrieved April 19, 2002, from http://www.textbookleague.org/82dumbo.htm

Bergman, T. (2002). *Bloom's cognitive and affective taxonomies.* Retrieved April 19, 2002, from http://www.mehs.educ.state.ak.us/blooms.html

Biggs, J. (1994). *Student learning research and theory - where do we currently stand?* Retrieved April 19, 2002, from http://www.lgu.ac.uk/deliberations/ocsd-pubs/isltp-biggs.html

Boehner, J. (2001). *Measuring student learning critical to academic success.* Retrieved April 19, 2002, from http://edworkforce.house.gov/press/press107/edreform3801.htm

Bogod, L. (2002). *Learning styles explained.* Retrieved April 19, 2002, from http://www.ldpride.net/learningstyles.MI.htm#Auditory Learners:

Brualdi, A. (1996). *Multiple intelligences: Gardner's theory.* Retrieved April 19, 2002, from http://www.ed.gov/databases/ERIC_Digests/ed410226.html

Christison, M. (1999). *Multiple intelligences: Theory and practice in adult ESL.* Retrieved April 19, 2002, from http://www.cal.org/ncle/digests/MI.htm

Claxton, C., & Murrell, P. (1988). *Learning Styles.* Retrieved April 19, 2002, from http://www.ed.gov/databases/ERIC_Digests/ed301143.html

Cole, C. (2002). *PowerPoint presentation.* Retrieved April 19, 2002, from http://www.wfu.edu/users/colerc02/powerpoint.htm

Cummings, F. (2000). Thinking of each and every one. *Eisenhower National Clearinghouse Focus 7*(4), 16 – 19.

Dawson, S. (2001). *Kinesthesis in science: Where red rover meets quantum mechanics.* Retrieved April 19, 2002, from http://www.grad.berkeley.edu/gsi/tea/essays1/TEA_Dawson.htm

Duffy, A. (1998). *Physics lecture demonstrations at Boston University.* Retrieved April 19, 2002, from http://buphy.bu.edu/~duffy/mech/1G10_25.html

Elfers-Wygand, P. (2000). *Use of kinesic (sic) abilities within a complementary dyad in a special population.* Retrieved April 19, 2002, from http://www.york.cuny.edu/~seitz/AERA2001.htm

Glennan, K., & Melmed, A. (1996). *Fostering the use of educational technology: elements of a national strategy.* Retrieved April 19, 2002, from http://www.rand.org/publications/MR/MR682/contents.html

Goodnough, K. (2001). Multiple intelligences theory: A framework for personalizing science curricula. *School Science and Mathematics, 101*(4), 180 – 193.

Grace, C. (1992). *The portfolio and its use: Developmentally appropriate assessment of young children.* Retrieved April 19, 2002, from http://www.ed.gov/databases/ERIC_Digests/ed351150.html

Grant, W. (1990). *The case for authentic assessment*. Retrieved April 19, 2002, from http://ericae.net/db/edo/ED328611.htm

Grossen, B. (2001). *What is direct instruction?* Retrieved April 19, 2002, from http://darkwing.uoregon.edu/~bgrossen/aftdi.htm

Hardy, B. (1996). *The SQ3R*. Retrieved April 19, 2002, from http://www.u.arizona.edu/ic/wrightr/other/sq3r.html

Haury, D. (1993). *Teaching science through inquiry*. Retrieved April 19, 2002, from http://www.ed.gov/databases/ERIC_Digests/ed359048.html

Haury, D. (1999). *Should students be tracked in math or science?* Retrieved April 19, 2002, from http://www.ed.gov/databases/ERIC_Digests/ed433217.html

Hopkins, W. (2000). *Quantitative research design*. Retrieved April 19, 2002, from http://www.sportsci.org/jour/0001/wghdesign.html

Huitt, W. (1998). *Direct instruction: Robert Slavin's model*. Retrieved April 19, 2002, from http://chiron.valdosta.edu/whuitt/col/instruct/dirinst.html

Ivey, G., & Broaddus, K. (2000). Tailoring the fit: Reading instruction in middle school readers. *The Reading Teacher, 54*(1), 68 – 78.

Jazwinski, C. (1996). *Experimental design typology.* Retrieved April 19, 2002, from http://www.tjhsst.edu/Psych/intelligence/index.html

Jones, P. (2001). *Assessment validity.* Retrieved April 19, 2002, from
    http://www.tjhsst.edu/Psych/intelligence/index.html

Justiniano, M., & Wang, G. (2001). *Intelligence theories.* Retrieved April 19, 2002, from
    http://www.tjhsst.edu/Psych/intelligence/index.html

Kaufhold, J. (1998). *What's wrong with teaching for the test?* Retrieved April 19, 2002, from
    http://www.aasa.org/publications/sa/1998_12/kaufhold.htm

Leath, A. (2001). *Government: National survey of student performance in science.* Retrieved
    April 19, 2002, from http://www.npaci.edu/online/v5.25/gov-stu.survey.html

Lewis, R. (1992). *Six steps to more effective science teaching.* Retrieved April 19, 2002, from
    http://www.the-scientist.com/yr1992/jan/prof2_920106.html

Livingston, J. (1997). *Metacognition: An overview.* Retrieved April 19, 2002, from
    http://www.gse.buffalo.edu/FAS/Shuell/CEP564/Metacog.htm

Marinez, D., de Montellano, O., & Bernardo, R. (1988*). Improving the science Achievment of
    Mexican American students through culturally relevant science. ERIC Digest.* Retrieved
    April 19, 2002, from http://www.ed.gov/databases/ERIC_Digests/ed296819.html

Marquis, J. (1997). *Category theory.* Retrieved April 19, 2002, from
    http://setis.library.usyd.edu.au/stanford/archives/fall1997/entries/category-theory/#Gen

Martin, W. (1997). *Regression toward the mean.* Retrieved April 19, 2002, from
    http://trochim.human.cornell.edu/tutorial/martin/regress.htm

McCombs, B. (2001, Summer). What do we know about learners and learning? The learner-
    centered framework: Bringing the educational system into balance. *Educational
    Horizons,* 182 – 193.

Moran, J. (2002). *Multiple intelligences.* Retrieved April 19, 2002, from
    http://www.tranquility.net/~scimusic/MI.html

Morrow, C., Zawaski, M. (2001). *Kinesthetic astronomy for at-risk students.* Retrieved April 19,
    2002, from http://www.aas.org/publications/baas/v32n4/aas197/1104.

Michael, R. (2000). Summarizing change in test scores: Shortcomings of three common
    methods. *Practical Assessment, Research & Evaluation*, 7(5). Retrieved April 19, 2002,
    from http://ericae.net/pare/getvn.asp?v=7&n=5

Musick, M. et. al. (n.d.). *Reading framework for the national assessment of educational
    progress: 1992 – 2000: Chapter three special studies and background information.*
    Retrieved April 19, 2002, from http://www.nagb.org/pubs/92-2000read/ch3.html

Nalanda Institute. (2001). *Visual learners.* Retrieved April 19, 2002, from
    http://nalandainstitute.org/visual.htm

National Academy of Science. (1995). *Science content standards: 9-12.* Retrieved April 19,
    2002, from http://www.nap.edu/readingroom/books/nses/html/6e.html

National Assessment of Educational Progress. (2000). *National report card: State science, report
    for Tennessee.* Retrieved April 19, 2002, from
    http://nces.ed.gov/naep3/pdf/stt2000/2002453TN.pdf

National Science Teachers Association. (2001). NSTA's guiding principles. *Retrieved April 19,
    2002, from http://www.nsta.org/aboutnsta*

North Central Regional Educational Laboratory. (1994). *Meaningful, engaged learning.*
    Retrieved April 19, 2002, from http://www.ncrel.org/sdrs/engaged.htm

Pallas, A. (1989). *Making schools more responsive to at-risk students.* Retrieved April 19, 2002,
    from http://www.ed.gov/databases/ERIC_Digests/ed316617.html

The Pennsylvania Coalition for Public Education. (1997). *How can portfolios be helpful to
    students?* Retrieved April 19, 2002, from http://www.pcpe.org/infoseries/portfolios.htm

Robotham, D. (1999). *The application of learning style theory in higher education teaching.*
    Retrieved April 19, 2002, from http://www.chelt.ac.uk/el/philg/gdn/discuss/kolb2.htm

Schwartz, W. (1987). *Teaching science and mathematics to at risk students.* Retrieved April 19,
    2002, from http://www.ed.gov/databases/ERIC_Digests/ed289948.html

Sheppard, R. (2002). *Ask the psychologist.* Retrieved April 19, 2002, from
    http://www.glfamily.com/html/ma-02/ma-02-psych.html

Siegrist, J. (2002). *The model of effort-reward imbalance measurement.* Retrieved April 19,
    2002, from http://www.uni-duesseldorf.de/MedicalSociology/eri/measurement.htm

Silverman, L. (2001). *Visual spatial learners an introduction.* Retrieved April 19, 2002, from
    http://www.gifteddevelopment.com/Articles/VSLWelcome.htm

Stone, S., & Glascott, K. (1998). *The affective side of science.* Retrieved April 19, 2002, from
    http://www.unesco-
    iicba.org/electronic_library/science/science_pages/science_articles/the_affective_side_of
    _science.htm

Sunal, D., Sunal C., Whitaker, K., Freeman, M., & Odell, M. (2001). Teaching science in higher
    education: Faculty professional development and barriers to change. *School Science and
    Mathematics, 101*(5), 246 – 257.

Szesze, M. (2001). *MCPS science curriculum frameworks.* Retrieved April 19, 2002, from
 http://www.mcps.k12.md.us/curriculum/science/curr/frameworks.htm

Tennessee Department of Education. (2001). *State of Tennessee report card 2001.* Retrieved
 April 19, 2002, from http://www.k-12.state.tn.us/rptcrd01/index.asp

Thomson, B. & Mascazine, J. (1997). *Attending to learning styles in mathematics and science
 classrooms.* Retrieved April 19, 2002, from
 http://www.ed.gov/databases/ERIC_Digests/ed432440.html

Tomlinson, C. (2000). *Differentiation of instruction in elementary grades.* Retrieved April 19,
 2002, from http://www.ed.gov/databases/ERIC_Digests/ed443572.html

Walters, J. (1992). *Application of multiple intelligences research in alternative assessment.*
 Retrieved April 19, 2002, from
 http://www.ncbe.gwu.edu/ncbepubs/symposia/second/vol1/application.htm

Wise, M. (1999). *Locus of control in our daily lives how the concept of control impacts the
 social world.* Retrieved April 19, 2002, from
 http://miavx1.muohio.edu/~psybersite/control/overview.htx

Zimmerman, J. (2001). *Put zip in your training: Appealing to the kinesthetic learner.* Retrieved
 April 19, 2002, from http://www.impactcg.com/training/kines.htm

Educ 590 Culminating Experience

Statement of Research Problem

Daniel Lewis

Abstract: Educational research indicates that students learn better when the instruction they receive incorporates aspects of Multiple Intelligence theory. One method of incorporating the Multiple Intelligence involves using graphic organizers and other visuals associated with the Spatial Intelligence.

Method:

1.   Researchers select a student population, whose previous instruction and assessment included little or no instruction incorporating Multiple Intelligence theory.

2.   Data will be collected about the past performance of these students in similar course work to the course in which they are enrolled during the duration of the study.

3.   Students in the population who have previously failed the course in which they are now enrolled may be used as a control group to check the validity of research results.

4.   Students in the test population will be given instruction and assessment dominated with incorporations of the use of Multiple Intelligence theory.

5.   Data will be collected about student performance, while they are receiving instruction and assessment incorporating Multiple Intelligence theory.

6.   Data analysis will be used to determine if the incorporation of Multiple Intelligence theory significantly altered student performance.

Hypothesis: Incorporating Multiple Intelligence theory in instruction and assessment will increase student performance.

Student Assessments: A Case Study of Fifth Grade Students at a Magnet School of Fine Arts, Chattanooga, Tennessee

Suzanne Nickel

Observation Dates:

March 21- April 26, 2002

The purpose of this case study is to reflect upon and experiment with different forms of student assessment. How do I, the teacher, know that my students are getting it? As a teacher, it is necessary for me to be able to evaluate the level of my students' achievement associated with the lesson objectives that I have set for them. These objectives are chosen based on national standards school standards, and upon the skills that my students will need for the next school year. Also, with regard to the skills that my students will need to have for the next grade, I will have a shorter list of "skills my lowest achieving students must have before exiting my class in the spring." This list will apply for all my students, however it is designed with my lower achieving students in mind. It is a disheartening fact that some students enter fifth grade and middle school with third grade level or lower academic skills. I do not know how this is possible and it is not the purpose of this project to answer that question. It is my purpose to assess and work with of my students when they enter my classroom. I will be discussing the various assessment techniques that tell me what my students have learned from lessons I teach and what skills they have developed. The skills I teach in my class are important for students to have as preparation for the next grade. Therefore, it is important for me to make sure that each one of my students possesses those skills that he or she will need to succeed the next school year.

This case study is based on a fifth-grade self-contained classroom at a magnet school of Fine Arts in Chattanooga; Tennessee, The observation dates take place from March 27 through April 26, 2002 The classroom has 23 students, nine of which are boys. There are six white students, all girls. The remaining 17 students are black. There are no Hispanic or Asian students in this class. One student, a boy, has been identified as gifted. Five students are identified as low-level achievers. Two of these receive special education support through the inclusion program. Of the five lower achieving students, two are girls and three are boys.

Several weeks after my arrival to their classroom I gave the fifth grade students a math worksheet with 53 fourth-grade level math problems. They completed this sheet for homework, I graded these papers and I have shown the results in the chart below:

Fifth-Graders' Scores on Fourth-Grade-Level Math Problems

At least six students have frequent disruptive behavior problems. These behavior problems exist during direct instruction, question/answer games, sketching, group work, centers, and quiet seatwork. These students demand more than their share of teacher and student attention. Their regular teacher has a strong personality and has a good system for helping them to control their behavior. She must frequently call these students' names and ask them to "lower their level" which indicates that the student has lost a privilege. At least three of these behavior problem students must eat their lunch alone and silently almost everyday. Three of these identified students also have their desks separated from the groups of desks and must sit and work alone at their isolated desk. When a new person, however, enters their room, these students need to test their boundaries all over again. They test continually to see what they are permitted is do in class in front of their classmates. These students' grades are low. They have little internal motivation. Two of them may not pass the fifth grade. Student behavior is important to mention in this case study because so many students in this class display poor public behavior and interfere with their classmates' learning. I will not continually refer to student behavior throughout this study, but I feel it is necessary to point this out because the existing student habits affect any type of learning assessment. For the rest of this study I will explore different ways of assessing student knowledge.

What is an assessment and why is it necessary? An assessment is a means teachers use to identify what a student has learned or not learned. An assessment should measure what it is intended to measure. In this case it should measure what has been taught. It should gauge how

well each student has understood the lesson objectives that were written before the lesson was given. An assessment must permit related generalizations about students' knowledge and skills. "Good assessment information provides accurate estimates of student performance and enables teachers or other decision-makers to make appropriate decisions" regarding what needs to be re-taught to which students (Bond, Herman, & Arter, 1994). This is the main reason teachers assess their students. The teacher has to know what the students know. Did the students learn what they were supposed to learn? Assess them and find out.

It is important to use appropriate indicators when assessing what students know how to do. To understand what is happening in any situation depends upon just what is asked but also how the questions are asked. Assessment result will be more or less precise depending upon the means used to gather data and the extent of the data gathered. No matter what the focus of the study, there is an abundance of indicators that can provide information about the knowledge and skills of the student(s) under consideration.

A meaningful evaluation depends to a large degree upon the quality of the indicators being used. By knowing the capability of the indicators to assess the student, it is possible to form opinions from one indicator to another. If the indicators are interrelated they will show more accurate results. In education, the assessment of learning is generally built around the demonstration of competence in certain domains. These domains and the goals and objectives that refer to them are specified in frameworks, guidelines, or course outlines. Teachers design instruction based upon these guidelines and, generally, even though the method of teaching may take many forms, there is a high correlation between what is taught and the guidelines that are set for what should be taught. It is this correlation that makes large-scale assessment possible. As long as the teacher teaches the same content to the whole population of students, indicators can

be developed that measure learning along the specified curriculum. Because of the connection between instruction and the stated curriculum, inferences can be drawn about the effectiveness of instructional strategies in the classroom.

The means used to determine whether students have achieved the goals set for them range from the results of simple observation to group-administered written tests; from a short homework assignment to the performance and analysis of a complex laboratory experiment. "Test scores, performance, and artifacts are all indicators of learning. Determining which indicators are best suited to specific purposes is the core of the assessment debate" (Bond, Herman, & Arter, 1994; Bond, Herman, & Arter, in press).

As I have already indicated, there are many ways to assess students. One of the most familiar assessments is the multiple choice test. A multiple choice test usually has dozens of questions or "items." For each question; the test-taker is supposed to *select* the "best" choice among a set of four or five options. (They are sometimes called "selected-response tests.") For example:

What causes night and day?

A. The earth spins on its axis.

B. The earth moves around the sun.

C. Clouds block out the sun's light.

D. The earth moves into and out of the sun's shadow.

E. The sun goes around the earth.

(Sadler, 1998, p. 265-296)

The "wanted" answer is "A." The other answer options are called "distracters."

Most standardized tests including state exams and most commercial achievement tests, are made up primarily of multiple-choice items. These tests are considered to be objective tests. They are thought to be objective because there is an absolute correct answer. The grader considers the correctness of the answer, and then grades the answers' correctness according to an answer key with only one correct answer for each question. These tests are under criticism because they appear to test lower level thinking skills such as fact memorization. They do not ask students to analyze or evaluate facts. Evaluation and synthesization of facts represent higher order thinking, whereas, fact memorization is a lower order of thinking. Multiple choice questions ask students to remember facts about a subject; therefore multiple choice assessments are considered to only evaluate lower order thinking rather than deeper knowledge of the subject.

Most researchers agree that multiple-choice items are poor tools for measuring the ability to synthesize and evaluate information or apply knowledge to complex problems. In math, for example, they can measure knowledge of basic facts and the ability to apply standard procedures and rules. Carefully written multiple-choice questions also can measure somewhat more complex mathematical knowledge such as integrating information or deciding which mathematical procedures to use to solve problems. However, as students move toward solving non routine problems, analyzing, interpreting, and making mathematical arguments, multiple-choice questions are not useful.

In sum, many multiple-choice items are an inexpensive and efficient way to check on factual ("declarative") knowledge and routine procedures. However, they are not useful for assessing critical or higher order thinking in a subject, the ability to write, or the ability to apply knowledge or solve problems.

Even with carefully written distracters, as in the "night anal day" example, it is often hard to know why a student got a question wrong or right. But unless a teacher has that information, the test result is not useful for improving instruction for the individual.

A standardized multiple-choice test may point to some broad areas that need improvement. For example, a test may show that students in a school or district need to improve on double-digit multiplication. However, the tests do not provide information that will help teachers do a better job of teaching double-digit multiplication because they do not show why the class generally did not do well.

If students were asked to explain how they got their answers, then their teachers would have a lot more information. This information is vital for teachers to make instruction more effective. For example, students who did not know why "the earth spins on its axis" is the correct answer to "night and day" but happened to guess the correct answer would be unable to explain why. Their mistaken views would be visible to the teacher, who could then address the misunderstanding and clarify the concept (FairTest, n.d.).

Another assessment teachers may use for finding out how well their students are understanding new information is peer assessment. Peer assessment can have some positive outcomes and provide all students with a clearer understanding of the goals that the class is trying to achieve when completing a project or presentation. These projects could be assigned to the individual student or to groups. I will describe some specific conditions were peer assessment works well. Classmates can help one another by brainstorming for related content and extensions of the topics. Peer assessment is valuable for student presentations if the students are well

informed about the content of each other's presentations. This means that the teacher

has spent some time teaching and reviewing the content that is to be included in these

projects. It will not be beneficial for students to evaluate something that they know

nothing about. A rubric must be provided by the teacher, for students to evaluate the

style and method of the presentations. In addition, the teacher should be present

during part of each student's assessment to provide direction and suggestions.

Students need to be instructed in how to transform the grading rubric sections into

questions that ask if these particular items are included in their peer's project.

Peer assessment may help students increase their awareness of the value of

structure, coherence, and layout in presentations. Classmates can check for correct

information and may be able to identify exactly where misinformation was incorporated.

Students may exchange a range of opinions, attitudes, and reactions to each other's

performance. Peers may appraise bibliographies so that their classmates might find other

reference sources. Students may comment on hands-on skills in experimental work. Peer

assessment of poster displays can draw the student's attention to various approaches to

visual presentations (Brown, Race, & Smith, 1996).

Short answer tests are another way of assessing what students know. In a short answer

assignment, students are asked to answer pertinent questions in their own words. The process of

reflecting about and writing answers to the questions assist in the student's retention of important

information as well as indicate to the teacher what the student knows. Short answer questions

require more higher order thinking than do multiple-choice questions. In a multiple-choice test, a

student may not recall the correct answer without the prompting of the provided choices. In this

case the student is reminded of the correct answer, which means that the student did not learn the

information as thoroughly as hoped. In other cases, students may know little about the subject of the question being asked and may simply get lucky with a correct guess. Short answers require that the student know about the subject in question. The student must be able to express that knowledge in writing. While student teaching, I noticed several times students telling me they know something but cannot explain it. If they cannot explain what they know, then they do not know the information well enough for a teacher to be satisfied. I would not be satisfied with that level of learning and retention. Short answer evaluations do not take an inordinate amount of time to grade and could be graded by classmates or self-graded as questions and answers are reviewed. As I will discuss late in this study, the amount of time an assessment takes a teacher to prepare, administer, and grade is important.

A teacher, who teaches the precise content of a test rather than the underlying concepts and skills associated with the curriculum, does their students a disservice. A teacher may believe that his or her students should be taught in the same format as the test rather than as they would be used in the real world. For example, a teacher may give up essay tests because they are inefficient in preparing students for multiple-choice tests. Studies have shown however that the higher order skills of synthesizing and evaluating content increase student understanding and retention of new knowledge much better than drilling facts.

Rather than increasing test scores, the focus on endless skill and drill can actually have the opposite effect. "Not surprisingly, students gives instruction aid at conceptual understanding do better on skills tests than students drilled on the skills directly" (Carpenter, Fennema, Peterson, Chiang, & Loef, 1988, p. 6). It can even be harmful to put off instruction in higher-order thinking shills (such as problem-solving) until low-level skills (such as computation) have been mastered. "Students learn by doing. After all, how many of us trued to write by endlessly

practicing on vocabulary tests, grammar worksheets, and spelling lessons? We learned by writing and by correcting our own errors" (Levin, 1987). Obviously, students, especially new learners, need some direct practice in skills. It is the stagnation of requiring students to remain in this lower order of learning that is debilitating. And low-achieving students suffer the most from this approach. Because their initial test scores are low, they are often given dull and repetitive skills instruction that does not enable them to use the skills in everyday contexts, such as journal writing and note-taking.

Using hands-on, real life problems has a definite advantage over the sit-in your-seat-and-do-your-workbook type of instruction and assessment. A professor at the University of Wisconsin, Brian Bottge (2001), with the help of the Learning Technology Center at Vanderbilt University, developed a short video entitled Bart's Pet Project, portraying a middle school student trying to build a cage for a new pet. Students must figure out how much wood is needed to build the cage and must add several combinations of lengths of wood for the cage frame. Students engaged in problem solving and came up with several ways of finding solutions. In a more complex short-term math project posed by Professor Bottge, students were asked to use model cars to calculate the lowest point they needed to release their car on a six-foot ramp. These calculations involved the functions of distance, rate, and time.

Compared to students who had received the more traditional instruction, the students who were able to apply their problem-solving skills to a real situation did significantly better on post-tests. They also did better on tasks that required applying these math skills. Also student behavior improved as they were engaged in finding solutions. The "students were proud of their ability to solve the problems. When they discovered an answer, they voluntarily shared their findings with the rest of the class" (Bottge, 2001).

Another issue in assessment is the amount of time an assessment takes for a teacher to prepare, administer, and grade. As teachers' time is consumed with teaching to national, state, and local standards, time for evaluating student understanding can be unintentionally limited. Therefore, it is important to consider the amount of time an assessment will take.

Collecting more grades gives a more accurate indication of a student's performance in a given subject than does fewer grades. As in calculating an average, more data gives a more accurate picture of a student's knowledge. If the teacher wants to have a more accurate assessment of a student's achievement, he or she must collect more grades rather than fewer grades to determine the level of achievement. With time frame in mind, short answer tests may allow for quick and frequent assessments of student understanding.

In Britain, an assessment system based on students' performance on standard assessment tasks (SATs) has been piloted the areas of English, math, and science. It has been estimated that the SATs took 2 to 5 weeks out of the school year. Although the SATs had several good effects, it has been observed that "the interruption of normal education was substantial" (Madaus & Kellaghan, 1993, p. 467). This report on the Standard Assessment Test in Britain goes on to relay the problems that exist when trying to administer a series of individually administered, performance-based measures.

> "at Grade 2,…the tasks have been redesigned so that many can be administered to the whole class at the same time, and some of the most time-consuming ones have been dropped" (1992, p. 57). In fact, the number of tasks students are expected to perform will be only about a third of the number originally proposed, and there is a possibility that multiple-choice questions will be used to further speed up the assessment (Maeroff, p. 279). Finally, Madaus and Kellaghan report that according to a study carried out by Patricia Broadfoot and her colleagues, "virtually all the teachers surveyed…reported that major disruptions had occurred to normal classroom practice, and half of those surveyed felt that the SATs were totally unmanageable" (p. 463). At a time when teachers are demanding more time to teach, will they buy into an assessment program that requires such a vast

amount of time be diverted from instruction? (Educational Assessment Reassessed: *The Usefulness of Standardized and Alternative Measures of Student Achievement as Indicators for the Assessment of Educational Outcomes.* William L. Sanders and Sandra P. Horn, University of Tennessee, 1995).

Fifth Grade Level Pre-Test

The student's performance on the post-test increased somewhat as shown by the chart below. We used red and black counters to cancel out each other to show the effects of putting together negative and positive numbers. Students kept an account balance using their math journals and the red and black counters. They also practiced adding and subtracting accounts using pennies to either add or take away from their accounts.

They were given worksheets to complete so they would understand that the hands-on activities they were performing could be applied to paperwork. The actions and visualization of using counters and pennies appears to have aided in the students' understanding of negative numbers. Below is the chart showing the results of the post-test.

Post-Test on Negative and Positive Numbers

My recommendation for student assessment is to keep numerous records of a variety of assessments types. In other words, maintain a portfolio for each student containing written tests with multiple choice, short answer, and essay questions on each test. Student journals with students' daily exercises and thoughts and questions would be part of the portfolio. Take home practice sheets for homework, a group project with a problem, and their ways to solve it. Each group member has a responsibility and the group receives that same grade based on a specified criteria. Achievement charts posted in the classroom tracking student gains in a particular facet of the subject will also be part of the portfolio. For the middle school student and younger, portfolios should be kept in large manila envelopes in the classroom in a hanging file crate for student daily access. Students this age should not have to bear the burden of taking care of such a large portion of their grades. Students need to practice responsibility, but the responsibility of housing the student portfolios needs to fall upon the teacher.

Sources

Band, Herman, & Arter. (1994). NCREVs *Policy Talks*, audiotape #2, *Reaching for New Goals and Standards: The Role of Testing in Educational Reform Policy* (NCREL).

Band, & Herman (1992). *National Center on Education and the Economy*, 1989 and U.S. Department of Labor, 1991.

Bottge, B. (2001). Using intriguing problems to improve math skills. *Educational Leadership, 58*(6), 68-72.

Brown, Race, & Smith. (1996). *500 Tips on Assessment*, Logan Page Limited: London.

Carpenter, Fennema, Peterson, Chiang, & Loef. (1998*). Principles and indicators for student assessment systems.*

FairTest, *The National Center for Fair & Open Testing*. Retrieved from http://www.fairtest.org/index.htm

Linn, B., Baker, E., & Dunbar, S. *National Center for Research on Evaluation, Standards, and Student Testing (CRESST).*

Sadler, P. M. (1998). Psychometric models of student conceptions in science. *Journal of Research in Science Teaching, 35*(3), 265-296.

Schoen, H. L., Fey, J. T., Hirsch, C. R., & Acoxford, A. F. (1999). Issues and options in the math wars. *Phi Delta Kappan, February*, p. 444-44

Writing Workshops

Marion Reddoch Pound
Education 590
Research Project

Introduction

I am interested in writing workshops because I am studying to be a middle school English teacher who will definitely be teaching writing as part of the curriculum. Over the past few years, as I have taught writing to several middle school home schooling students and worked in several classrooms, I have realized that student ability varies greatly. Developing a specific method for teaching writing in a way that works for all students is not easy.

So as my entrance into the real world of the classroom approaches, I am curious about a method of teaching writing that is beneficial to the maximum number of students. In my Masters program, I have heard a lot about the workshop approach. This approach emphasizes the process over the product--rewarding students for creativity and content strengths rather than punishing them for structure weaknesses. It also stresses the importance of student ownership. Students are encouraged to write and rewrite until their papers say what they want them to say. In effect, the student writer drives the process, although his peers and his teacher guide him along the way. Hence, the writing workshop is a student-centered, hands-on approach to teaching writing.

There are two general objectives of the writing workshop. One objective is to create writers who are comfortable with the writing process and with themselves as writers and critics of writing. As I have researched, I have seen that the workshop approach accomplishes this objective. Attitudinal surveys show that student attitudes about writing and about themselves as writers positively increase following involvement in a writing workshop. A second workshop objective is to improve student writing ability. Research has been less available regarding this objective, but teachers claim that skill and ability are definitely increased by workshops. These

teachers also seem to have very specific ideas about what makes workshops effective. As I researched, I paid attention to these ideas in an effort to answer the question, "Is the workshop approach an effective strategy? Does it improve the writing skills of the students involved?"

Literature Review/Data Collection

Since most literature on writing workshops refers to Nancie Atwell, one of the creators of the writing workshop and a leading workshop guru, I began my research by reading, "Nancie Atwell's *In the middle* and the ongoing transformation of the writing workshop," an article by Marcy Taylor. The article is actually a reflection on how Atwell's philosophy toward her own workshops has changed and how her advice has changed as well.

When workshops were initially created, their primary objective was to give students the freedom and the time to create and recreate, shape and reshape, their writing as they wished. The emphasis was on the writing process, not the final product, and the teacher's role was to facilitate that process. It was a very student-centered, student-driven process.

Today the writing workshop is still student-centered, but Atwell claims that the teacher must now "teach with a capital T," implying that the teacher's days of passive involvement are over (Taylor, 2000, p. 49). Atwell's revision reintegrates the teacher as central in the writing classroom. She calls on teachers to move from facilitating to intervening. Taylor writes, "At the heart of Atwell's new interventionist pedagogy are two underlying shifts: a redefinition of student responsibilities (*expectations*) and an emphasis on expert demonstration (*apprenticeship*)" (Taylor, 2000, p. 48). Atwell argues that teachers need to be more direct with their students. This "directness" about student responsibilities translates into new requirements for teachers. They must provide very specific explanations of expectations to students and hold

students accountable for certain processes as well as certain products. Teachers must also place themselves as experts directly in the midst of their student writers and direct their activities. Atwell still encourages teachers to listen and reflect on what they hear in conferences with students, but now she also advocates "intervening directly, telling writers what works and what doesn't…rather than only 'following the child'" (Taylor, 2000, p. 49).

However, Atwell still promotes workshops as a student-centered instructional method, where choice is a major value. But providing students with choices and freedoms is not the central premise of Atwell's workshop philosophy these days. Instead, "choice is a reconfigured value, reflecting a greater sense of the interrelation of writer, teacher, and larger rhetorical context" (Taylor, 2000, p. 49). As teacher knowledge and expertise are recognized, more authority is returned to teachers. The design of Atwell's new workshops reflects this balance between the choices of students *and* teachers (Taylor, 2000). Additionally, allowing teachers to intervene in the process (with direct advice and demonstration) and manage the creation of the product (with specific expectations) results in a more structured, more "doable" workshop.

Many other authors and teachers agree with Atwell and provide additional ideas about how to allow for the process of the workshop but create the structure that produces tangible results. One such teacher is Cheryl Kucera, a middle school language arts teacher and writing program coordinator. As she explored the workshop approach, Kucera quickly learned that there was a real difference in the various kinds of writing workshops. In her article, "Detours and destinations: One teacher's journey into an environmental writing workshop," Kucera claims that the writing workshop revolutionized her classroom once she adopted George Hillocks's approach to the workshop. His environmental writing workshops are unique in that various modes of

writing are required and the criteria for evaluation is clear. Also, grammar is addressed in the editing stage, instead of being studied as a subject separate from writing, like in the typical workshop mini-lessons. Modeling the writing process is emphasized as well as giving students standards to meet for each mode of writing (Kucera, 1995).

As Kucera initially integrated this approach, she still had some questions about teaching grammar (the students could not recognize, much less write, correct sentences), peer editing (the students did not take it seriously), and student-teacher conferences (they took too long and lacked focus) (Kucera, 1995). After reevaluating, Kucera returned to mini-lessons to teach grammar, and she restructured the peer-editing sessions and the student-teacher conferences. She created a peer-share sheet to guide the peer editors as they provided feedback to their fellow students. And, to tackle the conference dilemma, Kucera divided the class into conferencing groups, meeting with four students at a time and discussing specific areas of difficulty (Kucera, 1995). Kucera's modifications resulted in impressive results: Attitudes about writing improved *and* writing ability improved. She claims her environmental writing workshops produced tangible results because they were well designed. Specifically, these workshops "offered a structure and a set of goals that presented the students with clear expectations and attainable objectives" (Kucera, 1995, p. 185).

When Arlene Owens first implemented the writing workshop, she also began using portfolios (Owens, 1992). Although the primary purpose of the typical portfolio is to reflect growth, Owens uses portfolios to incorporate structure into workshops. In her article, "Portfolios in a writing workshop," she claims the portfolio is a useful tool for helping her students see their evolution as writers but that it also assists them in evaluating and critiquing their work. Like

Atwell now suggests, Owens directly intervenes in the student writing process by providing numerous guidelines to her students as they progress toward the final product. She provides a sheet to assist them as they edit their own pieces and their peer's pieces. There is also a sheet that reminds them of how their portfolios will be evaluated, as well as sheets to record their skill improvements and their personal spelling lists. Lastly, there is a sheet to record the date, genre, and title of each piece (Owens, 1992). These sheets become critical portfolio pieces, which not only provide the students with structure and guide them through the process, but also provide Owens with a means to assess the process *and* the final product.

In their book, *Practical Approaches for Teaching Reading and Writing in Middle Schools,* Teresa Moretta and Michelle Ambrosini argue that to help students develop into effective writers, teachers must provide choices, time, and structure; and they claim that implementing writing workshops enables teachers to make these provisions. In workshops, the writing process is taught and practiced in stages, and choices are offered within each stage (Moretta & Ambrosini, 1994).

Regarding choice, Moretta and Ambrosini claim that students perceive a greater amount of independence in workshops when they are able to choose what and how they write. For example, "prewriting may appear as a storyboard, a fiction map, clustering, listing, or discussion" (Moretta & Ambrosini, 1994, p. 43). However, this freedom, which is typically associated with writing workshops, does not necessarily translate into a lack of structure. The teacher determines the options offered at each stage and directs the implementation of student choices. Finding a balance between teacher intervention and student choice is emphasized.

Moretta and Ambrosini also believe that teachers should provide classroom time for writing and that students should write frequently. As students move through the stages of the writing process, teachers conference with them and respond to their writing. Moretta and Ambrosini believe conferencing makes students feel that teachers value them and their writing because they are given individual attention.

Additionally, Moretta and Ambrosini emphasize that the teacher's role is not only to conference with students but also to "make language learning meaningful" (Moretta & Ambrosini, 1994, p. 44). They encourage teachers to implement mini-lessons in the revising and editing stages of the workshop process. These mini-lessons focus on language conventions and writing strategies that equip the writer with the skills and strategies needed to write effectively. Most importantly, "the language skills taught have real meaning and are relevant to students as writers" (Moretta & Ambrosini, 1994, p. 59).

Moretta and Ambrosini believe that assessment is equally important in guaranteeing the effectiveness of the writing workshop. An obvious reason assessment is crucial is that it supports the goal of improving student writing ability. An equally important reason is that all students and teachers are now held accountable for meeting writing standards established by the state departments of education, and assessment provides an avenue to insure that those standards are being met.

Moretta and Ambrosini use the Pennsylvania Writing Assessment Scoring Guide as a tool throughout the writing workshop. Additionally, they have created a rubric based on the guide. They claim the rubric "makes students cognizant of the qualities of effective writing" (Moretta &

Ambrosini, 1994, p. 55). During one of their first workshop mini-lessons, they train students to use the rubric to assess themselves as they progress through the stages of the writing process.

In her article, "Writing workshops: Are they soundly conceived?," Andrea Lunsford echoes many of Moretta and Ambrosini's recommendations. She argues that in order for writing workshops to be effective that must be characterized by clear objectives and goals, materials which allow for the differences in the ways students learn, a combination of one-to-one instruction and small group workshops, and careful ongoing evaluation of techniques, materials, and student progress. She goes as far as to set forth several steps which she believes will lead to soundly conceived workshops. The first step in Lunsford's outline is for teachers to study and know their student population by exploring their writing background, their current ability, and the processes they use when writing. She recommends that teachers gather writing samples and establish profiles of their students. Lunsford's second recommendation is for teachers to establish goals for their workshops. She claims, "Only if we know what we want to do will we be able to tell anyone whether we have actually done it or not" (Lunsford, 1981, p. 45). As teachers set goals, Lunsford recommends they also identify the ways they plan to achieve the goals set. For example, teachers may plan to use sentence-combining materials to improve student writing. Most importantly, goals should be clear and measurable.

Lunsford recommends that workshop teachers also incorporate student-teacher conferences to provide one-on-one instruction in sub-skills such as spelling or comma usage. These conferences should accompany small group work on writing.

Lunsford also encourages teachers to develop writing assignments that are fully contextual and to allow students to work with their own texts in order to transfer the new skills

into their writing. Teachers may develop editing exercises based on pieces of writing produced by students in the workshop. Lunsford emphasizes that students should move from discovering the rationale behind their error patterns, to recognizing errors in their writing, to editing their own papers for those errors. This progression is important because without it, practice may fail to lead to improvement in student writing (Lunsford, 1981).

Similar discoveries were made as Joan Feeley and Carl Smith researched.   Both Feeley and Smith studied how teachers were conducting writing workshops. In his article, "Writing instruction: Current practices in the classroom," Smith claims that writing workshops are especially effective in helping students master the principles of process writing (Smith, 2000). Based on his findings, he provides several recommendations for the creation of effective workshops. One recommendation is that teachers conduct frequent mini-lessons, which focus on specific areas of writing such as procedures, strategies, qualities of good writing, and skills. Smith also recommends that before students begin their writing, teachers should demonstrate their own writing process. As students edit their pieces, teachers should provide clear standards for guidance.

Like Moretta and Ambrosini, Smith also stresses that in order for students to succeed as writers they must be given class time to write every day. Hence, teachers need support from administrators to implement writing workshops since it takes time from the academic day and a commitment to see students through the cycle from topic selection to prewriting to final publishing.

In her article, "A follow-up study of the writing as process seminars in the elementary school," Feeley claims that the workshop experience was positive for the teachers in her study.

Teachers allowed students to write from their own lists of topics, and the students enjoyed the writing. As a result of the workshops, the students wrote more, and the quality of their writing was better (Feeley, 1988). Feeley's teachers also claimed that the mini-lessons were the most productive aspect of the workshop. Students could address problems such as run-on sentences within the context of their own writing, instead of in abstract textbook lessons.

In their article, "Another story: Putting Graves, Calkins, and Atwell into practice and perspective," David and Peg Sudol write about Peg's experience incorporating the writing workshop into her curriculum. Finding a balance between structure and freedom in workshops is emphasized in their article. In Peg's classes, students were allowed the freedom of choosing their own topics, but all the students had to do the same type of writing at the same time (Sudol & Sudol, 1991). Peg also established structure by incorporating deadlines and developing well-established routines. Her workshops were well-organized and scheduled -- 10 minute mini-lesson, 30 minutes of writing and conferencing, 5 minutes of group sharing. During the first few weeks, she used her mini-lessons to establish the workshop guidelines. For the rest of the year, she taught discourse criteria, process strategies, and editing skills in her mini-lessons (Sudol & Sudol, 1991). She claims that the mini-lessons were the most valuable components of the workshop and "an excellent way to teach students what they needed to become good writers. Moreover, because these lessons addressed specific needs and were related to actual writing, the learning was always contextual and genuine" (Sudol & Sudol, 1991).

On the other hand, conferencing was difficult for Peg because they always took more time than she expected. She could not keep the conferences short. "To do a good job, she had to spend more time with students, asking questions, listening, reading their writing, and talking

about ways to improve it" (Sudol & Sudol, 1991, p. 298). However, when Peg evaluated her workshop experience, she was glad she had done it. "Her children enjoyed the writing. (Now they moaned and groaned whenever the workshop was canceled.) They wrote more than any previous students, and the quality of their writing was better" (Sudol & Sudol, 1991, p. 299).

In her article, "Writing workshop in junior high school: It's worth the time," Betty Byrne Manion claims that in order to succeed as writers, students need informed practice, examples of quality writing, and time--predictable blocks of time with a defined structure--to formulate and revise their ideas (Manion, 1988). Like the others, Manion also believes in mini-lessons, from 3-20 minutes, that cover class procedures, topic choices, revision and editing strategies, techniques for good writing, and even literature excerpts. She emphasizes that the needs of students should dictate the content of the mini-lessons. She favors using literature excerpts during the mini-lesson because they serve as models for student writing. Grammar is not neglected but is approached as a means of producing quality writing; hence, grammar work suddenly has a purpose, which is to help students build units of thought. Like Lunsford, Manion recommends sentence-combining exercises to help students present their ideas more clearly (Manion, 1988). She also stresses the importance of peer conferences and student-teacher conferences. And like Kucera and Owens, Manion suggests that teachers give students checklists to guide them as they edit. She has students correct their own mechanical errors before their peers edit their work. Lastly, the teacher edits and conferences with students before they rewrite and publish. Manion claims that her writing workshops have resulted in improved test scores on the Language mechanics and Language expression tests of the Comprehensive Test of Basic Skills (Manion, 1988).

Conclusions

Regarding the question, "Is the writing workshop an effective strategy?," the answer is clearly yes, that it improves the writing skills of the students involved. During my research, I encountered numerous articles that boasted the effectiveness of the writing workshop. Fortunately, the authors of the articles were very specific in their descriptions of these effective workshops. I took notes and then compiled a list entitled "Characteristics of an effective writing workshop." Eventually, I arranged all the characteristics according to importance and created a rubric for evaluating the effectiveness of a writing workshop. The rubric is also intended to be used as a guide for teachers as they integrate the workshop into their curriculum. I believe the rubric contains all the elements that a teacher needs to follow in order to have an effective workshop--a workshop that improves the writing skills of the students involved.

Results (based on the literature reviewed and subsequent data collection)

Rubric for the Implementation of Writing Workshops		
Score: <u>1</u> 2 3 4 <u>5</u> **Low** **High**		
Criteria **Criteria**	**Score** (1-5)	**x** **Weight** **of**
Clear Guidelines for the Process • sheets of guidelines for each stage of the process • time limits (due dates) for each stage	__ **5**	**x** **5** = __ **25**
Clear Criteria for Evaluation of the Final Product • rubric -- used to clearly communicate expectations	__ **5**	**x** **5** = __ **25**
Contextual and Frequent Mini-lessons • connection between grammar mini-lessons and student writing	__ **5**	**x** **3** = __ **15**
Structured Peer Editing Sessions • guidelines for the editing activities	__ **5**	**x** **3** = __ **15**

Student-teacher Conferencing Groups
   in addition to one-on-one conferences
• group meetings to discuss common problems
	__
	 5
		x **3** = __
		      15

Teacher as Expert
• direct intervention by the teacher (giving advice, making
   suggestions and corrections, and limiting student choice)
	__
	 5
		x **1** = __
		      5

Total Score: _____
               100

Works Cited

Kucera, C. (1995). Detours and destinations: One teacher's journey into an environmental writing workshop. *Language Arts, 72,* 179-187.

Lunsford, A. (1981). Writing workshops: Are they soundly conceived? *English Quarterly, 13*(4), 41-50.

Manion, B. (1988). Writing workshop in junior high school: It's worth the time. *Journal of Reading, 32*(2), 154-157.

Morretta, T., & Ambrosini, M. (1994*). Practical approaches for teaching reading and writing in middle schools.* Newark, DE: International Reading Association.

Owens, A. (1992). Portfolios in a writing workshop. In Lockledge, A. & Hayn, J. (Eds.), *Using portfolios across the curriculum*, 19-28. Columbus, OH: National Middle School Association.

Smith, C. (2000). *ERIC digests: Writing instruction: Current practices in the classroom.* Retrieved March 3, 2002, from http://www.edlgov/databases/ERIC_Digests/ed446338.html

Sudol, D., & Sudol, P. (1991). Another story: Putting Graves, Atwell, and Calkins into practice and perspective. *Language Arts, 68*, 292-300.

Taylor, M. (2000). Nancie Atwell's *In the middle* and the ongoing transformation of the writing workshop. *English Journal, 90* (1), 46-52.

Evaluating Art Projects

Carla Rose

EDUC 590

Dr. McAllister

Problem Statement

A student's artwork is an expression of the totality of the individual in ways no other medium is. This is why some people feel that grading serves no purpose in art. Yet art in schools has to be evaluated in one way or another because the public has held schools accountable for providing students with knowledge and developing skills (Sobol, 1998). For this reason, this study will be looking at the effect of the emphasis on process or product in the creativity of the students' work to see if the student becomes more or less creative in their artwork when evaluated.

Process vs. Product

Should teachers be concerned more about the process over the product? Or vice versa? It seems that the process vs. product orientation has been for many years and continues to be a dilemma in the field of education. All of those that are concerned about this aspect of education feel differently according to their field and experiences.

The process variables include the interaction of the student and teacher behaviors, and the subsequent, immediately observable changes in the student behavior. Teachers often focus most of their attention on these changes because these are the factors with which they most closely work (Wardlow, 1993). Teachers can "teach something" and then attempt to measure its effects in terms of student changes. The product variables, on the other hand, include the expected short term student growth and long term outcomes, which carry into adulthood. Most teachers seem to not focus on this issue due having little opportunity to measure how what they have done for the students has affected the students' lives through adulthood.

There are also several other variables within the students and the teachers themselves that make up part of the complex formula that produces changes in students. Experiences that form the teacher, such as age, gender, or the social class in which they grew up, affect how they interpret life events. These experiences affect their teacher   training experiences which include choice of college attended, features of the teacher   education program, and the pre-service teaching experiences. These sets of experiences affect the "teacher properties," intelligence and personality traits. All of these sets of experiences, which the teacher possesses before entering the teaching-learning situation, affect teacher behaviors in the teaching-learning process.

Students' formative experiences (age, gender, and social class) and learner properties (abilities, knowledge, and attitudes) affect what they do in the classroom. The social-community context in which the classroom (the school) is located also plays an   important part in the learning experience.

Process versus product has been researched continuously for several years in all levels of education. In many of those researches the process seems to outweigh the product in several instances. Knowing, a process, is valued over knowledge, a product. This is seen widespread across the different levels and areas of education especially in the fields of English and ESL, just to mention a few (Baines, 1999).

The superiority of process over product is very often seen in the arts as well. But according to some, such as Anna Kindler from the University of British Columbia, the view that all that counts in art is the process, is a myth. A common myth that has been very well supported by early childhood literature refers to the children's unguided explorations as the ultimate goal of early childhood art (Kindler, 1996). She points out a book, *Creative art for the developing child,*

that asserts that "process must always take precedence over the finished product" (Kindler, 1996, p. 26). Of course, the value of artistic process is undeniable. Art allows us to see, to hear, to know, to sense, to guess, to intuit, to question, to envision, to imagine, to perceive, to communicate, to engage, to pattern, and to attend to the world in   ways not otherwise possible.[i] Yet, the overemphasis on the artistic process is disturbing   in the context of what is important as part of the art experience in early childhood   classrooms.

In the arts, it is easy to see which classrooms are process oriented and which value the product more highly. There is a shift in the balance of process and product in the way lessons are presented. What the traits of creativity are and what is and is not appropriate art for young children also affect many of the art activities. An example of this scenario is seen in the following art activities that would take place in a childhood center setting.

In a finger-paint activity the activity allows the children to be involved in a process during which creative impulses can take shape. Through this activity, the teacher has opened the door for these children to become absorbed in what the process has to offer rather than in how their products will be evaluated.

In a mouse-making activity the children respond to a dictated step 1, step 2, step 3 procedure that expresses the ideas of the teacher, or book, not their own childlike ideas of how they can use the different materials to make something they have created. Step-by- step procedures that lead children toward a finished product may help children learn to sequence or follow directions, but the activity cannot be called creative arts. Similarly, early childhood teachers who have strong beliefs in the value of process over product most often cannot resist

from having their students produce items that could serve as gifts, holiday ornaments, or in some other ways become a commodity.

Teachers must look at how the children are using the materials. Each child deserves the opportunity to at least try out his/her original ideas. Teachers are to provide a variety of meaningful experiences closely related to the knowledge and experiences that children bring to the encounter. Teachers and students know when an activity has "worked" when students leave with a piece of art that is personally authentic, that represents real learning and supplies increased understanding of the art-making process from idea to product (Coulter & Wahl, 1998).

It is argued by some that a balance be found between process-oriented and product-oriented starting out through training teachers about both aspects and how they can be implemented in their field. Tradition has quite an appeal to teachers, not only because it brings comfort as "the familiar," but also because it seems to offer a stable place to be amongst all the changes going on in education. This accounts for the way that some teachers teach and do not look for new ways to improve.

Process versus product will continue to be one of the aspects of education that is most important. The school level, kindergarten through high school and even college and all the content areas of education are part of the scenario. As mentioned, the path in which the teacher chooses to teach has to do with so many factors that as teachers and students do not notice at first hand. If teachers are to make significant improvements in this endeavor, they must begin to understand their role in the complex formula of teaching. From this understanding, they can change those things, which they are capable of changing and improving.

Data Collection and Results

The study involved two groups of 4th grade students with a diversity of learning levels. The students participated in art once a week for 45 minutes. Both were given the same multiple-choice pre-test and post-test which involved six questions (each worth 2 points) covering art terms and concepts related to the new unit on Pre-Columbian art based on material from Lothrop (1976) and Trujillo (1976). Separate graphs for groups A and B are included to reflect the students' scores. Looking at the graphs, you will see two bars for each student. The bar on the left represents the pre-test and the bar on the right, the post-test.

The length of time between the pre-test and post-test extended itself due to unexpected weather conditions (snow day) and an unforeseen school event (picture day). These happenings set Group B back so I had to wait until they caught up to Group A. Group B took the pre-test 1 week later. It may be due to this reason that Group B acquired higher scores in their post-test than Group A because they had at 1 week less between the two assessments (Group A-3 weeks & Group B-2 weeks) . Both groups took the post-test during the same week after lesson #2 Making of Pre-Columbian disk. The students were also evaluated by using a rubric to gather information about the process and product:

Rubric for Art Project (each element worth 20 points for total of 100 points)

* *Symmetry* - use of lines, shapes and colors on one side of the work as an exact duplicate
   or mirror image of the other side.

* *Variety* – using different sizes of shapes, varying colors and patterns.

* *Originality Design* – interesting composition and subject matter.

* *Process* – Following procedures from preliminary sketch of design to rolling out of clay
   to create a round slab.

* *Neatness* – Craftsmanship of round slab, engraving of design and use of painting to
   enhance design.

The art project graph shows the results for Group A and B from the lowest to the   highest grade. On the Y axis each number represents one student. The X axis shows the minimum score of 80 up to 100. Group B was the group aware that I would be evaluating their projects. There were lower scores for this part of their evaluation. This may have also been from the students missing class and not being able to go through unit they way I had planned it out without the interruptions.

Conclusion

In conducting research, I have found out that there are many other variables that come into play unexpectedly. In this case these variables interfered with the time lapse between lessons and testing. This may explain for the scores of Group A being lower for they took the pre-test at least 1 week earlier and I had to wait until Group B caught up so that they could take the post-test at the same time.

In regards to the scores from the rubric, there is no great variance between Group A and Group B. By a small percentage, Group A had more students with higher grades. This leads me to believe that grading students on their art does not greatly affect their creativity. This would be my generalization in regards to grading in upper elementary grades. This may be a different case for middle and high school levels. According to the grade levels, it is supported that art is best evaluated by a variety of means, which may include portfolios, critiques, reflective journals,

essays, observations, interviews,   questionnaires, and other "alternative" assessment techniques recommended.

References

Baines, L. (1999). Losing the product in the process. *English Journal, 88*(5), 67-72.

Coulter, K. & Wahl, E. (1998). Telling stories with clay. *Arts & Activities, 123*(1), 24.

Kindler, A. (1996). Developments in the field of early childhood education and the instructional approaches embraced in Canada closely parallel those adopted in the United States. *Arts Education Policy Review, 97*(4), 26.

Lothrop, S. K. (1976). *Pre-Columbian design from Panama.* New York: Dover Publications, Inc.

Sabol, R. (1998). What are we testing?: Content analysis of state visual arts achievement tests. *Visual Arts Research*, 1-12.

Trujillo, G. (1976). *Disenos Autoctonos.* Panama: Editorial Universitaria.

Wardlow, G. (1993). Research on teaching. What affects student learning? *The Agricultural Education Magazine, 65*, 21-22.

A Comparison of Two Classroom Assessments

Tamara Salter

EDUC 590
Dr. McAllister

Spring 2002

Introduction to the Problem

Classroom tests are often constructed to look and function like standardized tests. There is not necessarily a valid reason to have to test students in a standardized format for internal classroom purposes. Standardized tests have shown to be problematic when used with certain populations because of validity problems. For example, are the tests written at an appropriate reading level for all students? Do all the students read the language they are being tested in at the same level? Are there a large variety of learning styles in the population? Are the analogies and vocabulary familiar to the student? Is the test really testing the knowledge that was covered in art class or is it biased against those students with low reading and written communication skills? These points are especially pertinent now because of the diversity of the populations in the student body. If so, then the classroom unit art test designed to look and function like a standardized test is not actually measuring what the students learned during the course of the unit. A classroom unit test's purpose is not usually to be used for cross comparisons between other classes or schools. It is primarily used by the classroom teacher to measure what students have retained and learned as a result of her lessons and what needs to be re-taught. A teacher may modify or change the way the unit is taught in the future based on a classroom test. It can also be an indicator of what grade should be awarded a student. Because a classroom assessment does not necessarily need to be modeled on the standardized test (multiple choice, true–false, essay), I wanted to investigate alternative methods of measuring the knowledge taught during a unit of study and compare that with student performance on the same material in a traditional end of the unit test.

Literature Review

Performance assessment, also called authentic assessment, is an alternative to traditional testing when assessing student learning. Performance assessment strives to mimic real life situations in order to more accurately pinpoint what students have learned and can do as a result of that learning (Wiggins, 1990). Examples of performance assessments are items such as requiring students to frame or conduct an experiment in order to test a hypothesis, or asking students to design, build, or write something. Students might be asked to collaborate on a project, or to research and plan a presentation. These assessments are called authentic or performance because the student is demonstrating directly that he has the knowledge and thinking skills needed to carry out the task, as opposed to taking a more traditional test where he might be asked a series of questions in order to "sample" what he knows.

Some of the types of performance assessments currently in use are station activities, domain projects, portfolios, and videotaped interviews (Ascher, 1990). In station activities, students are asked to perform a series of tasks using supplies and materials to demonstrate their knowledge and thinking strategies. Domain projects require students to work through a process to demonstrate an idea, concept or practice that is unique to a certain discipline. Portfolios are samples of the student's work to show a progression, or to demonstrate improvement in skills or abilities. Videotaping can be used to document a student's performance in reading, physical challenges, or as a verbal interview to explain their knowledge or thinking processes (Ascher).

There are two potential functions that performance assessments could have. One is to work as an internal assessment that is designed and used by the classroom teacher as a way to evaluate student learning of the material presented (North Central Regional Educational Laboratory, n.d.). In this case, the teacher is the designer of the performance assessment and decides how it will be

scored for results. Internal performance tasks are designed to correlate with what has been taught in the classroom and the teacher's objectives for those lessons (Haertel, 1999). The scores are not used outside the classroom in an internal assessment. They are used by the teacher to evaluate student learning and the effectiveness of the teacher's teaching. Performance tasks are more readily accepted as replacements for traditional tests in the classroom because classroom tests do not have to have as high of a reliability coefficient as a standardized test (Rudner & Schafer, 2001). The other function that a performance assessment can have is to be used as an external assessment. External assessments are used to make comparisons between classes, schools, school districts, or even to compare internationally between countries. External assessments traditionally take the form of standardized tests in order to be highly reliable and valid comparisons.

The reason that performance assessment is a current topic of debate in the educational arena right now is that our country is pushing for ways to accurately measure student learning in order to improve education. Accountability has been a major issue in the push for higher standards causing the use of external high stakes assessments in the form of traditional tests in order to identify low performing schools and teachers (Haertel, 1999). Traditional tests such as multiple choice tests have been used as standardized tests because of the ease with which they can be created, administered, scored, and the fact that they meet the criteria for validity and reliability as "indicators" of a student's abilities (Haertel). When using standardized tests with certain populations of students, reliability and validity issues have encountered criticism. There have been studies that indicate standardized tests are more a measure of a student's test taking ability or reading speed than their reasoning or thinking abilities (Haertel). Identified problem

areas for external standardized tests are that they unfairly favor students from higher

socioeconomic backgrounds by being biased. They may not be as fair as previously thought

because of "hidden" cultural, ethnic or gender biases (North Central Regional Educational

Laboratory, n.d.). Extraneous interference factors may play a part in testing issues as well such

as the student's ability to read, write, role-play situations, or understand the test question

(Ascher, 1990; Haertel, 1999; Rudner & Schafer, 2001). Some students' physical limitations or

home life situations may cause inaccurate testing results as well (Ascher).   There are concerns

that attaching rewards and sanctions to higher standardized test scores will cause teachers to

change their internal curriculum in order to drill students for the external standardized test,

therefore causing standardized tests to drive the classroom curriculum. Some educational

researchers are asking questions such as: Should high test scores be the goal for education or

should abilities to reason, think and solve problems be the goal? Are high stakes tests good for

students or are they teaching students that learning is cramming and memorizing facts for the test

(Wiggins, 1990)? Do traditional standardized tests really test what they claim to be testing for or

are there too many reliability and validity problems? Does the use of standardized tests restrict

the curriculum to topics that are easy to assess (Ascher, 1990) and focus on knowledge of

isolated facts rather than thinking skills? (Haertel, 1999) Because of these questions, some

researchers have been looking towards performance assessments as possible methods of

assessing students' abilities and skills in a more direct and accurate way than standardized tests

can.

The problems with replacing traditional tests with performance assessments lie mainly in the

area of external assessments rather than internal. Because of the difficulty of comparing

performance tasks from school to school, there has not been a widespread use of externally used

performance assessments, except for writing assessments. There have been some attempts to use

portfolios as external assessments in Vermont and Kentucky for writing and math samples. In

high stakes situations, there could be issues about how to make sure the samples contain the

student's actual work (Haertel, 1999). Performance tasks used externally have reliability

problems because it is difficult to get uniformity in the tasks and scoring. The scoring is also

more expensive and time-consuming than standardized tests. There could be limitations because

of materials, supplies, equipment, and location as well (Haertel; Wiggins, 1990).

In the classroom, performance assessments can be more readily used because the acceptable

reliability level is lower within a classroom (Rudner & Schafer, 2001), but most teachers

continue to use a test that resembles a standardized test to assess student learning (Haertel,

1999). Scores and ratings on performance assessments only require the teacher's judgment about

the performance within that classroom with that student. That teacher can evaluate according to

her standards and she can judge the student performance taking into consideration extraneous

factors because she knows the student, and she knows what she taught. Motivation to perform

might increase because the activities are more engaging, and perhaps students and parents will be

proud of their accomplishments (Haertel; North Central Regional Educational Laboratory, n.d.;

Wiggins, 1990). Teachers can use the information gained formatively and value the assessment

for its instructional purposes and educational goals as well. It "blurs the line between testing and

teaching" (Haertel, 1999, p. 663) and seems to draw closer to what a student's long term goals

for themselves might be. Elliot Eisner said, " The aim of schooling is not to enable the child to

do well in school-but to do well outside of school, in life" (Eisner, 1999. p. 658). Several

educational researchers have suggested that assessment does not have to be an either-or issue, but could include both assessment strategies. There could be some large scale external comparative testing done along with some performance testing to allow for those abilities and talents not covered by standardized testing data. (Eisner; Wiggins)

Problem Statement

The purpose of the study was to determine if overall scores will differ significantly when the same unit material is tested on students in two different quiz formats, one a traditional short answer quiz, and one that requires visual aids, demonstrations of techniques, and oral directions.

1. Will there be a significant difference in test scores between an alternative assessment and a traditional test?

2. Will results be consistent concerning the two tests (if a student knows the right answer in the traditional test, did he also know the right answer in the alternative test concerning the same question)?

3. Will some students score higher on one test indicating a preferential learning style? Will the class as a whole indicate a preferential style?

4. How can these results be further tested or used within a classroom situation?

Description

The art class consisted of 18 students. Some have been omitted from the study because of excessive absences from class and inability to participate. The class covered a unit emphasizing texture. A pretest was administered before the unit began. A project that emphasized texture was completed during the unit. Textbooks were used that emphasized vocabulary, works of art, and

techniques. The end of the unit quiz was designed to integrate a written traditional test and an

alternative test. The alternative test included stations of visual aids, demonstrations of techniques

by students, and oral instructions rather than written. The two tests covered the same concepts in

different formats. They were presented to the students as one test with a part 1 and a part 2. The

alternative test was presented first. The written short answer test was second.

Data Collection and Results

The alternative test involved reading questions to students who studied the visual aids and

marked a letter on a paper to indicate their choice as answer. They also had to demonstrate three

textural techniques they had learned during the unit. The written short answer quiz (the

traditional test) was given with instructions and questions printed on the page and was the same

quiz as the pretest. (See Pre-Test and Alternative Test samples.)

When looking at students' overall scores on the assessment, eight students scored higher (got

more correct answers) on the alternative test than on the traditional one.

three students scored the same on both tests and 4 scored worse on the alternative test. To

summarize the answer to the first inquiry question I had, 60% of the students scored better on the

alternative test, 40% scored the same as the traditional test or worse.

Only three students (20%) answered the test items on each test the same. The rest of the

students (80%) got some items right on one that they missed on the other. The answer to my

inquiry question number two was, no, the results were not consistent concerning the students'

performance on the two types of tests.

My third inquiry question was to find out if some students seemed to perform better on one

test than another. The answer seems to indicate that this may be true because out of the 12 total

test questions, 6 alternative test questions (50%) had a higher number of correct responses on them. On the traditional test, only three questions had a higher number of correct responses. Again, eight of the students scored better on the alternative test, four scored better on the traditional test, and three scored the same on both.

The average score on the pre-test was 1.6. The average score on both types of post-tests was 5.7.

Recommendations

My inquiry was on a very small scale with only 15 students and a small number of test items, so I do not have any recommendations beyond my immediate and personal use as a teacher. I do feel like I learned some interesting and valuable information and would like to track this study with more information that I gain in the future, as to how student performance varies depending on the format of the assessment.

Although the inquiry showed that the majority of students did better on the alternative assessment than the traditional test style, there were four students who scored better on the traditional test, particularly student #2 who seemed to know the material quite well in the traditional format, but was not able to identify the correct responses on the visual-orally read alternative test. This was an interesting fact to me considering art is a visual medium. It tells me that some students may be more comfortable taking standardized types of tests they have been taking throughout their school careers and may be more uncomfortable with an open demonstration style of assessment.

Alternately, I feel that these results also indicate that many students may perform much better on an alternative method of assessing their knowledge than on a traditional test which relies on

good reading and writing skills to do well. They could and should be given alternative

opportunities to demonstrate what they know and have learned.

   In conclusion, I will probably combine assessments to give all students a chance to succeed in

my classroom. I will incorporate some alternative assessment and some traditional assessment

within my lessons. I will note which students prefer certain types of assessments, and when

necessary, offer alternative chances for students to demonstrate what they know.

Pre- and Post-test questions used in the study.

Write the answers to the following questions.

1.What is visual texture?

2. and 3. Explain the difference between invented and simulated texture.

4. Give an example of a simulated texture.

5. Give an example of an invented texture.

6. Give an example of a matt surface.

7, Describe the textures you see in the artwork displayed.

8. Define trompe-l'oeil.

9. Describe how you make a collage.

   Match the technique below with the definition:

      a. paint is forced into random textured patterns

      b. freshly painted canvas is placed right sideup over a raised texture and scraped across the surface of the paint

      c. wet paint is scratched into with a variety of tools such as forks, razors, and combs

10. Frottage_____

11. Grottage_____

12. Decalcomania____

Alternative post-test

These questions were read aloud to students and they viewed works of art and wrote the letter key of the artwork or works that were applicable.

1. Which of these prints demonstrates visual texture. How do you know that it is visual texture?

2. Point out a simulated texture. Explain why it is simulated texture.

3. Point out an invented texture. Explain why it is invented.

4 and 5. Explain the differences between the textures in the two examples you just gave.

(simulated and invented)

 6. Look around the room and write down something that has a matt surface.

7. List the textures you see in G.

8. Which item here comes closest to being trompe-l'oeil?

9. Which item here is a collage?

Demonstrations:

10. Demonstrate a frottage technique.

11. Demonstrate a grottage technique.

12. Demonstrate decalcalcomania.

References

Ascher, C. (1990, June). Can performance-based assessments improve urban schooling? *Eric Clearinghouse on Urban Education*, Eric Digest Number 56. Retrieved April 4, 2002, from http://www.ed.gov/databases/ERIC Digests/ed/ed327612.html

Eisner, E. (1999, May). The Uses and Limits of Performance Assessment. *Phi Delta Kappan,* 658-660.

Haertel, E. H. (1999, May). Performance Assessment and Education Reform. *Phi Delta Kappan,* 662-666.

North Central Regional Educational Laboratory. (n.d.). *Reliabilty, validity, and fairness of classroom assessments*. Retrieved March 17, 2002, from http://www.ncrel.org/sdrs/areas/issues/methods/assment/assrelia.htm

Rudner, L. M., & Schafer, W. D. (2001, April). Reliability. *Eric Clearinghouse on Assessment and Evaluation College Park MD.* Eric Digest, ED458213. Retrieved April 4, 2002, from http://www.ed.gov/databases/ERIC Digests/ed458213.html

Wiggins, G. (1990). The case for authentic assessment. *Practical Assessment, Research and Evaluation, Eric Clearinghouse on Assessment and Evaluation*, 2 (2). Retrieved April 17, 2002, from http://ericae.net/pare/getvn.asp?v=2&n=2

Jeannettelena Santillan
Action Research Project

Dr. D. McAllister
Education 590 Culminating Experience
Spring Semester 2002

Action Research Project

Introduction

I first became interested in this problem many years ago in high school. I would see teachers give out tests and I would then wonder how they give grades to those in   special education classes. This curiosity would continue to grow in college and in university. It especially reached a crucial point of interest in the fall semester of 2000.   This was when I first observed inclusion children in the classroom.

Problem Description

Throughout my school career, all of my teachers used teaching strategies. In my problem or through my problem, I hope to find some teaching strategies dealing with learning disabled children. I would even go so far as to write down that this research will not be informatively helpful, but be helpful in the active classroom. Going back to the problem, one such as I wonders as to how one would modify these tests for children over a period of a semester and determine that these tests were not too easy or too hard. One of the ways that information was found was through a literature reference search. Overall, what is really desired is knowledge on the thoughts of the teachers about inclusion and how modification can help or hurt children. Up to this point, this researcher, a student teacher, believes that inclusion does cost the regular classroom but in the end this student teacher also believes and realizes that there will be inclusion children in her classroom. Evidence will be shown from statements by teaching professionals. These statements will be included in the study and pre- and post-tests given by this student teacher.

Plan of action

In order to meet the project requirements outlined by Dr. McAllister this researcher will gather opinions by teaching professionals, administer two pre- and post-tests, and create a graph for better visual representation of the pre- and post-test section. In the pre- and post-test section of the project, two groups will be tested. The first pre- and post-tests will be graded without knowing which students are inclusion. The second pre- and post-tests will be graded with the teacher first learning who is an inclusion child. The write-up will include the results of these tests, a graph, and comments from fellow educators.

Literature Review

Out in the highway of information there is much information on inclusion children and the classroom. Some deal with one component of inclusion and others with many different components. In the article by Steven N. Elliot, *Educational assessment and accountability for all students: Facilitating the meaningful participation of students with disabilities in district and statewide assessment programs (2000),* educators are given a glimpse of Wisconsin's wish to facilitate knowledge of the state's academic content standards. This especially applies to the area of inclusion. This article will provide the researcher with information on how to deal with different testing accommodations and alternative types of assessment. It also discusses how to impart this knowledge to the "educational stakeholders," the parents. Not only will this article be helpful to the project by allowing this researcher to learn more about inclusion accommodation and assessment, but it will also provide knowledge needed to make objective judgments about the information provided by education professionals. *Including students with disabilities in the Missouri assessment program* by Mary Edgley (1998), will provide this project

with information on why inclusion children should be included in all statewide assessment

programs. It will also be helpful in providing information on how teachers can make

accommodations for students to participate in these statewide assessment programs. Though this

is not an article but more like a training manual, it reads easily and provides three cases of

personable inclusion children to read about. It is believed that this particular piece will also be

helpful because it projects from the inclusion child's point of view. Due to the importance of

statewide assessment, this article should be read before any of the following articles. In doing

so, one is left with an overall better understanding of why inclusion is so very important.

In no uncertain terminology it is understood that the law takes a backseat to the

importance of an educational system or a child's right to learn. Undoubtedly, the law is at times

the determining factor to which an administration or parent may turn to receive or deny the

necessary. Thusly, Jane Jarrow has written an article *Understanding the law to give students*

with disabilities full potential (1998) believed to be extremely important to research. This article

centers on three pieces of legislation-the Individuals with Disabilities Education Act (IDEA), the

Americans with Disabilities Act (ADA), and Section 504 of the Rehabilitation Act of 1973.

Altogether, this article will provide for the project an overall sense of what is allowable (lawfully

speaking) and what is not.

In many areas of today's America, home schooling is something that is becoming a force

to deal with. Though the project will be held in the public school system, it is important to look

at the home schooling system. Home schooling and the one-room schoolhouse are the basis for

the whole American educational system. This system is not able to provide some of the

"necessary items" for the inclusion child. These items can include helpers, TDD machines,

specialized computers, and yes, even the standard federal regulation. It is believed that this particular piece*, Home schooling and students with disabilities (1998)*, will be the most helpful. The way in which it will be most helpful is through allowing comparison between home schooled inclusion children and regular inclusion children in the classroom. What can be added about this article's helpfulness is the ready availability of the information. Many home schooled children that have disabilities are not readily available in society. Thusly, this piece will provide valuable information.

The article*, Accommodating students with disabilities in national and state Testing Programs* is extremely important to have read before any research is actually analyzed. This article not only deals with statewide assessment, but also with the inconsistency of accommodations given to inclusion children. This particular piece even goes so far as to discuss the tug-of-war between individual rights and the rights of society as a whole. For this researcher, this article will provide information to support a belief previously outlined above. This belief is thought to be that in providing accommodations for some, the majority will suffer. Once reading of this article has begun, it is quickly realized that there is a vicious cycle. If money is provided by federal or state funds for an inclusion child, the teacher must devote much needed time to that particular student. In providing that time to the inclusion student, the other students could suffer from receiving lower level or rushed education. If the inclusion child is taken out of the classroom, then the law outlined in a previous paragraph will take over and the school system will suffer. If the school system suffers (for example, having to pay the system's court costs), then all of the system's children will suffer.

As one looks over all of the mentioned literature (also referenced below), all articles are ones of in which every teacher must have working knowledge. Though this student teacher already has much needed information, more information is needed. This information is information one would get by actually carrying out research.

Action

Pre-Test

The test was given to two groups of students. Group A was the group with fewer inclusion children. Group B was the group with more inclusion children. The cooperating teacher chose to give the two groups of students the test at the end of the first day of class. The test contained multiple choice items. This allowed for no instance of misinterpretation of written work. The answers would be either correct or incorrect. The results of the pre-test are as follows:

Group A	Question 1	Question 2	Question 3	Question 4	Question 5
18 Students	0 Wrong	0 Wrong	1 Wrong	2 Wrong	3 Wrong
% missed	0%	0%	1%	11%	16%
% correct	100%	100%	99%	89%	84%
GroupB	Question 1	Question 2	Question 3	Question 4	Question 5
22 Students	4 Wrong	5 Wrong	4 Wrong	9 Wrong	8 Wrong
% missed	18%	22%	18%	40%	36%
% correct	82%	78%	82%	60%	64%

As one should notice, group A did not have much trouble with the first two questions. As the questions became harder, the misses from the correct answer rose higher. This is best illustrated with an 11% miss rate for question 4 and a 16% miss rate for question 5. The reader may ask how the author come up with percentage rates for missed and correct answers. This author simply took the number of missed answers, divided it by the number of students in the classroom, and reported the percentage score.

Group B had significantly higher miss rates. Questions 1 and 3 both had an 18% miss rate. Question 2 was missed by 22% of the class and question 5 was missed by 36% of the class. The highest miss rate belonged to question 4 at 40%. It is hoped that after instruction by the teacher, the score will rise for these students. There may be a possibility of having to provide private instruction for these students to succeed with the numbers unit. If this is true, then the hypothesis of inclusion students needing more time to master certain objectives rings true.

Post-test

The post-test was given to the same two groups of students. The students were given the post-tests right before the unit exam given by their teacher. The results are as follows.

Group A	Question 1	Question 2	Question 3	Question 4	Question 5
18 Students	0 wrong	0 wrong	0 wrong	3 wrong	2 wrong
% missed	0%	0%	0%	16%	11%
% correct	100%	100%	100%	84%	89%
Group B	Question 1	Question 2	Question 3	Question 4	Question 5
22 students	1 wrong	0 wrong	0 Wrong	3 Wrong	5 Wrong
% missed	1%	0%	0%	16%	22%
% correct	99%	100%	100%	84%	78%

As one should immediately see, scores rose. They rose for groups A and B. For Group A, the results coincided with the author's belief that if children are taught they will learn No one in Group A missed question 1 or question 2. For question 3, the subjects rectified the one question they missed in the pre-test. The biggest disappointment was question 4. Question 4 jumped from having two incorrect responses for a percentage 11% missing the question to three incorrect responses for a total of 16% missing the question. Question 5 was the question that gave the most satisfaction. Question 5 improved by having one less question marked wrong. This brought the percentage rate down from 16% to 11%. Though these results provide proof that the instruction was fruitful to some, the question of the inclusion group remains.

As stated, the test scores rose for Group B.   For question 1, group B had four incorrect responses on the pre-test. This made for a total of 18% of the subjects getting this question wrong. In the post-test, the subjects in Group B missed this question only once. In the pre-test, question 2, was missed five times, or by 22% of the students The post-test measured this same question after instruction and it was found that the "inclusion" classroom did not miss this question at all. The same happened for question 3 as did for question 2. In the pre-test, Group B missed question 4 nine times. This is a total of 60%. The post-test showed that after instruction Group B missed question 4 only three times. This showed instruction helped a total of 22% to achieve permanent learning. Question five also provided happy results. After instruction, the number of subjects in Group B missing question five dropped from eight   to five. This means that a total percentage of subjects getting the question right rose from 64% in the pre-test to 78% in the post-test. Overall, the test   results for Group B shows that instruction helped the "inclusion" group.

When this researcher started on this journey, many a teacher told her that measuring learning between those who are inclusion and those who are not inclusion would be impossible. One teacher even told this researcher that even if inclusion children learned, it could never really be measured or used in a positive manner due to the degree of modifications many a child has to have. This personal researcher's opinion is that though inclusion is a very important point toward helping "special" children learn, and Public Law 94-142 and IDEA-97 make sure that inclusions is an active part in school systems throughout the United States, if children are graded on an equal par and if the level of expectation is high, all children will learn. This project is one that shows how well children can learn without modifications. Though Group A was largely

without any inclusion children and Group B was largely comprised of inclusion children, no modifications were made to either test to measure learning. Therefore, it is this author's viewpoint that the answer to the question, does inclusion hold back otherwise "normal" children and in practicing inclusion, to the inclusion children hinder learning for themselves and others, is no.

References

Edgley, M. (1998). Including students with disabilities in the Missouri assessment Program. (ERIC document Reproduction Service No. ED436888). Retrieved from http://ericnae.net/ericdc/ed436888.htm

Elliot, S. N. (2000). Education assessment and accountability for all students: facilitating the meaningful participation of students with disabilities in district and statewide assessment programs. (ERIC Document Reproduction Service No. ED443231). Retrieved from http://ericnae.net/ericac/ed443231.htm

Home Schooling and Students with Disabilities. (1998).Quick Turn Around (QTA) Project Form. (ERIC Document Reproduction Service No. ED418544). Retrieved from http://ericnae.net/ericdc/ed418544.htm

Jarrow, J. (1998). Understanding the law to give students with disabilities full potential. (ERIC Document Reproduction Service No. ED432196). Retrieved from http://ericnae.net/ericdc/ed432196/htm

Kleinger, J. K. (1999). Student's perceptions of instruction in inclusion classrooms: Implications for students with learning disabilities. *Exceptional Children, 6(1).*

Swierzbin, B.; Anderson, M. F.; Spicuzza, R.; Walz, L.; Thurlow, M. L. (1999). Feasibility and practicality of a decision making tool for standards testing of students with disabilities. State Assessment Services, Minnesota Report 21. (ERIC Document Reproduction Service No. ED 441306). Retrieved from http://ericnae.net/ericdc/ed441306.htm

Pre and Post-Test
Numeros 1 hasta 1 millon
Nombre: _____

Fecha:_____

Clase: _____

1. 45
      a. cuarenta y cinco
      b. cincuenta y cinco
      c. treinta y cinco
      d. sesenta y cinco

2. 73
      a. sesenta y tres
      b. setenta y tres
      c. ochenta y tres
      d. cincuenta y tres

3. 56
      a. sesenta y seis
      b. cincuenta y seis
      c. cuarenta y seis
      d. setenta y seis

4. 435
      a. cuatro cientos veinte y cinco
      b. cuatro cientos cuarenta y tres
      c. quinientos treinta y cinco
      d. cuatro cintos treinta y cinco

5. 2, 672
      a. dos mil seis cientos sesenta y dos
      b. dos mil seis cientos setenta y dos
      c. tres mil setecientos setenta y dos
      d. tres mil setecientos sesenta y dos

Answer key: 1. a, 2. b, 3. b, 4. d, 5. b.

Culminating Experience

Education 590

Spring 2002

Cathy Scarbrough

April 18, 2002

Dr. Deborah A. McAllister

Problem Statement: Beginning readers lose learned skills even after a short break from school,

such as winter break.

Testing tool: STAR Reading computer based test.

Pre-testing: Pre-test dates were from 8/11/01-8/15/01. These test were conducted during their

reading groups and therefore occurred over a 5-day period.

Post-testing: Post-test dates were from 1/28/02-2/06/02. These tests were conducted during

their reading groups and therefore occurred over a 5-day period.

The STAR Reading measures grade equivalent, instructional reading level, normal curve

equivalent, percentile rank, scaled score, and the zone of proximal development. The grade

equivalent scores range from 0.0 to 12.9+. This score represents how a student's performance

compares with that of other students nationally. The instructional reading level is the grade level

at which a student is at least 80% proficient in recognizing words and comprehending the

material when assisted. These scores for first-graders are Pre-Primer (PP), Primer (P), and 1

through 12. The Normal Curve Equivalent scores are based on an equal interval scale. The

difference between any two successive scores on the NCE scale has the same meaning

throughout the scale. This range is from 1-99. The Percentile Rank score compares a student's

test performance with that of other students nationally in the same grade. This range is from 1-

99. Produced by the STAR Reading tests, the Scaled Score is the most fundamental score. The

scores range from 0 to 1400 and span from grades 1-12. This score is calculated based on the

difficulty of the question and the number of correct responses. The Zone of Proximal

Development defines the level range at which the student needs to be selecting books for optimal

growth reading without difficulty.

Test Population: The test population consisted of 20 first-graders. There were 11 males and 9

females.

Data Collection and Results:
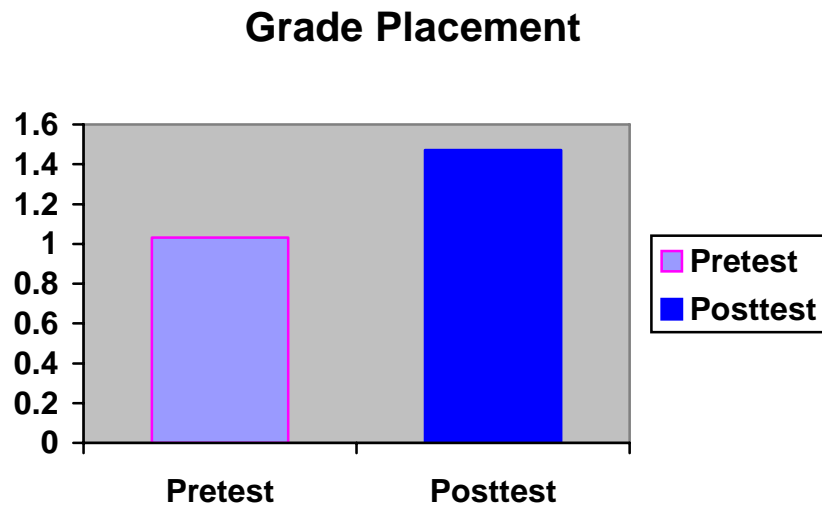
Grade Placement

The Pretest Mean for Grade Placement was 1.03 and the Posttest Mean for Grade Placement was

1.47. This is a Mean Change of 0.44.
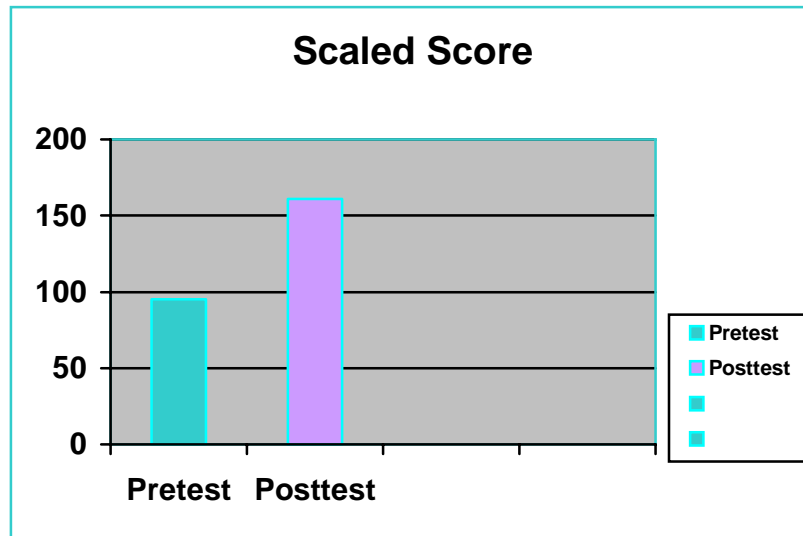
Scaled Score

The Pretest Mean for the Scaled Score was 95 and the Posttest Mean was 161. This is a Mean

Change of 66.
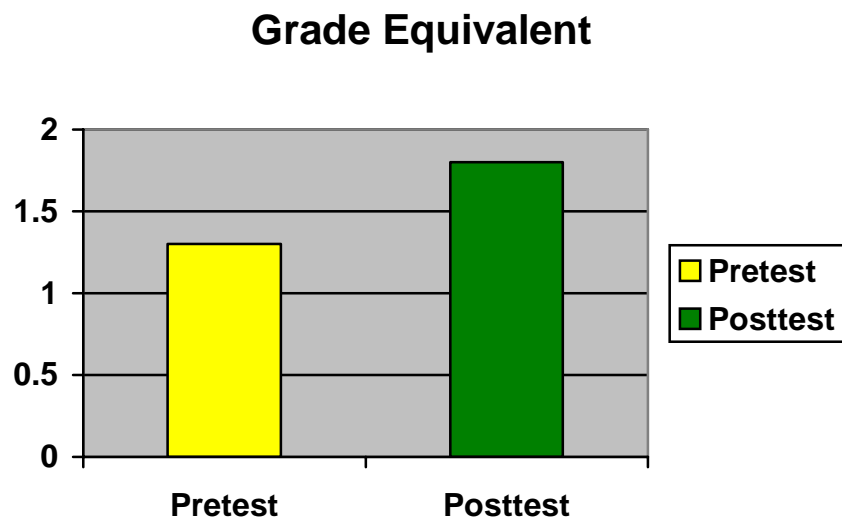
Grade Equivalent

The Pretest Mean for Grade Equivalent was 1.3 and the Posttest Mean was 1.8. This is a Mean

Change of 0.5.

Percentile Rank

Percentile Rank chart showing Pretest bar at approximately 27 and Posttest bar at approximately 54, with y-axis from 0 to 60. Legend: Pretest, Posttest.
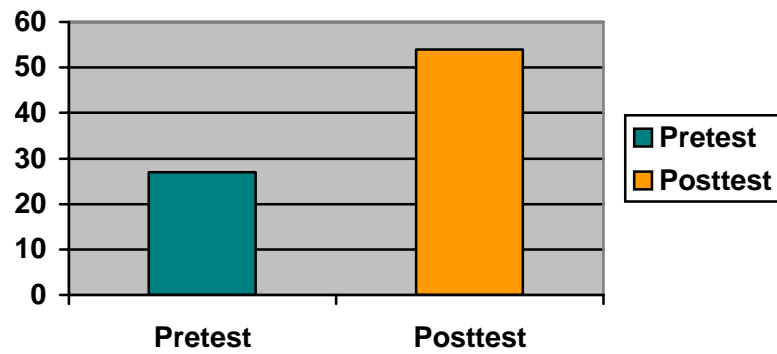
The Pretest Mean for Percentile Rank was 27 and the Posttest Mean was 54. This is a Mean

Change of 27.

Normal Curve Equivalent

Normal Curve Equivalent chart showing Pretest bar at approximately 37 and Posttest bar at approximately 52, with y-axis from 0.0 to 60.0. Legend: Pretest, Posttest.
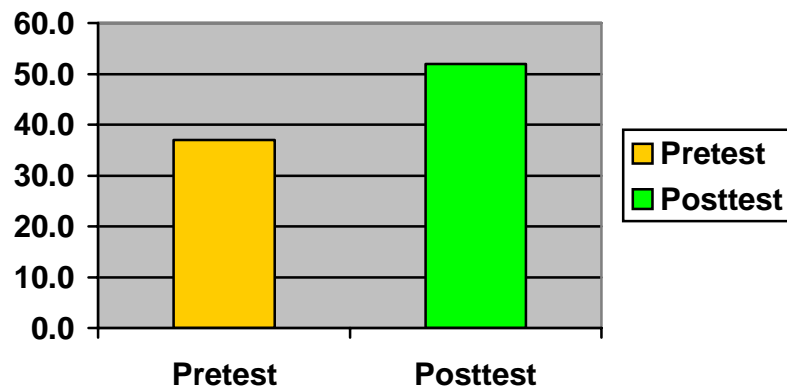
The Pretest Mean for Normal Curve Equivalent was 37.2 and the Posttest Mean was 52.0. This

is a Mean Change of 14.8.

NAME	Test Dates	Grade Place-ment	Scaled Score	Grade Equivalent	Percentile Rank	Percentile Range	Normal Curve Equivalent	Instructional Reading Level
#1, female								
(pre)	12/17/2002	1.00	59	0.4	1	1-9	1	PP
(post)	2/4/2002	1.51	87	1.2	38	23-44	43.6	PP
#2, male (pre)	12/17/2002	1.00	62	0.5	3	1-16	10.4	PP
(post)	2/6/2002	1.51	76	0.9	28	17-34	37.7	PP
#3, female								
(pre)	12/17/2002	1.00	70	0.8	29	12-48	38.3	PP
(post)	1/28/2002	1.44	75	0.9	29	16-38	38.3	PP
#4, female								
(pre)	12/17/2002	1.00	144	1.6	80	73-86	67.7	0.4
(post)	1/28/2002	1.44	338	2.8	95	91-98	84.6	2.9
#5, male (pre)	12/17/2002	1.00	67	0.7	16	3-36	29.1	PP
(post)	2/5/2002	1.44	145	1.7	63	50-70	57	0.5
#6, male (pre)	12/17/2002	1.00	70	0.8	29	12-48	38.3	PP
(post)	1/28/2002	1.51	261	2.3	82	71-91	69.3	2.1
#7, male (pre)	12/17/2002	1.00	72	0.9	39	19-55	44.1	PP
(post)	1/28/2002	1.49	175	1.8	67	57-71	59.3	1.1
#8, female								
(pre)	12/17/2002	1.00	76	0.9	55	36-66	52.6	PP
(post)	1/28/2002	1.44	259	2.3	83	73-91	70.1	2.1
#9, male (pre)	12/17/2002	1.23	327	2.7	97	94-98	89.6	2.8
(post)	2/4/2002	1.51	228	2.1	72	67-88	62.3	1.7
#10, male (pre)	12/17/2002	1.00	62	0.5	3	1-16	10.4	PP
(post)	2/4/2002	1.51	119	1.5	50	38-63	50	PP
#11, male (pre)	12/17/2002	1.00	65	0.6	9	1-29	21.8	PP
(post)	1/28/2002	1.44	83	1.1	42	29-45	45.8	PP
#12, female								
(pre)	12/17/2002	1.22	67	0.7	12	3-29	25.3	PP
(post)	1/28/2002	1.23	67	0.7	12	3-29	25.3	PP
#13, male (pre)	12/17/2002	1.00	61	0.5	1	1-12	1	PP
(post)	1/28/2002	1.44	71	0.8	19	8-31	31.5	PP
#14, male (pre)	12/17/2002	1.00	85	1.1	72	48-73	62.3	PP
(post)	2/4/2002	1.51	222	2.1	71	68-82	61.7	1.7
#15, female								
(pre)	12/17/2002	1.00	44	0	1	1-1	1	PP
(post)	2/4/2002	1.51	74	0.9	23	11-32	34.4	PP
#16, male (pre)	12/17/2002	1.23	168	1.8	78	66-81	66.3	1.0
(post)	2/4/2002	1.51	150	1.7	62	49-68	56.4	0.6
#17, female								
(pre)	12/17/2002	1.00	74	0.9	48	22-62	48.9	PP
(post)	1/28/2002	1.49	87	1.2	40	24-45	44.7	PP
#18, male (pre)	12/17/2002	1.00	59	0.4	1	1-9	1	PP
(post)	2/4/2002	1.51	62	0.5	2	1-10	6.7	PP
#19, female								
(pre)	12/17/2002	1.00	351	1.8	85	77-88	71.8	1.0
(post)	2/4/2002	1.51	105	2.9	95	89-98	84.6	3.0

#20, female								
(pre)	12/17/2002	1.00	298	1.4	73	48-78	62.9	PP
(post)	2/4/2002	1.51		2.5	90	79-94	77	2.5

The above chart displays each student's individual growth in each category from Pretest to Posttest.

Conclusion: The test results from this study did not support the hypothesis that beginning readers lose learned skills even after a short break from school, such as winter break. Only 2 of the 20 first-graders tested scored lower on their post-test as opposed to their pre-test. Eight students raised their reading instructional level from pre-primer to first grade level or beyond.

Recommendations: If conducting a test similar to this in the future, I would try to give the post-test immediately after returning from the break in school. This should probably be done during the first week of returning to school.

Resources

STAR Earl Literacy Computer –Adaptive Diagnostic Assessment (Pre
      K through Independent Reader)

Computer and Internet Use by Students
Case Study: Survey of Suburban High School 10th Grade Biology and
Urban Magnet 7th and 8th Grade Science Classes

Hamilton County, Tennessee

Submitted By:
Kathleen Ann Spring

EDUC 590 Culminating Experience
Spring 2002
Dr. Deborah A. McAllister

Introduction

Statement of the Topic

There are several areas that are well suited for computer applications in school and classroom management. The computer can be used as a tool to save time, improve accuracy of information, and efficiency in handling large amounts of data. These applications use computer-based file managers and spreadsheets for budgets, school inventory, and student records. Desktop publications, like Microsoft PowerPoint, allow teachers and administrators to enhance their presentations to students as well as community groups and parents. In addition, teachers are able to communicate with other teachers and administration and are able to access lesson plans via the Internet and electronic mail.

The students of today are constantly bombarded with many media images both at home and in the classroom. Technology is moving at a rapid pace and it is necessary that these students have access to computers and the Internet. What happens to those students who do not have a computer at home with Internet connection? Are they able to get the time they need to do research or answer questions at school?

Literature Review

Evolution of computer technology began as a result of the 1890 census. It was determined that it would take 10 years to process the data collected unless some new mechanism was employed (Forcier, 1996). Herman Hollerith invented a method of analyzing the census data with the use of punched cards and as a result of this invention it only took 3 years to assimilate the data. Hollerith manufactured his invention and then later merged with IBM. In 1945, ENIAC, the first general purpose electronic digital computer was introduced. ENIAC occupied 3,000

cubic feet of space, weighed 30 tons, contained 18,000 vacuum tubes, and drew 140,000 watts of power. The ENIAC could only do simple addition, subtraction, multiplication, and division.

In 1951 the first electronic computer to use stored data was developed. The vacuum tubes were replaced by transistors. One transistor was only ½ - inch square and computers were reduced from building size to room size to size of several large file cabinets. The year 1975 began the advent of microcomputers. Microcomputers were first marketed in kit form for hobbyists and then in 1977 Apple and Radio Shack microcomputers hit the market. The transistor was replaced with an integrated circuit or chip. A ¼ - inch chip contains millions of transistors. Then in 1982, Time Magazine's Man of the Year was a computer.

Apple's laptop Macintosh Powerbook 540, developed in 1993, weighed about 7 pounds and occupied less than 1/7 of a cubic foot of space. It had 4 megabytes (MB) of memory which was expandable to 36 MB. It was 3,000 times greater and 100,000 times more reliable than ENIAC. Now mobile users employing a personal computer are able to interconnect to a network of other users in order to search a labyrinth of databases to access information (Forcier, 1996).

In 1994, widespread use of the Internet began. The Internet is a global network allowing communication with many computer users and connection to resources from around the world. The computers and Internet can provide opportunities for inquiry-based learning, networking, study, and collaboration with others from around the world (Tripathi, 1998). Students using the Internet and World Wide Web (WWW) can:

- Improve the ability to learn and understand new and changing information technologies

- Learn to synthesize data into a meaningful whole

- Develop skills required to rate information for relevance in meeting specific needs

- Understand how to use a variety of search engines (Tripathi, 1998)

Computer skills and the ability to use computers and other technology to improve learning, productivity, and performance has become as fundamental to a person's ability to navigate through society as traditional skills such as reading, writing, and mathematics (United States Department of Education, 1996). Reform efforts have been made in the science and math fields of study and instruction over the last several years. The fourth goal of National Goals 2000 was to have American students be the best in the world in science and math by the year 2000. This certainly is a worthwhile goal, but is more difficult to achieve for students who have or attend schools with limited resources (Monhardt, 1998). Teachers are encouraged to integrate computers in their instruction (Matray & Proulx, 1995). The Web can be a tool used for student centered education, cooperative education, integration of curriculum, and team teaching (Tripathi, 1998).

A study completed by the Buck Institute for Education in 2000 for the Governor's Office, State of Idaho found that elementary students use computers more frequently to improve their basic academic skills than do secondary students. Secondary students use computers more frequently for word processing, email, and Internet research than do elementary students. The study also found that students at all levels use computers infrequently to contribute to a web site or prepare multimedia presentations. Teachers want their students to use computers more frequently but state that there are not sufficient numbers of computers at their schools (Mergendoller, 2000).

Census data from youth indicators for 1989 and 1993 on computer use by students in grades 1 through 8 and grades 9 through 12 showed that in 1989 approximately half of elementary school students and in 1993 more than two-thirds used computers at school. The computer usage rate for high school students was a little over one-third in 1989 and 58 percent in 1993. Between 17 and 18 percent of students used computers at home but a considerably lower number actually used the computers for school work. Table 1 is a summary of this census data.

Table 1 Computer Use By Students		
	Grades 1 through 8	Grades 9 through 12
Percent of students using computers at school		
October 1989[1]	52.3	39.2
October 1993[2]	68.9	58.2
Percent of students using computers at home for any purpose		
October 1989	17.8	20.7
October 1993	24.7	28.7
Percent of students using computers at home for school work		
October 1989	6.3	12.2
October 1993	10.8	20.9
[1] Source: U.S. Department of Commerce, Bureau of Census, Current Population Survey, October 1989, unpublished data		
[2] Source: U.S. Department of Commerce, Bureau of Census, Current Population Survey, October 1993, unpublished data		

As illustrated in Table 2, the percent of public schools with internet access has increased substantially from 1994 at 35 percent to approximately 97 percent in 2000.

Table 2 Percent of Public Schools with Internet Access, 1994 - 2000							
School characteristic	1994	1995	1996	1997	1998	1999	2000
Total	35	50	65	78	89	95	98
Instructional level							
Elementary	30	46	61	75	88	94	97
Secondary	49	65	77	89	94	98	100
Size of enrollment							
Less than 300	39	39	57	75	87	96	96
300 to 999	35	52	66	78	89	94	98
1,000 or more	58	69	80	89	95	96	99
Percent minority enrollment							
Less than 6%	38	52	65	84	91	95	n.a.
6% to 20%	38	58	72	87	93	97	n.a.
21% to 49%	38	54	65	73	91	96	n.a.
50% or more	27	40	56	63	82	92	n.a.
Source: National Center for Education Statistics, *Internet Access in U.S. Public Schools and Classrooms: 1994 -2000.*							

What is the challenge for teachers, parents and students? Technology is rapidly changing and this has implications for teacher preparation and how teachers are best equipped to deliver challenging curricula to a varied group of youngsters in rural schools (Bol & Strage). The survey presented here investigates how much students in two Hamilton County, Tennessee schools use computers at home and at school.

Research Questions

The following questions provided the initial framework for research efforts outlined in this report:

1. Do the majority of students have access to computers at home, and if they do not have access at home do they have ready access somewhere else? (school, grandparents, friends)

2.   What kind of systems do the students use?

3.   Do the students have ready access to the Internet at home or school?

4.   Do they have their own email accounts?

5.   Do they use the computers in classes for research, to complete homework, and class assignments?

6.   Do teachers use computers while teaching?

7.   What search engines do the students use?

8.   Do the students use any Internet homework help sites?

9.   Are the students given opportunities at school to use computers?

10.   Do the students turn in homework word processed or use any spreadsheet programs?

11.   What kind of software do they use?

12.   What are some of the students' comments or suggestions on the use of computers and the Internet for classes and studies?

Refer to Appendix A for a copy of the survey questionnaire used in the study.

Research Methodology

The instruments used in this study incorporated a survey that is included in Appendix A. No formal instrument or test will be used in conjunction with this study. The participants in this survey included the 10th grade biology class at a suburban high school and the 7th and 8th grade science classes at an urban magnet school in Chattanooga, Tennessee.

The high school total student population is approximately 1,200. The makeup of the 10th grade biology classes are as follows:

- 1st period, 14 students of 7 males and 7 females
- 2nd period, 22 students of 12 males and 10 females
- 3rd period, 21 students of 10 males and 11 females
- 4th period, 15 students of 11 males and 4 females
- 6th period, 24 students of 12 males and 12 females

The mission of the magnet school, a Paideia School, is to maintain high expectations for all while providing a diverse population of students and equal opportunity to develop intellectually, socially, and physically in order to become productive, self-reliant citizens. The school is a non-zoned magnet school with a student body of 60 percent majority and 40 percent minority. Students come from all over Hamilton County. Total student population is approximately 378. Kindergarten through 3rd grades has a student teacher ratio of 20:1 (40 per grade level). The 4th through the 8th grades have enrollments of 50 per grade level.

The makeup of the 7th and 8th grade classes is as follows:

- 3rd period 7th grade, 22 students of 9 males and 13 females
- 4th period 7th grade, 20 students of 8 males and 12 females
- 5th period 8th grade, 25 students of 12 males and 13 females
- 6th period 8th grade, 25 students of 10 males and 15 females

The data was collected primarily through the students' answers to the questions on the survey form. General observations were made on projects in the classes that required the use of a computer and the Internet.

The survey was handed out at the first day of instruction as a student teacher for each class. The students at the high school completed the survey on January 9, 2002. The survey was distributed to the 7th and 8th graders on April 2, 2002, also the first day of instruction, and collected throughout the week.

Data Analysis

The primary data from this study includes the Computer Technology Questionnaire and documents collection. Data analysis is based on the researcher's interpretation and any trends, challenges, and problems are noted. Possible solutions, conclusions, and recommendations for further change will be the summary of the final report.

Summary of Survey Results

Table 3 summarizes the results of the survey questionnaires completed by the 7th and 8th grade and the 10th grade biology classes. The sampling from the two schools was equal. The middle school sample size was 67 total and the 10th grade sample size was 69. Both of these included the majority of the population of 7th and 8th grade at the magnet school and all of the 10th graders at the high school. Figure 1 illustrates the students' use of computers at home and at school. The 7th and 8th grade was combined into the middle school category. Figure 2 illustrates student access to the Internet and email.

	7th	Percent	8th	Percent	10th	Percent

Table 3 Computer Technology Survey Results						
	7th	Percent	8th	Percent	10th	Percent
Sample Size	34		33		69	
Access to computer at home						
yes	32	94%	28	85%	56	81%
no	2	6%	5	15%	13	19%
Other access away from school						
yes	27	79%	21	64%	16	23%
no	3	9%	3	9%	7	10%
System						
Apple/Mac	5	15%	4	12%	3	4%
PC	26	76%	29	88%	29	42%
Other	8	24%			29	42%
Access to internet						
yes	34	100%	31	94%	65	94%
no	0	0%	1	3%	4	6%
Email						
yes	29	85%	23	70%	47	68%
no	5	15%	9	27%	21	30%
Teacher's use of computer						
yes	9	26%	3	9%	4	6%
no	1	3%	16	48%	17	25%
occasionally	23	68%	13	39%	48	70%
Labs/other projects on computer						
yes	25	74%	23	70%	26	38%
no	7	21%	8	24%	43	62%
Classroom time						
yes	29	85%	27	82%	57	83%
no	1	3%	2	6%	12	17%
Homework help sites						
yes	13	38%	4	12%	10	14%

	7th	Percent	8th	Percent	10th	Percent
Table 3 Computer Technology Survey Results						
no	16	47%	25	76%	59	86%
Software						
Works	13	38%	14	42%	39	57%
WORD	26	76%	25	76%	51	74%
EXCEL	5	15%	11	33%	5	7%
ACCESS	2	6%	1	3%	4	6%
PowerPoint	16	47%	10	30%	14	20%
other						
Assignments word processed						
yes	13	38%	5	15%	17	25%
no	3	9%	4	12%	14	20%
occasionally	13	38%	20	61%	38	55%

Figure 1
Percent of Students Using a Computer at School and At Home

Figure 2
Percent of Students with Access to Internet and Email Accounts
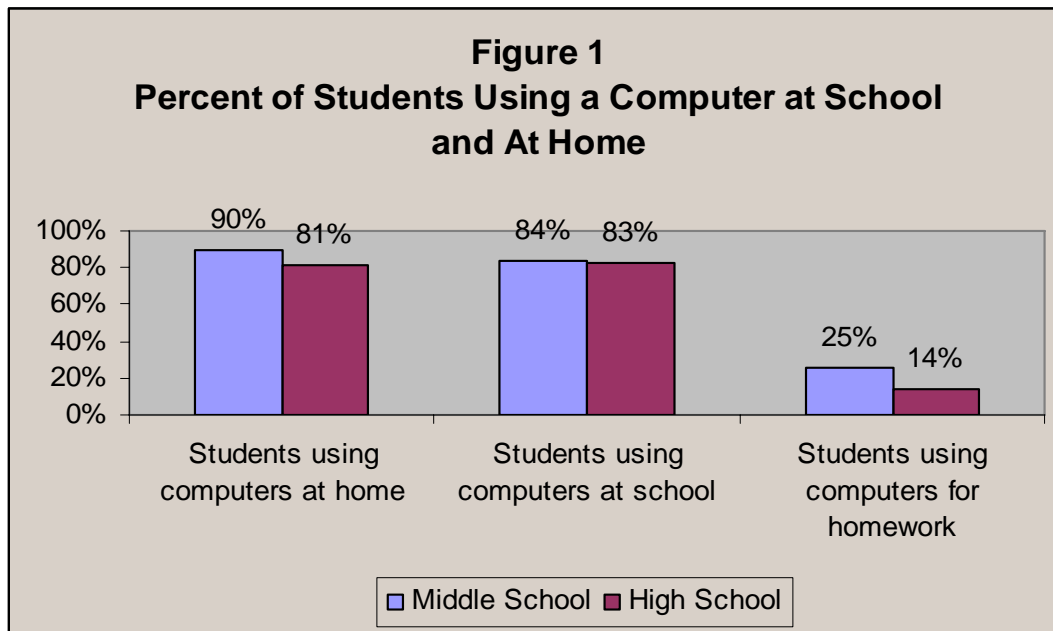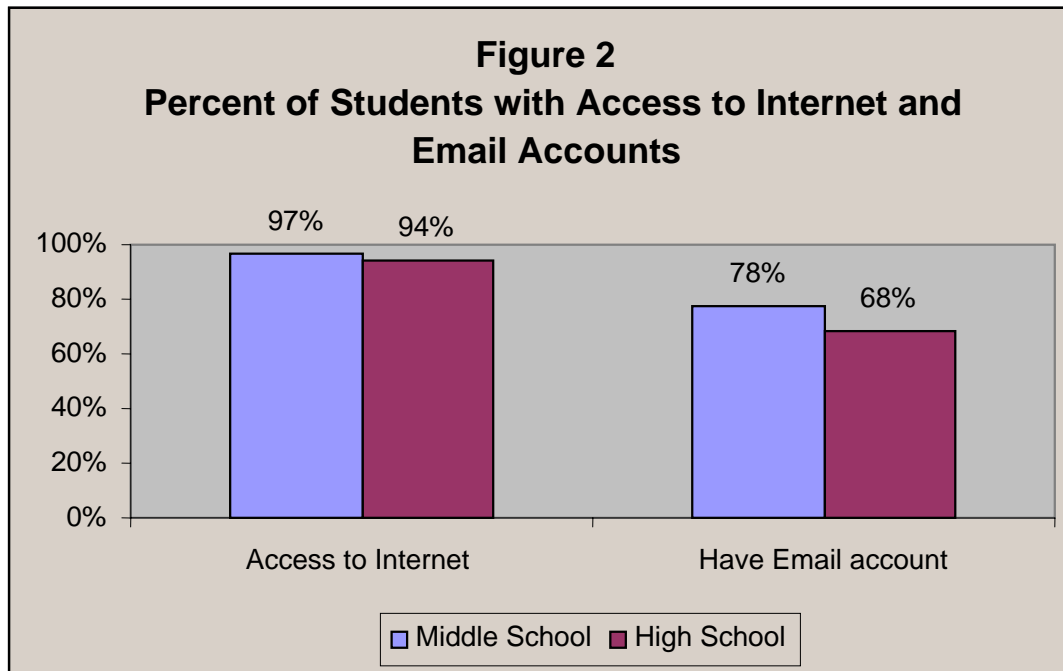
Some general observations of the data from the survey include that the majority of the students use personal computers like Dell, Gateway, and other clones. Approximately 10 percent of the students, who do not have computers at home, do not have computers access away from home, either. This would include grandparents, friends, or easy access at school. The students perceive the use of computers by their teachers in their classrooms as occasional. The software students use the most includes Microsoft Word at approximately 75 percent, and Microsoft Works at approximately 40 percent at the middle school and 57 percent in the 10th grade.

Internet Search Engines

The primary search engines used by the students are listed in the following:

- AOL NetFind
- www.about.com
- www.altavista.com
- www.askjeeves.com
- www.att.com
- www.compuserve.com
- www.dogpile.com
- www.excite.com
- www.google.com
- www.hotbot.com
- www.infoplease.com
- www.infoseek.com
- www.lycos.com
- www.mamma.com
- www.megaspider.com
- www.msn.com
- www.netscape.com
- www.pinkmonkey.com
- www.search.com
- www.worldbookatlas.com
- www.yahoo.com
- www.yahooligans.com
- www.yourdictionary.com

Twenty-four percent of all the students surveyed use Google as their main search engine, 20

percent use Yahoo, and 18 percent use AskJeeves.

Homework Help Internet Sites

A majority of the students do not use homework help Internet sites. Those that do use the

following sites:

- AOL – research and learn
- www.altavista.com (for translation)
- www.ask.com
- www.encarta.com
- www.homeworkhelp.com
- www.schoolsucks.com

Student Comments or Suggestions for Use of Computers and Internet

There were no 10th grade responses on comments or suggestions, but the 7th and 8th

graders had a few comments, as listed below:

- Need to do more with computers in the classroom, we have computers in all the classrooms, but hardly ever use them because they are slow and out of date.
- Need faster cable modems
- Should have more time to use computers at school, especially for those who do not have computers at home
- We like to use computers because they are quick and easy for assignments.

Summary and Conclusions

As compared to the 1993 census data student use of computers at home and at school

show an increase. In 1993, 69 percent of the students used computers at school and at the magnet

middle school there was an increase to 84 percent. In the high school there was an increase to 83

percent from the 58 percent in the census data. The survey data also showed a substantial

increase in the percentage of students that used computers at home for any purpose. In the 1993

middle school census, 25 percent of the students used computers at home and the survey at

middle school showed 90 percent. For the high school there was an increase from 29 percent in

1993 to 81 percent. The students using computers for homework or schoolwork in the 1993

census was lower than the students' use of computers at school or at home and the same showed

true as a result of the survey. For comparison purposes, Table 4 is a summary of the results for

census data and for the survey data.

Table 4		
Comparisons of Computer Use By Students		
	Grades 1 through 8	Grades 9 through 12
Percent of students using computers at school		
October 1989[1]	52.3	39.2
October 1993[2]	68.9	58.2
Survey Data 2002[3]	84.0	83.0
Percent of students using computers at home for any purpose		
October 1989	17.8	20.7
October 1993	24.7	28.7
Survey Data 2002	90.0	81.0
Percent of students using computers at home for school work		
October 1989	6.3	12.2
October 1993	10.8	20.9
Survey Data 2002	25.0	14.0
[1] Source: U.S. Department of Commerce, Bureau of Census, Current Population Survey, October 1989, unpublished data [2] Source: U.S. Department of Commerce, Bureau of Census, Current Population Survey, October 1993, unpublished data [3] Source: Results of Survey Questionnaire collected in Spring 2002		

Computers and technology have become part of the tools that students and teachers use in

schools. But to what extent and how effectively these tools are utilized is still a question. A

project was given to the biology classes at the high school to research, write a one- to two-page

report, and present the information gathered on a current event topic relevant to genetics. Refer

to Appendix E for a summary of the general requirements for the project. The students were encouraged to use Internet sources in their research and time was given in class and out of class to use one of the three computers available in the classroom. Out of all the students' presentations only two presented their findings with a PowerPoint presentation and one student did a video. One student had to be given extra time because he did not have any access to computers outside of the classroom. In general, the reports were not typed and double-spaced as required and a vast majority of the students just printed out the Internet page and turned that in as their report. I also found that there were many students who had researched information from Internet sources that were not reputable.

The 7th grade students were given a project to track the weather over 30 days for the Chattanooga area. Refer to Appendix F for a summary of the general requirements for the project. The students were encouraged to collect data from Internet sources and to record their sources on a daily basis. They were also required to present the data in a table format and graph portions of their data for analysis. The majority of the students did not utilize spreadsheet programs to graph their data because they did not know how to. In future assignments of this nature I may spend the extra time to model the use of spreadsheets for data compilation and analysis.

The students did not utilize time given to them in class to use computers available to them. The general complaint from both of the sets of students was that the computers were too slow or were constantly freezing up. As a teacher, I was not able to utilize the computers either for PowerPoint presentations for the same reasons.

Students and teachers are trying to use computers more for their studies and instruction, but as technology advances, the infrastructure at the schools surveyed in this study have not been able to keep up with the technology. As a result, the technology is not being used to its fullest potential. It was evident also that teachers may need to spend more time reviewing sources that the students. The students have so much data at their disposal that they can get lost in it and are not able to or are not taking the time to determine the validity of the data they are obtaining.

References

Forcier, R. (1996). *The computer as a productivity tool in education*. Englewood Cliffs, NJ:

Prentice–Hall, Inc.

Matray, P., & Proulx, S. (1995). Integrating computer/multimedia technology in a high school

biology curriculum. *The American Biology Teacher, 57*(8), 511-520.

Mergendoller, J. R., & Moriarity, K. (2000). *An analysis of computer use by Idaho students and

teachers.* Novato, CA: Buck Institute for Education.

Monhardt, R. M. (1998). Facilitating science literacy in a rural school. *Bulletin of Science,

Technology and Society, 18*(1), 47-53.

National Center for Education Statistics. *Internet access in U.S. public schools and classrooms:

1994 -2000*. Retrieved March 31, 2002, from

http://print.infoplease.com/ipa/A0764484.html

Tripathi, A. K. (1998). *International Knowledge Networks, Corp*. Retrieved February 25, 2002

from http:///www.iteachnet.com

U.S. Department of Commerce, Bureau of Census. (1993, October). *Current population survey*,

unpublished data. Retrieved March 31, 2002 from

http://www.ed.gov/pubs/YouthIndicators/Description.html#29

U.S. Department of Commerce, Bureau of Census. (1989, October). *Current population survey*,

October 1989, unpublished data. http://www.ed.gov/pubs/yi/y9631a.html

U.S. Department of Education. (1996). *Getting America's students ready for the 21st century.*

Retrieved April 15, 2002, from

http://www.ed.gov/Technology/Plan/NatTechPlan/title.html

Appendix A Computer Technology Questionnaire

Dear Biology Students: As part of my requirements to graduate I have to conduct a research project incorporating some part of the curriculum we have addressed during my time as a student teacher with you. What I have chosen to do is to conduct a survey on the how each of you use the computer in your biology class, in other classes, or at home. I will be analyzing your responses in conjunction with your One + One Egg Baby project and Case Study research. I would appreciate it if you would take the time today to fill out this questionnaire for me. Please note that your names or any other personal information will not directly be used in my final paper.

Thank you for your time.

Ms. Spring

Please read each of the following questions and circle the appropriate response

1. Do you have access to a computer at home?
    a. Yes (proceed to question 3)
    b. No (proceed to question 2)

2. If you do not have ready access to a computer at home, are you able to use your grandparents', other family members', friends', or other source away from school?
    a. Yes (proceed to the next question)
    b. No (proceed to question 6)

3. What kind of system do you use?
    a. Apple/Macintosh
    b. PC
    c. Other

4. Do you have access to the Internet at home or school?
    a. Yes
    b. No

5. Do you have your own personal email?
    a. Yes
    b. No

6. What classes this year have you used the computer for research or to complete homework and class assignments? (please list all your classes that apply)

_____
_____
_____
_____
_____
_____

7. Do your teachers use the computer while teaching?
   a. Yes
   b. No
   c. Occasionally

8. Have you completed any labs or other projects as a class using the computer?
   a. Yes
   b. No

9. When asked to do a project for school or for your own studying, what search engine(s) do you use? (circle all that apply or tell me what other searches you use)
   a. Google
   b. Dogpile
   c. Hotbot
   d. AOL NetFind
   e. Ask Jeeves
   f. Lycos
   g. Other _____

10. Do your teachers give you time in class to use the computers in the classroom or to go to the library?
    a. Yes
    b. No

11. Do you use any homework help Internet sites and what are they?
    a. Yes
    b. No
    c. Name of sites

       _____

12. What software do you regularly use? (circle all that apply)
    a. Works
    b. WORD
    c. EXCEL
    d. ACCESS
    e. PowerPoint

    f. Other

_____

13. Do you turn in your assignments word processed?
    a. Yes
    b. No
    c. Occasionally

14. Any comments or suggestions on the use of computers and the Internet for your classes and studies

_____
_____
_____
_____
_____
_____
_____

THANK YOU FOR YOUR TIME AND CONSIDERATE RESPONSES

Appendix A Computer Technology Questionnaire

Dear 7th and 8th Grade Students: As part of my requirements to graduate I have to conduct a research project incorporating some part of the curriculum we have addressed during my time as a student teacher with you. What I have chosen to do is to conduct a survey on the how each of you use the computer in your biology class, in other classes, or at home. I will be analyzing your responses in conjunction with the answers I got from the 10th grade I student taught. I would appreciate it if you would take the time today to fill out this questionnaire for me. Please note that your names or any other personal information will not directly be used in my final paper.

Thank you for your time.

Ms. Spring

Please read each of the following questions and circle the appropriate response

15. Do you have access to a computer at home?
    a. Yes
    b. No

16. If you do not have ready access to a computer at home, are you able to use your grandparents', other family members', friends', or other source away from school?
    a. Yes
    b. No

17. What kind of system do you use?
    a. Apple/Macintosh
    b. PC (like Dell, Gateway, etc.)
    c. Other

18. Do you have access to the Internet at home or school?
    a. Yes
    b. No

19. Do you have your own personal email?
    a. Yes
    b. No

20. What classes this year have you used the computer for research or to complete homework and class assignments? (please list all your classes that apply)

    _____

    _____

    _____

_____
_____
_____

21. Do your teachers use the computer while teaching?
    a. Yes
    b. No
    c. Occasionally

22. Have you completed any labs or other projects as a class using the computer?
    a. Yes
    b. No

23. When asked to do a project for school or for your own studying, what search engine(s) do you use? (circle all that apply or tell me what other searches you use)
    a. Google
    b. Dogpile
    c. Hotbot
    d. AOL NetFind
    e. Ask Jeeves
    f. Yahoo
    g. Lycos
    h. Other _____

24. Do your teachers give you time in class to use the computers in the classroom or to go to the library?
    a. Yes
    b. No

25. Do you use any homework help Internet sites and what are they?
    a. Yes
    b. No
    c. Name of sites

       _____

26. What software do you regularly use? (circle all that apply)
    a. Works
    b. WORD
    c. EXCEL
    d. ACCESS
    e. PowerPoint
    f. Other

       _____

27. Do you turn in your assignments word processed?
    a. Yes
    b. No
    c. Occasionally

28. Any comments or suggestions on the use of computers and the Internet for your classes and studies

_____
_____
_____
_____
_____
_____
_____
_____

THANK YOU FOR YOUR TIME AND CONSIDERATE RESPONSES

Appendix E Current Events Assignment

General Instructions

Of all the fields in biology none is evolving as rapidly as gene technology. Current research has removed DNA from one organism and placed it in another, there has been cutting and rearranging of DNA, and even making synthetic DNA. Gene technology has an impact that is far reaching and will impact your lives and those of the entire world.

For this assignment you are to follow the steps outlined below
1. Select a current event topic that is relevant to genetics and sign up for it no later than *February 11*[th]. Assignments of topics will be on a first-come first-serve basis.
2. Research the topic in at least two other resources (one of which cannot be an internet source): *newspapers, news programs, news magazines, books, journals.*
3. Write a one to two page paper summarizing the event and describing its relevance to the advancement of genetics, science, medicine, etc. and other research that is being conducted.
4. Include resources
5. Orally present the topic to the class (poster boards or visual aids are encouraged).
6. Paper presentations will be on *February 19*[th] (unless otherwise advised).

Scoring of the assignment

	Score
1. Picked topic by February 11th	5 points
2. Paper typed and double spaced	10 points
3. Clear and concise introduction of event topic	20 points
4. Clear, concise discussion of relevance of event to advancement of science	25 points
5. Bibliography	5 points
6. Presentation February 19th	30 points
7. Use of visual aids	5 points

TOTAL POINTS AVAILABLE   100 points
NOTE: For every day the report is late you will have 10 points taken from grade.

Current event topics may include but are not limited to the following (there are many subtopics in some of the headings below):

Human Genome project
Anthrax
DNA fingerprinting
Curing genetic disorders
Making genetically engineered drugs
Genetically modified weapons (bioweapons,
        bioterrorism)
Improving livestock production
Roundup Ready
Crime scene investigations/forensics
Genetically modified soybeans
Current university research
Genetically engineered plants resistant to
        herbicides and pets
Genetically engineered food
Cloning
Stem cell research
New born testing
Fetal analysis
H.I.V. research
Cancer research
Crop engineering
Genetic counseling
Current private research
Stem cell sources

Appendix F Weather Assignment and Rubric

In this assignment you will be keeping a journal of the weather for the next 30 days *(March 18 – April 16)*. The following are the requirements for the assignment (to be presented in report form) and the scoring rubric.

DATA COLLECTING AND RECORDING   (50 POINTS)

List of the data you will be collecting and recording:

1. Time of the sunrise and time of the sunset (5 points)
2. Temperatures, daily high and low temperature in ^0F and ^0C (5 points)
3. Precipitation amounts (5 points)
4. Wind direction (extra credit, wind speed) (5 points)
5. Barometric readings (5 points)
6. Humidity (extra credit, dew point) (5 points)
7. Other general observations. Is it rainy, cold, cloudy, hot, sunny, etc.? (5 points)

This data can be collected from the Internet, newspapers, the evening news, the Weather Channel, or any other source you may find. But *you must note the source of the data*. Suggestion: keep the daily logs of your data in a table format (5 points)

RESEARCH AND DATA ANALYSIS (25 POINTS)

1. Average annual rainfall for Chattanooga (5 points)
2. Average springtime temperatures for Chattanooga (5 points)
3. Average low and high temperature for the 30 days (5 points)
4. Total precipitation for the 30 days (5 points)
5. Graph of temperature, humidity or barometric readings (5 points)

DATA OBSERVATIONS AND SUMMARY REPORT (35 POINTS)

From your daily observations, research and data analysis write a summary of your findings and any trends or correlations you may see. Assemble the data you collected, your observations, any research you did, your graphs and summary into a report format. For this portion of the assignment you will be graded on the presentation of your work and on the trends and correlations you may see.

DATA COLLECTION FROM MARCH 18 THROUGH APRIL 16. DATA JOURNAL, GRAPHS, AND REPORT DUE APRIL 19, 2002. 5 POINTS WILL BE TAKEN OFF FOR EVERY DATE REPORT IS LATE.

A Review of the Literature

Character Education

By

Sonya Steele

EDUC 590
Dr. McAllister
April 19, 2002

When discussing character education in America, it is important to understand what character education is and its unique historical perspective. Early in American history, Judeo-Christian values and mores dominated the classroom. From the beginnings of American education to the early 1930s, students across the country began their school day with a prayer. According to Leming (1993), structured moral education slowly became part of the US school program during the first 30 years of the 20th Century and involved an "elaborate code of conduct and group activities in school clubs" (p. 63). Furthermore, there were very clear codes of right and wrong.

Expressed teaching of clear moral codes began to change in 1924, when Columbia University researchers undertook the Character Education Inquiry, the most detailed and comprehensive inquiry to date into the nature of character and the school's role in its development. From this 5-year study, assessing the character-related behaviors of 10,865 youths, the researchers concluded in their three-volume report that character education in the classroom was at best ineffective and at worst resulted in more immoral behavior.

The effects of this overwhelming "evidence" from the Columbia University report along with several United States Supreme Court cases, which were sufficiently aligned, allowed the removal of the references to religion and the teaching of morals from American classrooms. Thus, by the 1950's, character education curriculums had all but disappeared in American schools (Leming, 1993, p. 65).

In 1966, Lawrence Kohlberg for the first time linked his cognitive-developmental theory of moral reasoning with the practice of moral education in schools. Since that time, American education's efforts to incorporate values and morals into the curriculum and instruction of schools have been dominated by the classic Piaget/Kohlberg hierarchy of developmental

perspective. Typically considered to be the theoretical framework for the field of modern character education, several other perspectives and insights that are important are often overlooked. According to Swanson (1995), foundational research can also be seen in the work of M. L. Hoffman on parental influences and the internalization of values and the work of Bandura, et al. and their Social-Learning research model of social reinforcement (p. 296-7).

Nevertheless, character education is not simply a matter of understanding the theory and choosing the right curriculum. Evaluating the validity and reliability of the research is an often-misunderstood process and in the case of character education, current quantitative research is difficult to find. Therefore, reviewing classical theory can provide insight.

In Kohlberg's moral dilemma discussion approach, the teacher assisted the students in resolving moral conflicts and ensured that the discussion took place in a values-free environment that contained the conditions essential for stage growth in moral reasoning (Leming, 1993, p. 65). The emphasis was on the process of moral thinking and the uni-directional movement to higher levels of moral development, not the control of behavior or the outcome of the moral decision.

In Social-Learning, the theoretical framework is based upon behavioral learning theory, which is well-defined based on the principles of Skinner. Bandura postulated that a child's moral thinking and development can move in both a more and less sophisticated direction. His classic study showed that children exposed to modeled responses were able to change their moral thinking to both higher and lower developmental levels. This was contrary to the Piaget/Kohlberg theory, which assumed growth goes in only one direction. Ultimately, this work explains why moral thought is not a predictor of behavior. Developmental theorists maintain that while social influence may cause retrogressive thinking and contrary behavior, the direction

of moral reasoning will be toward more mature, more sophisticated thought. Other theorists concentrated on moral development as a process of internalization of values, norms, and rules acquisition, which depend on the social environment.

Leming's review of moral discussion data involving a single dependent variable (the stage of moral reasoning) compared to values clarification data containing a wide range of dependent variables (values thinking, self-concept, attitudes, dogmatism, and value-related behavior) were highly consistent. He determined that the predicted change in a given variable seldom showed more than a 20 percent variance. Thus, his review of the research again supports the Social-Learning theory mentioned by Swanson. Unfortunately, the research data reviewed supports the belief that increasing students to higher stages of moral development has little practical utility in influencing students' behavior.

In a study that simply focuses on attitudes of 79 current teachers and 54 future teachers concerning character education, Zern (1997) used a questionnaire to determine the following. Zern found that 95% of all of those participating believed that values should be taught to students in today's schools. The popularity of the values was not equal, therefore, the respondents were asked to identify those values they would teach in the classroom. They are listed in descending order as follows: responsibility (89%), respect (88%), honesty (86%), fairness (79%), caring (75%), diversity (72%), citizenship (63%), value of human life (53%), tolerance for homosexuality (28%), pro-choice (13%), and pro-life (11%). All seven traditional values were picked more frequently than the politically sensitive values. The degree of agreement among teaching professionals as to which values they found most important points to the universality of values held in by most civilized democratic societies (p. 505).

Choosing any one theory to clarify moral reasoning would be difficult, but determining why the theory and research remain planted firmly in the fabric of character education is easy. Plainly stated it is public support. According to Zern, people of all ages and all segments of U.S. society believe it is very important to teach values to young people (p. 505). Phi Delta Kappan Gallup polls indicate that for the last 20 years, "close to 80 percent of the U.S. adult public believes that schools should be involved in the moral development of their students" (Zern, 1997, p. 505).

In the face of public debate about whose values should be expressed and about public school teachers being neutral, Damon (1992) states that for schools that have adopted and advocate values clarification—the results are not good. Instead of coming away with improved understanding, firmer beliefs or better conduct, children become confused and cynical about the school's message or lack thereof. He argues that values neutrality is misguided because, "among civilized people everywhere, there is widespread consensus about core values and constructive participation in a democratic society" (Damon, 1992, p.3). He believes that by teaching children the social and historical context of such values, schools prepare its children for full citizenship.

Thus, Townsend asks the question "Is it really possible to teach values that we all agree upon?" And she answers resoundingly, "Of course!" (Townsend, 1992, p 31) Accordingly, she argues that schools already present a set of universally accepted set of social norms and that it is not difficult to take that thinking one step further and create a curriculum that actually teaches other values that are universally accepted (Townsend, 1992). For instance, an ideologically diverse representative group of community leaders from Sweet Home held public forums, listened to community opinion, held extensive discussions and was able to unanimously produce

a list of values with which everyone was comfortable. Townsend exclaims, "Now, when people

ask them "Whose values?" they can proudly say "Ours!" (p. 30)

Teaching values, supported by the community, does more that yield heart-warming

anecdotes—it brings results. According to Stafford (1995), teaching values means helping kids to

learn honesty, responsibility, respect for themselves and others, the importance of serving one's

community and nation. These are ideals, which have sufficiently universal appeal to serve as the

founding and guiding principles of this country. Stafford also expresses that people launching

character education programs express surprise at the level of support they receive. He believes

that they most remarkable expression of unity is not that most any group can agree on a list of

values they want taught but that schools are excitedly talking about values at all.

Public support is now being ushered into a new era, according to U.S. News & World

Report, which states that the Character Education Partnership in Washington, D.C. now reports

40 states that require or encourage character education. If Congress approves President Bush's

education budget, which includes $25 million for character education—three times the current

amount-- those numbers could rise dramatically (Lord, 2001). Lord quotes Lickona, a

psychologist and director of the Center of the 4th and 5th R's at the State University of New

York-Cortland, who states that "Education has always had two great goals: to make kids smart

and to make kids good" (p.51). Lickona also recalls the 1980's trend of employing what he calls

"self-estemia," in which kids "learned more about feeling good that being good" (Lord, 2001, p.

51).

Even though there are no shortages of compelling testimonials comprehensive studies are

surprisingly hard to find. Since 1995, the U.S. Department of Education has spent $33 million

for states to develop character education programs, but there's no evaluation to determine

success (Lord, 2001).   According to Anderson (2000), effective character education cannot be taught as a separate curriculum, but must be entwined in all curriculums. She continues by stating that an effective educational environment exists when staff, students and families work together in an atmosphere of mutual trust and respect.

Unfortunately, this is easily stated but difficult to apply. Therefore, Leming (1993) introduces another important angle on character education that lends application to the ideology. His analysis of effective character education programs indicate that a number of school-based research projects have investigated the relationship between school atmosphere and student behavior. Leming states that one of the major educational success stories over the past decade is the use of cooperative learning strategies. In cooperative learning, students find they are not responsible for the own learning but for that of others. They find that this type of learning environment results in impressive student achievement and positive social values and behavior. Students in these groups learned to get along better with students of other races and ethnic groups, demonstrated greater mutual concern for one another and were more likely to engage in prosocial behavior.

Leming continues by exploring another application—the use of a collective process of deliberation in which students and teachers propose and agree on norms for behavior. The group then enforces compliance. They found that because this approach positively harnesses strong peer pressure within a democratic context, it allows students to eventually modify antisocial behavior. Again, we see that morality is found in the context of social norms.

In conducting our national debate about character education, it is important to keep in mind that character education is not a new idea. It is an idea as old as education itself. Swanson (1995) suggests that we must have a broader understanding of moral thinking before enacting

character education. Understanding motivational mechanisms, internalization of values, social-learning as well as the academic theories and cognitive development models is only the beginning of a daunting task. Nevertheless, as the character education movement gains support, it is important to understand the leadership direction of its greatest proponents. Thus, President George Bush, in a discussion of character building programs proclaims, "We are here today to recommend that throughout America we teach values to our children. That we not only teach our children how to read and write but that we be bold enough to teach them the difference between right and wrong, as well" (2001, p.594). Finally, President Bush expressed this sentiment, in the words of Martin Luther King, Jr., who said, "Intelligence is not enough. Intelligence plus character, that, is the goal of true education" (2001, p. 594).

<div align="center">Summary</div>

Character education is located in the theoretical framework of numerous fields: in the moral hierarchy of Kolberg, in the social theory of Bandura and with many other theorists who seek to determine what influences moral behavior. Finding qualitative research that gives a simple solution to the problems of how to give future generations of students the character needed for cohesive, productive society is simply not readily available. Furthermore, the best trends in research seem to suggest that character education does not work. Character education seems to be highly supported by the vast majority of people. While it is difficult to study character education programs, by means which allow us to know the effects unequivocally, there seems to be something inside of people saying it is better to do something to impart character, than to do nothing and hope for the best.

Works Cited:

Anderson, D. R. (2000). Character education: Who is responsible*? Journal of Instructional Psychology, 27*, 139-142.

Bush, G. W. (2001). Remarks in a discussion on character-building programs in education. *Weekly Compilation of Presidential Documents*, 37, 594.

Damon, W. (1992). Teaching values in school promotes understanding and good citizenship. *Brown University Child and Adolescent Behavior,* 8, 1-3.

Leming, J. S. (1993). In search of effective character education. *Educational Leadership,* 51, 63-72.

Lickona, T. (1998). A more complex analysis is needed. *Phi Delta Kappan*, 79, 449-455.

Lord, M. (2001). Morality goes to school. *U.S. News & World Repor,*130, 50-55.

Stafford, T. (1995).   Helping Johnny be good: Can 'character education' save the public schools? *Christianity Today,* 39, 34-40.

Swanson, R. L. (1995). Research foundations of moral and ethical education. *Education, 116* , 296-302.

Townsend, K. K. (1992). Why Johnny can't tell right from wrong: The most important lesson our schools don't teach. *Washington Monthly, 24*, 29-33.

Zern, D. (1997). The attitudes of present and future teachers to the teaching of values (in general) and of certain values (in particular*). Journal of Genetic Psychology, 158,* 505-508.

The Paideia Approach:
Writing and Reading

Hollie Steele
EDUC 590

The area of content I chose was writing and reading through a unit on bugs. One major objective for me was to allow a group of kindergarteners to develop a love for writing and reading. The approach I took to this content was Paideia. In the Paideia approach, there are many different ways of evaluating and engaging students in the writing/reading process. This paper will discuss the content I chose, the Paideia approach of developing writing/reading, the process and results of evaluating a very diverse group of kindergarteners, and my results.

"The better reader you are the better writer you will become." This was a famous saying my second grade teacher would exclaim each morning as we began our reading assignments. As I grew up, I came to understand we needed chances and opportunities to develop our reading and writing skills simultaneously in order to become proficient in each area. For this reason, I became a better reader and writer.

At my second placement, I soon learned that this was also a priority. I did my second placement at an urban magnet school. They engage in the Paideia approach and have an underlying focus on reading and writing. Although I have done many observations in this type of setting, I have never engaged in planning and creating a writing and reading curriculum utilizing the Paideia method.

In 1982, a philosopher named Mortimer Adler and a group of educators called the "Paideia Group" published a book entitled, *The Paideia Proposal, an Educational Manifesto.* This book offered systematic ways of addressing the content area of writing and reading as well as all of contents. A few well-known educators who shared his philosophy and had a profound effect on this type of teaching process were Horace Mann, John Dewy, and Robert Maynard Hutchins. All in which had a strong background in mathematics and literacy (National Paideia Center, 2001).

There are three columns of instruction in the Paideia approach. These are didactic, intellectual coaching, and seminars. Didactic instruction is an efficient way to present a body of information to students. It is a delivery of factual information. Lecture, demonstration, videos and reading are common forms of this type of instruction. The goal of this instruction is for students to acquire the "must know information" about a subject. This only 10 to 15% of instructional time (National Paideia Center,2001, p. 6).

I utilized this as a circle time and introduced the new topic of the day. I would also utilize this time to orally read many leveled books. This gave an opportunity for each student to become exposed to different types of literature and the importance of reading. I would also use this time to write all words and topics unfamiliar to the children. At this time the children would add to their "word wall" any new words introduced to them. This wall was an alphabetical chart of words the children have learned and written throughout the year. Later, I will address the results of evaluating this type of learning process.

The second column of instruction is intellectual coaching. This is a guidance through modeling and questioning. Intellectual coaching often happens by questioning as well as positive or corrective feedback. The goal for intellectual coaching is for students to acquire expertise in skills of learning, such as reading, writing, calculating and observing. Developing skills in a relevant context occurs through a teacher's development and use of units called coached projects. Intellectual coaching ideally occurs 60-70% of instructional time. (National Paideia Center, 2001, p. 7).

At this time, I assessed and evaluated the students through performance tasks, project work, checklists and rubrics. (Please see results page.) In a school wide theme called Living Art, I chose to do a unit on bugs. Within this unit, we studied the butterfly and it's lifecycle,

ladybugs, bees, and spiders. I chose to evaluate the students' writing, reading and learning processes through checklists and performance tasks. I would use a checklist at the beginning of each lesson (similar to a KWL chart) and at the end of each lesson. The pre-test and post-test I utilized was a performance task on the life cycle of a butterfly. The children would use the intellectual coaching time during centers. In all centers, the students would explore the life cycle and ask many questions. The centers I chose were: Reading, Writing, Art, Computers and Math (all literature enriched). At this time, I would assist each child and individualize the learning experience.

The third and final type of Paideia instruction is seminar. This is a collaborative, intellectual dialogue facilitated by open-ended questions about a text. The goal of Paideia seminar is for students to expand their understanding of ideas and values within the curriculum. The seminar nurtures both intellectual and social skills. Paideia seminars occur approximately 15-20% of instructional time. An assessment and evaluation process for this process is through self-identified goals, discussion, and writing (Nystrand, 1997, p. 7).

I administered the posttest after one of our seminars on *The Very Hungry Caterpillar*. An example of the seminar I conducted is as follows:

Pre-Seminar: Read *The Very Hungry Caterpillar* and discuss hard to understand words.

Ex: cocoon, chrysalis, caterpillar…

Seminar: Read *The Very Hungry Caterpillar* and initiate these questions:

Opening: What was important to the caterpillar?

What was the most important stage of the book? Why?

Core: Based on the text, why did the caterpillar eat so much?

Why was it important for the caterpillar to eat?

What happened to the Caterpillar? Why?

What does it mean to change?

Closing: Are there stages/changes that we as humans go through? What are they? Why?

Have you ever gone through a change? How did it make you feel?

(Cook-Gumpetz, 1986, p. 14).

This seminar was focused on reading a text and discussing the importance of changes and cycles butterflies and humans go through. I believe this seminar incorporated the context of my focus, reading/writing, and the importance of life changes. After the seminar, for a post seminar activity I chose to do the post-test. The day before, I became a center and administered the pre-test to each student. This was by utilizing the second stage of Paideia instruction: coaching. Although the students were engaged in discussion and questioning, I allowed the small group of students to discuss and ask questions among themselves. I charted the students' answers and questions. After the seminar I gave the whole group the task and asked them to do it individually, without help. I charted the processes they used in constructing the lifecycle and the comments about the text.

The kindergarten class I evaluated and worked along with was very diverse. There were four Hispanic children, ten African American children, two children who were half African American and Polynesian, and one Asian student, of which three students spoke another language at home. The evaluation process, although seemed the norm for many in this school, needed to be individualized for most and broader at the same time. This was a challenge in my case.

Between 15 and 20 percent of our United States school children speak a foreign language at home and the number is growing rapidly (as the case in my class). By definition, these

Limited English Proficient (EP) students do not speak English as a primary language, and their culture frequently differs from those students in the classroom. (Geisinger, 1996, p. 2)

Therefore, I needed to understand how the cultural background influenced the approach to my students' test taking, especially when testing writing and reading skills. The pre- and post-test needed to be properly developed, normed, reliable, and validated. I also made sure to ensure fairness of the tests to have indifferent teachers review the post-test in early development, documented evidence showing the effective use of the test with the LEP students and utilized another assessment tool such as observation to incorporate and ensure knowledge of the information asked (Geisinger, 1996, p. 4-10).

The results I found were simple. The literature read contains vital issues in content, content which has stood the test of time and aroused the students. The Socratic method of teaching helps the students retain interests in the reading and writing curriculum. The adequate background information allowed the students to read and sound out the selections individually, after they had been discussed. The three basic elements of introducing the material, diagnosing what the students do not understand and having them ask questions and explore the content, and finally discussing the text as a whole group allowed the students to become lifelong learners. It also allowed the students to conceptualize the information and become owners of the information taught.

Research by many educational scholars has found that the Paideia approach to learning works. It allows the students to intrinsically understand and know the information. It is hands on learning (Roberts, 1999, p. 4). John Dewey believed and found that educators should combine relevant curriculum with active student learning. In fact his idea led directly to the

creation of the Paideia coaching and assessment section of the Paideia philosophy (Dewey, 1916, p. 47).

All in all the examples of the pre- and post-test, checklists used, and the chart that displays the results will accurately and appropriately show that the Paideia approach is not only different but exemplary in teaching diverse children. With the content focus and the approach used it was a successful "marriage" in teaching these kindergarten students the importance of bugs and the lifecycle of bugs on our land. By utilizing the Paideia approach, allowing writing and reading to be a focus was not difficult. By nature, this approach allows the teacher to assess comprehension of reading material, listing skills, and writing abilities.

Seminar Text Rubric
(This was used as a tool for establishing equality of the text)

3= strong 2= average 1=low

| *Criteria*	*3*	*2*	*1*
Ideas and Values	Addresses multiple ideas and values	Addresses some	Addresses one idea
Degree of Challenge	Few participants comprehended without assistance	Some	All participants comprehended without assistance
Curricular Relevance	Clearly related	Somewhat related	Limited in relation

Daily Class Checklist

Name:	Read on level:	Used phonics to help read:	Wrote a sent:	Used inventive spelling:

Pre- and Post-Test:

The Very Hungry Caterpillar

Life Cycle of a Butterfly

What was your favorite part of the book?
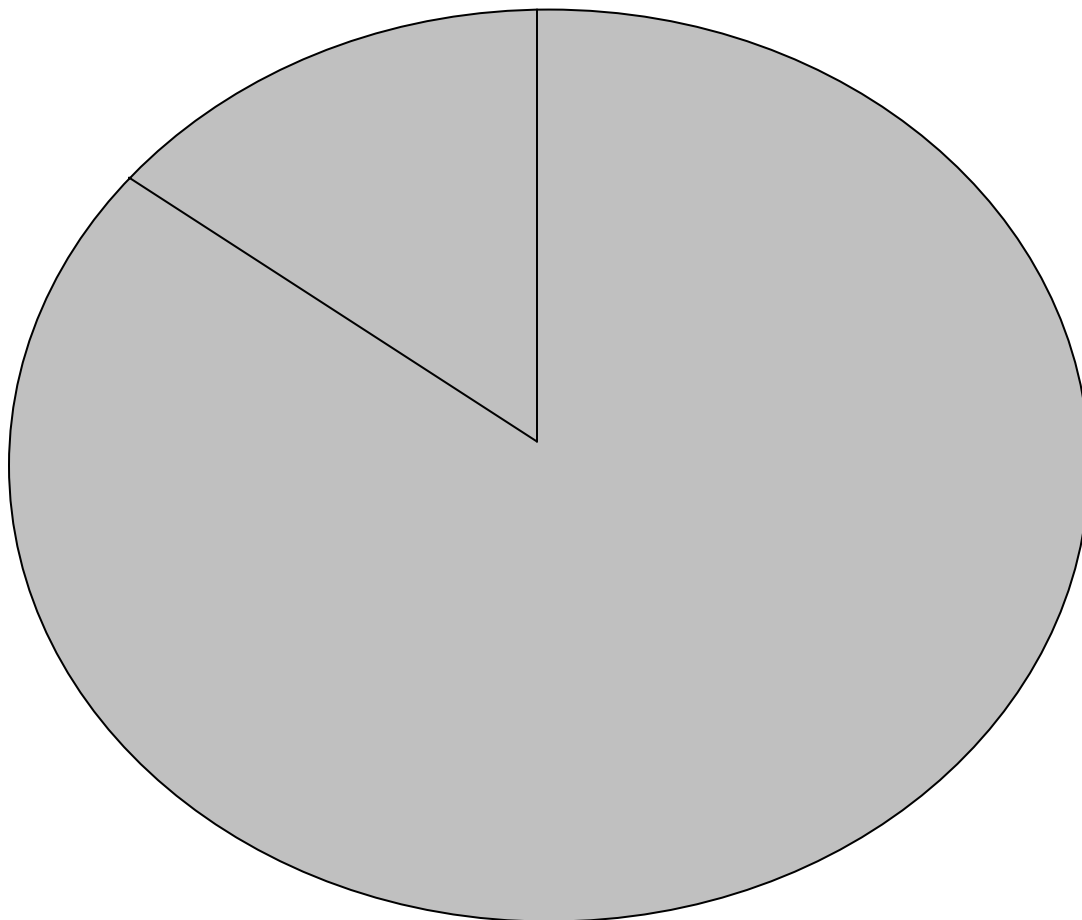
Results (pre-test):
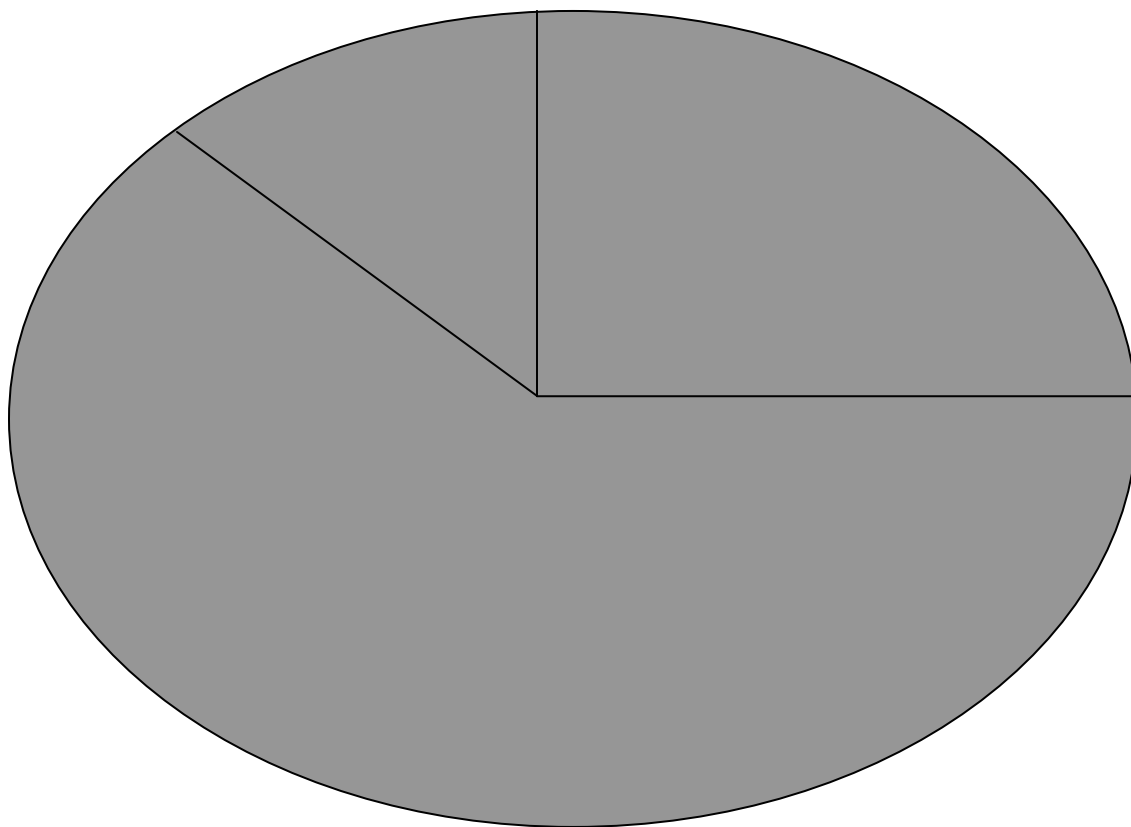
15%- scored 90% or higher

25%- scored 70% and 90%

60%-scored below 70%

Results (post-test):

15% scored 70% and below

85% scored 90% and higher

Student Rubric:

1. I wrote my name. _____

2. I wrote a sentence with a period. _____

3. I used five colors. _____

4. I listed and numbered the four stages of a butterfly in order._____

In each space provided, the child will indicate by faces how they did. ☺, ☹,………

References:

Cook-Gumerz, J. (Ed.). (1986). *The social construction of literacy.* Cambridge: Cambridge

University Press.

Dewey, J. (1916). *Democracy and Education.* New York: Macmillan.

Geisinger, K. (1996). Assessing language minority students. *Young Child, 27*, 2-15.

National Paideia Center. (2001*). Active thinking through dialogue.* Bouvier and Kelly, Inc.

Nystrand, M. (1997). *Opening Dialogue.* New York: Teachers College, Columbia University.

Roberts, T., & Billings, L. (1999). *The Paideia classroom: Teaching for understanding.*

Larchmont, NY: Eye on Education.

BRAD WALKER Project Creator

BRITTAIN YOUMANS Research Partner

EDUC 590 CULMINATING EXPERIENCE

MAKING THE GRADE

RESEACH PROJECT

Introduction

Grading is never fun. This is true for both the teacher and the student. Grades strike at the heart of our sense of fair play and justness, and despite the best of intentions, no grading system has been devised that accurately measures the content of student knowledge in relation to the intentions of the instructor, or that objectively judges the motivation the student brings to the field of study, or that skillfully calculates a pupil's efforts as a percentage of his abilities. And all these ills come before the necessary consideration of how one student's "performance" compares to the performance of others. Just as vital is the question of how the assessment of one student's work, under the tutelage of one teacher, may be confidently compared to another student's mastery of the same subject under the guidance of another teacher in another school system in another state. Yet in spite of all these pitfalls, the need to assess the achievement level of content mastery remains. Grades allow a means of measuring one's own progress and a measurement of how this mastery compares to that of others.

THE POTATO FAMINE AND THE IVY LEAGUE

Now, as I find myself preparing to move from "gradee" to "grador," I discover deeper dimensions of the grading dilemma. My background in American history, one of the subjects I wish to teach, touts the meritocratic ideals upon which our Founding Fathers built this nation; ideals with which, being the descendant of poor Irish potato farmers, I wholeheartedly agree. Without a merit system, all the benefits, both intrinsic and otherwise, of attending elite universities would reside solely within the privileged classes; in effect, creating an American aristocracy.

B.F. SKINNER SMELLS A RAT

My background in psychology reminds me of B. F. Skinner's work with lab animals involving the influence of reinforcement upon the adaptation or abandonment of behaviors.

Quite simply, that desired behaviors may be encouraged through the utilization of reinforcers, such as cheese or good grades (depending upon the type of animal under consideration), and conversely, that subjects will produce at the lowest possible level of performance will continually to be rewarded. Equally important is the fact that more complex and demanding behaviors will be extinguished quickly if rewards come more steadily and more easily. This applies to students and lab mice alike.

So how are Skinner's rats, the Founding Fathers and my grading paranoia related to my teaching career? The answer: the Georgia HOPE Scholarship program, of course.

"HOPE"-ING FOR THE BEST

The state of Georgia began its lottery-funded, merit-based Helping Outstanding Pupils Educationally (HOPE) Scholarship program in 1993. State residents graduating from high school with at least a 3.0 grade point average in core curriculum courses qualify for paid tuition, fees, and a book allowance at Georgia's public colleges and universities. Students choosing to attend a private college are eligible for a $3,000.00 annual grant. To date, HOPE has served almost 440,000 students and spent $950,000,000.00 in the state's institutions of higher learning. Aside from graduating high school with at least a 3.0 GPA, students must maintain a B average in college (reviewed every two semesters) to maintain their scholarships. The HOPE program has become a blueprint for similar programs in Florida, Louisiana, Kentucky, Maryland, South Carolina and California.

TO "B" OR NOT TO "B"

What's not to like? Every high school teacher wants to see their students go on to college, and the enormous amount of money devoted to this noble goal in Georgia creates unprecedented opportunity and motivation. This kind of money also creates unprecedented pressure on teachers

at both the high school and university levels to "help" students create and maintain that all-important B average. This "help" is known in academic circles as "grade inflation," and is a topic of growing concern among high school teachers, college professors, and state legislators, alike. Interestingly, the primary beneficiary of this school money bonanza, the University of Georgia, has issued numerous reports and findings that firmly deny any substantial evidence linking the HOPE scholarship program with grade inflation; at the same time the Georgia Student Finance Commission says it needs some $44 million more in lottery revenues to fund its scholarship program through the end of this year. The need for extra money comes after a tightening of the requirements for HOPE eligibility did not result in an expected 35 percent drop of qualified students. The actual drop in students with qualifying GPA's was only 4.3 percent. Can this strong student showing be the result of students accepting the academic challenge, or is it indicative of grades being inflated to whatever point needed?

THE "SCENARIO" OF THE CRIME

Consider this scenario: As a new high school history teacher, I take a job at a Georgia public school. Like many north Georgia schools, my school has experienced a tremendous growth in Latino students. In my 12th grade U.S. Government class is a Latino boy who has been in the U.S. for only 5 years. Unlike most of the Latino students in the school, he and his family are here legally and therefore eligible to attend college under the HOPE scholarship program. He is bright and hard working and shows great promise, but the best he can manage in my class is a 72 average due to his still-developing language skills. As a teacher, I believe that he is capable of succeeding in college if given time for his English skills to mature. Further, I know that his only chance of attending college is on scholarship and that this would make his academic success a model for other Latino students in the school. With this in mind, I must ask myself, am I ending

this student's future by issuing him the C he has earned? And in the bigger picture, this case

applies to all of my students from poor or lower-middle income families. Am I depriving them of

the chance for a college education and of the future benefits of that education for both the

students and society? Could my un-inflated C doom these students to unnecessarily menial

futures?

For the Latino student, it takes a major league curveball to go from a mediocre C to a low B.

And what about the kid who can obviously do the work, but is simply immature? The first

solution to this problem is to go strictly by the book - no 80 average, no B, no exceptions. I

could also ease my conscience by allowing more students to "earn" B's by lowering my course

expectations (i.e., "inflating" their grade). I find this the most unacceptable solution of all. It

undermines my integrity as a teacher and does a disservice to my pupils by further reducing their

readiness for college. Finally, I can continue to teach rigorous content while researching the

effect of grade inflation in high school on subsequent academic success or failure in college. If

my research demonstrates that high school grading trends lead to appalling failure rates in

college, then there is no reason to create unrealistic expectations of academic success and waste

useful state revenue with programs like HOPE. Conversely, if my research indicates that the

trend toward boosted high school GPA's has no effect on college success, then I might be

inclined to grant B's to all to send them out to college. I would be the most popular teacher in

the county and provide more money for the educational system!

DEFINING MOMENTS

The problem is gnawing concerns that the trend of increasing high school GPA's in Georgia

coincides with the advent of the HOPE scholarship program. Is this a cause and effect

relationship? And is the relationship positive or negative? Proponents of the HOPE program

argue that the upward trend in GPA's is a result of the rewards offered by the scholarship program. Gary Henry, a Georgia State University researcher who has been studying the program almost since its inception, enthusiastically proclaims, "The results connecting HOPE with student achievement just reinforces what a powerful incentive it is for students to do better." Detractors of the program claim that linking money to B averages has infected both high schools and colleges with grade inflation. Ralph Noble, president of the Georgia Association of Educators, bemoans, "There is pressure on high school teachers to inflate these grades," and University of Georgia history professor Will Holmes, upon learning that only five of his 96 students in his American history class had merited an A, decided to give A's to students with an 87.35 or above, as well as to some who had lower scores but did especially well on the final. Doing so raised the number of A's to 23. "I knew many of my students were working hard to earn their 3.0's...I just weakened... my T.A.'s and I participated in some pretty wholesale grade inflation," declared the professor. Of course, neither side of this argument can prove their point without a statistical analysis of the available data; hence, the need for research.

Operational definitions are necessary in order to clarify and define the task at hand. Grade inflation is defined as awarding students any grade above what is merited by their academic performance. While this study will not peek into teachers' grade books, it will consider an A the reward for "excellent" work, a B the reward for "good, above average" work, a C the grade for "average" work, while D's and F's retain their dubious distinctions. For our purposes, the greatest concern is average work that receives above average grades presumably to obtain HOPE money. Grade inflation will be evidenced by:

- ✓ Individual graduating high school classes in which greater than 50% of all students qualify for HOPE scholarship monies. *

- ✓ Individual graduating high school classes in which greater than 20% of all HOPE scholars require placement in at least one learning support class once in college. *

- ✓ Sophomore year college HOPE scholarship retention rates of less than 50%. **

- ✓ Minority sophomore year college HOPE scholarship retention rates. ***

- ✓ Entering freshmen class mean GPA's increases that have not been coupled with similar mean SAT's increases at the University of Georgia (measured over time).

*These percentages are based on the averages of all Georgia high school graduates for the year 1999.

**This percentage rate is my own, based upon the assumption that at least half of all 3.0~4.0 GPA high school grads can maintain a 3.0 minimum after two semesters in college.

***Ideally, there should be little to no statistical difference in majority and minority population scholarship retention rates. I contend that any dramatic downward turn in minority retention rates suggests grade inflation pressures on high school teachers to "help" minority students attend college on HOPE funds.

The plan is straightforward. Graduating class data will be collected from all public Georgia high schools via the Georgia Department of Education's user-friendly and surprisingly comprehensive website, http://doe.k12.ga.us. Next, data relating to HOPE scholarship recipients regarding numbers of students, ethnic backgrounds, GPA's, college entrance exam scores and retention rates will be collected from the Georgia Student Finance Commission, courtesy of their website, www.gsfc.org, and from the website of the University of Georgia at

www.admissions.uga.edu/stat.html. Data from the Student Finance Commission will present a

picture of HOPE students for the state at large while information from the University of Georgia

at Athens will help determine the effect of the program at the state's largest recipient of HOPE

scholarship monies, and helps to narrow the focus of the study. The goal is to collect student

data for the previous 10 years. This would allow for a comparison of pre- and post-HOPE

student performance as related to my field of interest.

The time-line for carrying out the project is remarkably short, thanks to the Internet and the

thoroughness of the Georgia Department of Education. The high school graduating class data for

each Georgia high school is already categorized along criteria relevant to my research and can be

downloaded within 2 hours. The Georgia Student Finance Commission answered my e-mail

request for materials within two hours and I received the materials via fax the next day. Due to

the availability of materials (except for GPA's), there is no reason this HOPE study could not be

comfortably carried out within a month's time.

LIES, DAMN LIES, AND STATISTICS

General literature regarding whether or not the HOPE scholarship program invites grade

inflation is decidedly inconclusive. Reports issued by the University of Georgia stress evidence

that the program is helping Georgia to keep more of its top teen scholars in the state, instead of

losing them to top universities in neighboring states, such as the University of Virginia and the

University of North Carolina at Chapel Hill. UGA notes with pride that the fall 2000 freshman

class has the highest average high school GPA in the school's history—a whopping 3.66. And

the Applied Research Center, funded by the Georgia State University system, offers an

interesting news release proclaiming "Council finds HOPE does not cause grade inflation,"

based upon a survey of parents and students that finds that those with greater knowledge of the

HOPE scholarship program's requirements are "more likely to expect to attend a four-year college." "This research should clear up any concerns that HOPE might be causing negative effects, such as grade inflation," proudly proclaims Glenn Newsome, executive director of the Georgia Student Finance Commission, the agency that oversees the HOPE scholarship. The same commission claims in their May 2000 report that the HOPE is responsible for the 2.2% increase in SAT scores above 1200 in 1997 as compared to 1992. Interestingly, there is no mention as to whether or not the HOPE is responsible for the flat scores from 800 to 1000, and the drop in scores between 1000 and 1200. By the way, the report enthusiastically acknowledges the $570,107,095.00 the USG has received in HOPE money since 1993. (This is the same commission that needs an additional $44 million in lottery revenues to fund its scholarship program through the end of the year after the expected 35% drop in qualified applicants due to tighter standards failed to materialize.)

The *Chattanooga Times News-Free Press* follows the program closely. Some related article appears in the newspaper virtually weekly. An October 1, 2000 story notes that the average SAT score for Georgia B students this year was 922, about 46 points below the national average for B students nationwide, and almost 100 points below the average for all SAT-takers across the nation. A later newspaper article reported that the Georgia Board of Education may recommend end-of-course tests rather than grades as the standard for scholarship awards due to perceptions of grade inflation at both the high school and college levels. *The Chronicle of Higher Education* points out that "almost half of the freshmen who enter the university [UGA] lose HOPE after the first year… with some 55 percent of white freshmen carrying HOPE into their sophomore year, while only 27 percent of black freshmen retain their scholarships."

Although this clouds the way for the HOPE team, one must keep in mind that all of these reports are aimed at supporting their own opinions and agendas. Let's look at the numbers themselves. The graduate data for Georgia high schools is a step in the right direction. While it would be easy enough to collect the published data on all Georgia public schools, I chose to download data on schools within close proximity to the University of Tennessee at Chattanooga, as these schools were of the greatest personal interest. Briefly, Lakeview High School in Catoosa County had 77% of its 1999 grads eligible for HOPE money, 24% of which required at least one remedial college course. Ringgold High School, also in Catoosa County, had 36% of its grads eligible for HOPE, with 24% needing placement in learning support. Dalton High School graduated 82% of its students with at least a 3.0 GPA, 22% of which were placed in learning support. Walker County's Ridgeland High School had 60% of its student population eligible, with 30% needing remedial work. One inner city Atlanta school was chosen at random for my brief survey. Crim High School had 53% of its grads qualified for HOPE. Sixty-four percent required remedial classes once in college. Finally, a report in the *Augusta Chronicle*, looking at all the data sampled, reported that of all schools with at least 10 scholarship winners in 1997-98, only one school had a retention rate greater than 59%. Nine high schools had retention rates of less than 15%.

It is also worth mentioning, that while not relevant to the study of grade inflation and the HOPE scholarship program, there is a wealth of material concerning grade inflation in both public and private high schools and colleges across the country. *The Los Angeles Times* has reported that the University of California at Berkley is re-formulating the GPA's of student applicants to its law school, based upon each school's LSAT average, and how common a certain GPA is at a particular school. Even the Ivy League is not immune. *When Hope and Fear*

Collide, a new book by Arthur Levine and Jeanette Cureton, reveals that since 1969, the percentages of C's and A's undergraduate students receive has flip-flopped. Princeton's median GPA has gone from 3.0 to 3.4 since 1973, Dartmouth now has 44% of its students earning A's, and Harvard has doubled the number of undergraduate A's it doles out since 1966.

ROUND UP THE USUAL SUSPECTS

"Scientific research in education" is already considered a suspect, at best. While not wanting to add to that reputation, the proposed study does not require a massive amount of effort or a Ph.D. in statistics. The fact that this study has not previously been conducted says more about the amount of money involved than the originality of the design. Although much of the work presented in this report suggests that the HOPE scholarship program has contributed to grade inflation in Georgia, it is important to remember that until all of the necessary data has been collected and statistical analysis conducted a cause-and-effect cannot be drawn. Also, because statistics are only available from 1992 on and because no data on students' GPA's is made available to the public, the study must be conducted to the best of our ability with the accessible data.

MATERIAL EVIDENCE

"Adjusting for Grade Inflation". [On-line] Available World Wide Web:

> http://home.pcmagic.net/abe/gradeadj.htm

Applied Research Center. Council Finds HOPE Does Not Cause Grade Inflation. [On-line]

> Available World Wide Web: http://arc.com/dairl/99/11/15.html

Chronicle of Higher Education. HOPE Scholarships Transform the University of Georgia

> [On-line] Available World Wide Web:

> http://chronicle.com/colloquy/97/inflation/background.htm

Georgia Student Finance Commission. The HOPE Scholarship's Effect on Enrollment in the

University System of Georgia [On-line]. Available World Wide Web:

http://www.gsfc.org

Grade Inflation at Public Universities: Who Profits? Who Pays? [On-line] Available World

Wide Web: http://www.uair.edu/~epmoore/inflation.html

Hope For Whom? Financial Aid for the Middle Class and Its Impact on College

Attendance. [On-line] Available World Wide Web:

http://www.highereducation.org/crosstalk/ct07000/voices0700.shtml

HOPE Helps Keep Top Teens in Georgia. (2000, November 13). The Atlanta Journal-

Constitution, p.30.

Keeping HOPE (1999, June 6). The Augusta Chronicle [On-line] Available World Wide

Web: http://augustachronicle.com/headlines/060699/hope.jpg

The Phenomenon of Grade Inflation in Higher Education.[On-line] Available World Wide

Web: http://frontpagemag.com/archives/academia/wilson04-13-99.htm

The Numbers

The first step in conducting this study reveals a rapid growth in the number of Georgia high

school graduates eligible for the HOPE Scholarship.

Table 1 Number of Students Eligible for HOPE Scholarship

Graduation Year	Number of Georgia Graduates	Number Eligible for HOPE	Percent Eligible for HOPE
1992	57,742	N/A	N/A
1993	59,520	27,863	46.8%
1994	58,315	30,804	52.8%
1995	59,736	32,713	54.8%
1996	59,444	33,212	55.9%
1997	61,004	35,347	57.9%
1998	64,386	38,332	59.5%

Since the year of HOPE's inception in 1993, the number of Georgia students eligible for the

HOPE has grown from 27,863 to 38,332 in 1998. That is a hefty gain of 10,469 eligible

students, while the student population has only grown by 6,644. A gain such as this in the

number of Georgia students achieving a B average would indicate one of two things – either

students are more motivated to make higher grades because of the chance to receive the HOPE,

or Georgia teachers, since 1993, have begun to award average scholastic achievement with above

average grades. Also, the trend goes against the bell curve theory, wherein most students will

achieve average grades with above and below average grades being awarded to fewer students at

the top and bottom. In Georgia, half or over half of the graduating seniors are receiving above

average grades in their core academic subjects.

But back to the first question: is grade inflation responsible for this dramatic rise in GPA, or

is the incentive the HOPE scholarship offers a substantial motivation for students to achieve

higher academic success? One way to find out is to compare Georgia students' GPA's to their

SAT and ACT composite scores. It would be reasonable to assume that if students were able to

achieve higher grades, they would be able to score higher on the SAT and ACT tests. After all,

these standardized tests are designed for the very purpose of gauging scholastic aptitude, or a

student's true academic capability.

*All scores based on re-centered scale.

Table 2 SAT Mean Composite Verbal and Math Scores

Year	US	Georgia	Difference in Scores
1992	1001	948	53
1993	1003	949	54
1994	1003	948	55
1995	1010	960	50
1996	1013	961	52
1997	1016	967	49
1998	1017	968	49

While Georgia students' SAT scores have increased much faster than the national average, Georgia SAT scores remain well below the national average. Because the SAT is an objective and standardized test (unlike grades), the national mean composite would represent a score of an average American student. Because the grade of B is an above average grade, it would be unreasonable to assume that a student scoring at or below the national average on the SAT (as many HOPE recipients appear to be) would consistently receive above average grades, unless those grades were inflated.

However, the fact that SAT scores in Georgia have risen steadily since 1993 does suggest a rise in student achievement and since the SAT composite scores carry no proposed correlation to letter grades, the argument that HOPE recipients are receiving inflated grades is shaky, if not invalid.

To further investigate this scenario, we randomly selected ten Georgia high schools being sure to include both rural and inner-city samples. We then collected the data indicating the percentage of students in each school eligible for the HOPE scholarship and compared it to the average ACT composite for that school. The purpose is to see if students receiving a 3.0 are keeping their ACT scores at or above the national average, which is 20.0/ 21.0.

Table 3 GA High Schools-Number of Students Eligible for HOPE vs. Average ACT Composite

High School	% eligible for HOPE	Average ACT
Catoosa – Ringgold High School	55%	21.0
Fulton – Milton High School	81.2%	21.9
Polk – Rockmart High School	40.3%	20.1
Randolph County High School	30.4%	15.2
Spaulding – Griffen High School	64.2%	19.3
Tattnall County High School	30.7%	N/A less than 5% take it
Thomasville High School	42.3%	17.3
Trion City High School	50.6%	21.4%
Walker – Lafayette High School	54.1%	19.7
Dekalb –Avondale High School	53.2%	15.8

While these statistics reaffirm that most Georgia students are receiving average scores on objective standardized tests, it brings to light one of two things. Either a large percent of students eligible for the HOPE are on a technical track and do not take the ACT or SAT (as must be the case in Tattnall County) or many students eligible for the HOPE are not receiving above average scores on the ACT. Again, this would be an expected outcome for students receiving above average grades in core academic subjects.

The Georgia Student Finance Commission reports that over 75% of all HOPE recipients lose the scholarship at some point during their college career, indicating that these students cannot continue to maintain the B average they earned in high school once moving on to college. Out of these 75%, over 40% dropout of college after losing the HOPE scholarship. Unless these students reenroll at a later time, this makes waste of not only the HOPE scholarship money awarded to these students, but the time students have spent in college that they could have spent learning a trade or gaining certification in a specific technical field.

Table 3 Percent of HOPE Scholars Who Lose HOPE After Two Years

1993	52.4%
1994	50.6%
1995	46.6%
1996	43.1%

The rates are about the same for minority students, but appear even higher for African American students.

Table 4 Percent of HOPE Scholars Not Retaining HOPE After 2nd Year

Ethnicity	1993	1994	1995	1996	Average
Asian	42.1%	40.6%	48.6%	38%	42.5%
African American	62.7%	63.7%	57.9%	54.9%	58.9%
Hispanic	50.7%	49.3%	44%	42.3%	45.5%
Other	52%	49.4%	52.9%	40.7%	46.7%
White	50.8%	47.8%	43.7%	40.4%	44.6%
Overall	52.4%	50.6%	46.6%	43.1%	47.3%

These results suggest that if grade inflation is occurring, it occurs at a higher rate in schools with higher minority population, especially those with high African American populations, such as inner-city Atlanta schools (which have one of the lowest ACT mean composite averages). Because most of these schools are found in lower income communities, the need to help these particular students afford college is understandable and more likely. The high concentration of minority students losing the HOPE during college could also contribute to the high dropout rate among this group, as these particular students could not afford college at all without the HOPE scholarship.

Conclusion

After perusing the data provided by the state of Georgia and its educational counterparts, we find no solid evidence that the HOPE scholarship has directly created grade inflation in Georgia high schools. The steady and impressive increase in SAT scores suggests GA students are achieving higher academic standards each year. However, we did find reason to suspect grade inflation occurs in Georgia high schools, as it most likely occurs in every high school from time to time. But due to the fact that Georgia high school students with above average GPA's in core academic subjects *consistently* perform at or below average on the SAT and ACT and that an average of half of Georgia seniors graduate with a 3.0 indicates that average students are receiving above average grades. So while the HOPE scholarship may not be completely responsible for the disturbing trend, statistical analysis does indicate that grade inflation occurs in the state of Georgia.

The Effects of Student Self-Monitoring and Self-Evaluation on Their
Social and Academic Behaviors

Susan M. Young
The University of Tennessee at Chattanooga

Abstract

Classroom management has been a concern of educators for years. Research studies have provided teachers with numerous strategies to improve the learning environment in their classrooms. Two examples of these strategies are self-monitoring and self-evaluations. However, the studies have focused on specific participants in small numbers, rather than a large number of heterogeneous students. The purpose of this study is to determine the effects of self-monitoring and self-evaluation on the social and academic behaviors of students' and on the overall classroom behavior.

Introduction

Classroom management has been the topic of countless books and journal articles. Numerous approaches to classroom management have been presented over the years, but none have been identified as the "cure-all" approach. Teachers must consider the various approaches to classroom management and choose a style or combination of styles that offers them the best means of providing an effective learning environment. One such approach is the installation of student monitoring, not only by the teacher, but also by the students. Student involvement and compliance with rules and procedures can be monitored successfully if the expectations have been communicated to the students. Participants in student self-monitoring and self-evaluation have been numerous and diverse. However, most of the studies focus on a small number of specific types of individuals. Very few researchers have studied whole classroom monitoring and evaluation. This study examines the relationship between students' awareness of their behaviors through self-monitoring and self-evaluation and an increase in positive behaviors in the classroom.

Review of the Literature

Educational research is often not utilized as the resource that it could or should be to educators. According to Mitchem and Young (2001, Literature Review, para. 1) Lamke made the following comment to illustrate the relative importance of educational research:

If the research in the previous three years in medicine, agriculture, physics, and chemistry were to be wiped out, our life would be changed materially, but if the same research in the area of teacher personnel in the same three years were to vanish, educators and education would continue much as usual. Educational research procedures must be practical and student-friendly presenting no risk to students. One area in which a substantial gap exists between the "state of the art and the state of practice" (Mitchem & Young, 2001, Literature Review, para. 1) is classroom management, especially disruptive behavior.

Self-monitoring has been established as a highly successful intervention technique that increases academic achievement, on-task behavior, and test performance. Student self-monitoring can also be used to target specific behaviors (Jacobson, 1998). Typically, self-monitoring changes the targeted behavior in a positive direction (Akande, 1997). Self monitoring also provides students with the power to actively participate in their learning and an internal locus of control. Students begin to accept responsibility for their behavior, successes, and failures (Hengstler, 2001).

Self-regulation processes, including student self-monitoring and self evaluation techniques have been researched in numerous settings with a wide variety of participants. For example, Vanleuvan and Wang (1997) analyzed first- and second-grade students self-monitoring practices by observing verbalizations. Akande (1997) explored the validity of research that

indicates tutors perform better when they utilize self-monitoring techniques and reinforcement behaviors.

Additional self-monitoring research involves students with disabilities. Wehmeyer, Agran, and Hughes (2000) emphasized the importance of self determination for students with disabilities. Unfortunately, many of the disabled youth are not in programs that facilitate self-monitoring strategies. A national survey of secondary-level educators shows that a majority believes that self-determination, including self-monitoring, is important to the success of students with various types and degrees of disabilities. However, 33% of the teachers responded that their students are not involved in their educational planning (Wehmeyer, Agran, & Hughes, 2000). According to Zimmerman (as cited in Hengstler, 2001), self-monitoring provides adolescents with an opportunity to enhance their learning, "metacognitively, motivationally, and behaviorally" (Hengslter, 2001). The effects of self-monitoring on students with learning disabilities and ADD/ADHD (Shimakuburo, Prater, Jenkins, & Edelen-Smith, 1999) and the effects of self-monitoring on adolescents (Korb, 1998) have been studied as well. Even teachers have been studied to determine the effects of their own self-monitoring skills on student achievement (Allinder, Bolling, Oats, & Gagnon, 2000). Mitchem and Young (2001) assess the validity of the research currently available on self-management, which involves self-monitoring, self-evaluation, and positive reinforcement. These researchers agree that a successful program provides students with the opportunity to accept responsibility for their own social behavior and academic performance.

Even though the research on self-management strategies is bountiful and has been collected from a variety of settings and participants, very few researchers have focused on an entire, heterogeneous group of students. All children must learn to be responsible for their

actions and behavior, successes and failures, academically and socially. Using strategies that encourage such behaviors could promote inclusion and improve the behavior of all students in the class. The purpose of this study is to examine the effects of self-management on four groups of students in an eighth-grade physical science class. The hypothesis is that self-monitoring and self-evaluation of behavior can improve students' academic and social skills and encourage them to accept responsibility for their behavior and actions.

Method

Setting

The study was conducted at a Tennessee public middle school in Hamilton County. The school is a zoned magnet school funded by the federal Magnet Schools Assistance Program. The student population consists of students zoned for the school and those selected based on a federally sanctioned lottery. Over 50% of the student population is black and approximately 37% are white. The remaining students are Asian, Hispanic, and Indian. The focus of the school is math, science, and technology.

Instruments

Students received four forms to complete for this study. The first completed was the Student Self-Evaluation Rubric (Teach-nology, Feb. 6, 2002). The second was the Self-Monitoring Checklist, a deviation of the first rubric, the third was the Self-Monitoring Checklist for One Behavior, and the fourth was the Self-Evaluation Rubric for a second time.

Time Schedule

The study covered a period of 3, five-day weeks. Self-evaluation occurred on the first day, self-monitoring of several behaviors during the next nine, and self-monitoring of one behavior during the next four. On the 15th day, a final self-evaluation was given.

Costs

The costs involved in this study are minimal. The primary cost is the paper used to make copies of handouts so that each student receives one of each.

Participants

The four physical science classes consisted of 20, 23, 22, and 24 students. Of 89 students, only 5 had been identified through testing as having learning disabilities. These disabilities included poor reading skills, attention deficit with hyperactivity, and poor gross and fine motor skills. Three of the students were identified as gifted. The classes consisted of 45 males and 44 females. The breakdown of each group according to sex and race/ethnicity is shown in Table 1.

Table 1 Breakdown of the Number of Males and Females of Each Race, the Number of All Males, the Number of All Females, and the Total Male and Female Participants in the Study

Race/Ethnicity	Black	White	Indian	Asian	Total
Male	21	22	2	0	45
Female	24	16	1	3	44
Total	45	38	3	3	89

Procedure

Data collection spanned a period of 3 consecutive weeks. Students were introduced to the project on day 1 of the first week. Students were told the purpose of the study, which included raising the level of awareness of their behaviors and how this awareness can allow them to take control of their own learning experiences. Over the course of 3 weeks, three handouts (Figures 1 [not included], 2, and 3) were given to the students. They received the Self-Evaluation Rubric (Teach-nology) on the first day of the first week. Students evaluated each of 10 behaviors prior to any self-monitoring strategies. The purpose was to compare their individual assessments with

the teacher's assessments of the students' behavior to determine the level of agreement between the teacher and students.

Students received a self-monitoring behavior rubric on the second day. They were instructed to place a check for each occurrence of each behavior on the handout. They were told to do this each day and on Friday, total the checks for each behavior. The monitoring occurred only during the physical science class. This part of the procedure occurred during a nine-day period.

Students received a self-monitoring rubric the third week. During this week they monitored a single behavior. The behavior was one that the teacher and student agreed was one that could be improved significantly. At the end of the third week, students received the self-evaluation rubric to complete. The results of the final and initial self-evaluations were compared for improvement in behavior for each student and to determine the level of agreement with the teacher's assessment.

To initiate a positive attitude from the students, they were told that rewards would be given during the project. Students who improved behaviors during the project would receive rewards such as snacks and/or free computer time. At the end of the study, the group with the most improved behaviors would be have two class periods with a movie and popcorn.

<div align="center">Results</div>

Immediately following the introduction of project to the students, their remarks, questions, and facial expressions were noted. Examples of questions and remarks are as follows:

14 Do we have to do this?

15 Do we get a grade for this?

16 This is stupid!

17 This is so ridiculous!

18 This is a waste of time.

Approximately 65% of the students responded negatively to the project. However, interest

increased as the project progressed.

Self-Evaluation Rubric

        The results of the comparisons of the teacher's evaluations and the students' self-

evaluations show that white students evaluated themselves more positively than did the black

students. Furthermore, the white students' evaluations were more frequently higher than the

teacher's evaluations. Black students' evaluations were most often similar to the teacher's

evaluations or, in some cases, were lower. Results are presented in Table 2 and Table 3.

Table 2 Number and Percentages of Males with Inflated Evaluations

		Males			
Race/Ethnicity	Black	White	Indian	Asian	Total
Frequency	4	10	1	0	15
% of all males	8.9	22.2	2.2	0	33.5
% of each race	19	45.5	50	0	

Table 3 Numbers and Percentages of Females with Inflated Evaluations

		Females			
Race/Ethnicity	Black	White	Indian	Asian	Total
Frequency	7	8	1	1	17
% of all females	15.9	18.2	2.3	2.3	38.7
% of each race	29	50	100	33.3	

        The results for Indian and Asian students are not acceptable due to the small sample size

of each. The data tables show that the incidence of "inflated" evaluations were significantly

higher for white males and females. When based on the total number of males, the percentage of

white males that rated themselves more positively was over 2.5 times higher than the percentage

of black males. Within each race, the percentage of white males that inflated their evaluations was more than twice the number of black males doing so. The same trend is true of white females. Overall, approximately 32% of all students rated themselves more positively than the teacher. All students received feedback with the intent of promoting more honest evaluations.

Self-Monitoring

The honesty level appeared to improve with the end of the first 4 days of self-monitoring. Only 26% of the students checked behavior skills more often than observed by the teacher. All students received feedback on their self-monitoring results. The teacher held individual conferences with each student of the 26% to provide an opportunity for their input into the behavior study and how they could best improve their behavior.

During the first week, approximately 5% of the students improved at least two of the behaviors listed. The second week, 8% of the students showed improved behavior skills in at least two of the behaviors listed. Approximately 3% improved at least three of the skills.

Self-Monitoring of One Behavior

The data show that 83% of the students' ratings were in agreement with the teacher's ratings. The remaining 17% rated the frequency of their behaviors only slightly higher than that observed by the teacher. This was an improvement over both the self-evaluations and first week of self-monitoring results.

Final Self-Evaluation

The purpose of the comparison of the initial and final evaluations was to determine the overall improvement of all behaviors for each student. In addition, the agreement between each student's evaluation and the teacher's evaluation was noted. Compared with the 32% of students

who initially rated their behavior more positively than the teacher, only 19% rated their behaviors more positively on the final evaluation.

Discussion

The study shows that the majority of students will rate their behaviors honestly, especially after feedback from the teacher regarding the comparison of the student's evaluation with that of the teacher. As time progressed, fewer students rated their behaviors more positively or as occurring more frequently than did the teacher. The teacher's evaluations and monitoring are crucial to success of the project and to the validity of the data.

The results of the study are presented as percentages rather than a complete statistical analysis due to the lack of time and proper software. Furthermore, the study covered only a 15-day period. However, the results do lend support to the hypothesis that self-monitoring and self-evaluation of behavior can improve students' academic and social skills and encourage them to accept responsibility for their behavior and actions.

An extension of this project for the future could supply more detailed results. The study could cover the entire school year rather than 3 weeks. Furthermore, more emphasis should be placed upon a few, critical, targeted behaviors. Finally, a detailed statistical analysis could provide more conclusive results. Theoretically, given enough time, 100% of the students in the study will change their behaviors in a positive manner.

References

Akande, A. (1997). The role of reinforcement in self-monitoring. *Education, 118*, 275-281.

Allinder, R. M., Bolling, R. M., Oats, R. G., & Gagnon, W. A. (2000). Effects of teacher self-monitoring on implementation of curriculum-based measurement and mathematics computations of students with disabilities. *Remedial and Special Education, 21*(2). Retrieved February 6, 2002 from http://www1.lib.utc.edu:2054/itw/infomark/203/243/23735507w2/purl=rc1_EAIM_0_A64693231&dyn=7!xrn_2_0_A64693231?sw_aep=tel_a_utc

Hengstler, J. E. W. (2001). Key factors in adolescent distributed learning. *Academic Exchange Quarterly, 5*(2), 43-50.

Jacobson, R. (1998). Teachers improving learning using metacognition with self-monitoring learning strategies. *Education, 118,* 579-591.

Kolb, J. A. (1998). The relationship between self-monitoring and leadership in students. *The Journal of Business Communication, 35*(2), 264 282.

Mitchem, K. J., & Young, K. R. (2001). Adapting self-management programs for classwide use. *Remedial and Special Education, 22*(2). Retrieved February 6, 2002 from http://www1.lib.utc.edu:2054/itw/infomark/203/243/23735507w2/purl=rc1_EAIM_0_A73860420&dyn=11!xrn_3_0_A73860420?sw_aep=tel_a_utc

Shimakuburo, S. M., Prater, M. A., Jenkins, A., & Edelen-Smith, P. (1999). The effects of self-monitoring of academic performance on students with learning disabilities and ADD/ADHD. *Education & Treatment of Children, 22.* Retrieved February 6, 2002 from http://www1.lib.utc.edu:2054/itw/infomark/203/243/23735507w2/purl=rc1_EAIM_0_A79855742&dyn=9!xrn_3_0_A79855742?sw_aep=tel_a_utc

Vanleuvan, P. & Wang, M. C. (1997). An analysis of students' self monitoring in first- and second-grade classrooms. *The Journal of Educational Research, 90,*132-151.

Wehmeyer, M. L., Agran, M., & Hughes, C. (2000). A national survey of teachersÆ promotion of self-determination and student-directed learning. *Journal of Special Education, 34*, 58.

Intervention Packages for Academic Concerns. (n. d.). Retrieved February 8, 2002 from http://www.syracuseschools.net/SBIT/dirhtml/intfile/intpackg/pkgslfmn.htm

Teach-nology. (n. d.). *Rubric. rubrics, teacher rubric makers.* Retrieved February 4, 2002 from http://www.teach-nology.com/cgi bin/behavior.cgi

Self-Monitoring Behavior Rubric

Middle Academy

Eighth Grade Physical Science

Teacher:

Student Name _____Date_____

Directions
Be aware of the behavior skills below. For each day of the week, make as many checks as are appropriate for each behavior. Some require only one check per day, while others may have several checks. Total the number of checks for each behavior for the entire week.

Behavior Skill	Monday	Tuesday	Wednesday	Thursday	Friday	Weekly Total
Arrives to class on time						
Brings Necessary materials						
Completes homework						
Follows directions						
Listens to teacher/staff						
Accepts Responsibility for actions						
Demonstrates positive character						
Remains on task						

Figure 2. Self-monitoring behavior rubric.

*The weekly total indicates the number of checks for each behavior. These number will

correspond to the verbal scores of the Self-Evaluation Rubric: 0 = Never, 1 = Rarely, 2 = Most

of the Time, 4 = Always

Self-Monitoring Behavior Rubric
for One Behavior

Middle Academy

Eighth Grade Physical Science

Teacher:

Student Name _____Date_____

Directions
Choose the appropriate behavior skill as agreed upon with the teacher. For each day of the week, make as many checks as are appropriate for the selected behavior. At the end of the week, total the number of checks for that behavior.

Behavior Skill	Monday	Tuesday	Wednesday	Thursday	Friday	Weekly Total
Arrives to class on time						
Brings Necessary materials						
Completes homework						
Follows directions						
Listens to teacher/staff						
Accepts Responsibility for actions						
Demonstrates positive character						
Remains on task						

Figure 3. Self-monitoring behavior rubric for one behavior.
*The weekly total indicates the number of checks for each behavior. These number will

correspond to the verbal scores of the Self-Evaluation Rubric: 0 = Never, 1 = Rarely, 2 = Most

of the Time, 4 = Always