

Student Work

11-1-1999

Achievement in Multi-Grade Versus Single-Grade Elementary Classrooms

Rhonda J. McBride
University of Nebraska at Omaha

Follow this and additional works at: <https://digitalcommons.unomaha.edu/studentwork>
Please take our feedback survey at: https://unomaha.az1.qualtrics.com/jfe/form/SV_8cchtFmpDyGfBLE

Recommended Citation

McBride, Rhonda J., "Achievement in Multi-Grade Versus Single-Grade Elementary Classrooms" (1999).
Student Work. 2624.
<https://digitalcommons.unomaha.edu/studentwork/2624>

This Thesis is brought to you for free and open access by DigitalCommons@UNO. It has been accepted for inclusion in Student Work by an authorized administrator of DigitalCommons@UNO. For more information, please contact unodigitalcommons@unomaha.edu.

ACHIEVEMENT IN MULTI-GRADE VERSUS SINGLE-GRADE
ELEMENTARY CLASSROOMS

An Ed.S. Field Project

Presented to the

Department of Psychology

and the

Faculty of the Graduate College

University of Nebraska

In Partial Fulfillment

of the Requirements for the Degree

Education Specialist

University of Nebraska at Omaha

by

Rhonda J. McBride

November 1999

UMI Number: EP74168

All rights reserved

INFORMATION TO ALL USERS

The quality of this reproduction is dependent upon the quality of the copy submitted.

In the unlikely event that the author did not send a complete manuscript and there are missing pages, these will be noted. Also, if material had to be removed, a note will indicate the deletion.



UMI EP74168

Published by ProQuest LLC (2015). Copyright in the Dissertation held by the Author.

Microform Edition © ProQuest LLC.

All rights reserved. This work is protected against unauthorized copying under Title 17, United States Code



ProQuest LLC.
789 East Eisenhower Parkway
P.O. Box 1346
Ann Arbor, MI 48106 - 1346

ED.S. FIELD PROJECT ACCEPTANCE

Acceptance for the faculty of the Graduate College,
University of Nebraska, in partial fulfillment of the
requirements for the degree Education Specialist,
University of Nebraska at Omaha

Committee

Robert Henry Woody Psychology
Name Department/School

C. Raymond Milliner Psychology
Name Department/School

Stuckis SPED
Name Department/School

Robert Henry Woody
Chairperson

November 30, 1999
Date

Abstract

This study investigated differences in achievement of students in multi-grade classrooms vs. those in single-grade classrooms. The participants were 254 3rd through 6th graders. Reading, language, math, spelling, social studies, and science scores from the Comprehensive Test of Basic Skills were used to compare the achievement of students in multi-grade classrooms with their same-grade peers in single-grade classrooms. Third grade students in multi-grade classrooms were found to have significantly higher achievement scores than third grade students in single-grade classrooms. No significant differences in achievement were found between single-grade and multi-grade students in fourth, fifth, or sixth grade. These results may be explained by the possibility that third graders in multi-grade classrooms assimilate information presented to fourth graders. Students in multi-grade classrooms may also have an advantage due to more individualized instruction.

Acknowledgements

I would like to thank Dr. Robert Woody, the chairman of my Ed.S. project committee and academic advisor, for his patience, support, and guidance with this research project. Another committee member, Dr. Ray Millimet, was extremely beneficial in helping me understand and analyze the data. Dr. John Hill, the third committee member, was also helpful by providing prompt feedback and suggestions. All three of the committee members were always available to answer questions and provide resources, and their assistance is truly appreciated. I would also like to thank Dr. Lisa Kelly-Vance for her time and assistance during the early stages of this project.

There are three people who were involved in the data analysis to whom I am very grateful. Jonathan Chow spent numerous hours completing the initial analyses. Michael Hepperlen later assisted me by doing some additional analyses. I could not have completed this project without their help. I would also like to thank Dr. Wayne Harrison, the professor who helped arrange for the aforementioned gentlemen to assist me. Thank you to everyone who had a part in the completion of this project.

Table of Contents

Introduction	1
Background	2
Multi-Grade Classrooms	2
Rationale for using multi-grade classrooms	2
Achievement in multi-grade classrooms	3
Purpose of the Research	12
Method	13
Participants	13
Design	13
Measures	13
Procedure	14
Results	16
Discussion	17
References	23
Tables and Figures	
Table 1	26
Figure Caption	27
Figure 1	28

Achievement in Multi-Grade versus Single-Grade

Elementary Classrooms

Chapter 1

A multi-grade classroom is a type of classroom organization in which two or more age levels are grouped together and students retain specific grade assignments. In small, rural schools, multi-grade classrooms are used extensively as a method of combining students into larger groups for more cost-efficient instruction.

Many arguments have been made favoring multi-grade classrooms. Way (1979) argued that remaining in one classroom for two to three years can provide students with a sense of security. Also, younger children have an easier time developing socialization skills by joining an established group of children. When they become the older children in the classroom, they then have the opportunity to provide leadership to the younger children and assist them in learning new skills. In addition to the social benefits, multi-grade grouping can provide more opportunities for individualized learning (Way, 1979). It also encourages teachers to use a more individualized approach to teaching. Another advantage to multi-grade classrooms is that teachers seem to be in a better position to evaluate the cognitive progress of each student when the students spend more than one year in the classroom (Milburn, 1981). Teachers have also found that younger students in the multi-age classrooms often learn materials being taught the older children without formal instruction (Yerry, 1964).

Critics of multi-grade classrooms claim that no support has been provided to the claim of increased social and personal adjustment in multi-grade classrooms (Brown & Martin, 1989). Brown and Martin (1989) contend that parents and teachers often don't approve of multi-grade classrooms, and that there is no evidence of higher achievement in these classrooms.

Little research has been done to determine the effects of multi-grade grouping on student achievement. The purpose of this study is to determine what effects, if any, multi-grade grouping has on academic achievement.

Background

One hundred years ago, multi-grade classrooms were commonplace, especially in rural areas. In fact, in 1918, there were 196,037 one-room schools, representing 70.8% of all public schools in the United States (Miller, 1990). At that time, economics and student enrollment made it necessary for one teacher to teach all the students in a community. By 1980, less than 1,000 of these one-room schools remained.

In the early 1800's, the graded structure of elementary schools was developed. Single-grade classrooms, in which only one grade level was assigned to a classroom, became more prevalent. This was done chiefly because of the assumption that it would enhance learning and make teaching easier. Other elements influencing this change were the establishment of teacher training schools, the popularity of the monitorial system, the influence of German education, the call for state-supported education, and the appearance of graded texts (Rule, 1983).

Soon after the graded structure was established, critics began to attack its rigidity and lack of individualization. Since that time, various grouping and grading plans have been developed to improve instruction and meet the individual needs of the students (Ansah, 1989; Rule, 1983).

Multi-Grade Classrooms

Rationale for using multi-grade classrooms.

Multi-grade instruction became popular during the latter half of this century. During the 1960s and 1970s, open education and individualized instruction became influential curriculum and instructional models and were often implemented in multi-grade

classrooms (Miller, 1990). Today, there are two primary reasons for using multi-grade classrooms (Cobham, 1992). First, many schools, especially in rural areas, use multi-grade classrooms due to economic necessity. It is necessary to reduce costs and equalize teacher workloads. Other schools choose to use multi-grade classrooms for philosophical reasons. One reason for choosing multi-grade organization is flexibility of scheduling which can accommodate the individual needs of the students. It also results in the students becoming more resourceful and independent.

Achievement in multi-grade classrooms.

There have been very few research studies done comparing the achievement of students in multi-grade and single-grade classrooms. The research that does exist typically uses group achievement scores for comparison. By and large, most of the studies have found no significant difference between the achievement of the students in multi-grade vs. single-grade classrooms.

An overview of quantitative research was conducted by Miller (1990). He reviewed thirteen studies comparing academic performance in multi-grade and single-grade elementary classrooms. The studies Miller reviewed consisted of different sample sizes and included various grade levels. Both urban and rural schools were included. Various academic subjects were used in the studies reviewed, however, reading, math, and language were used most frequently. Different methods of measuring achievement were utilized, although most used group achievement tests. Of the thirteen studies included in the review, eight produced results which indicated no difference in achievement. Two of the studies showed a trend favoring multi-grade classrooms, but the results were not significant. The other three studies had some statistically significant results favoring multi-grade classrooms, but the results were mixed, meaning that only one or two analyses from each of these studies produced significant results. Miller concluded that student

achievement is neither better nor worse in multi-grade classrooms than in single-grade classrooms. Some of the research indicates that there may be significant differences in achievement depending on subject and grade level, however, not enough studies exist to make generalizations regarding which subjects or grade levels are positively impacted by multi-grade instruction.

A study conducted by Brown and Martin (1989) compared both group achievement data and final report card grades of 418 elementary school students in single- and multi-grade classrooms in New Brunswick, Canada. The participants were in grades one through five. Scores from all the subject areas were averaged, so specific reading and math achievement differences were not available. The researchers matched each student in the multi-grade classrooms with an age-mate from the single-grade classrooms for comparison purposes. No significant difference in academic performance was found through either the group achievement comparisons or through the grade point comparisons. However, Brown and Martin concluded that they did find differences, which were not statistically significant, in individual achievement between the students in the multi-grade classrooms and their single-grade matched counterparts. Only 20% of the comparisons favored single-grade classrooms, while 80% favored multi-grade classrooms.

A study by Douglas (as cited in ERIC Clearinghouse on Reading and Communication Skills, 1981) examined the effects of single-grade and multi-grade classroom groupings on reading achievement. His study included 402 students who had just completed the second grade. The second graders in the multi-grade classroom had been in a classroom with first graders. No significant difference was found between the achievement of students in the multi-grade classrooms and those in the single-grade classrooms. A small significant difference was found favoring multi-grade classrooms for older students within the grade.

Way (1979) also compared the achievement of elementary school children in single- and multi-grade classrooms. Her study included 366 children from four different elementary schools in a suburban school district. The multi-grade classrooms included the grade combinations of first and second; third and fourth; fourth and fifth; and third, fourth, and fifth. Achievement data were compared for students in grades two through five using the Comprehensive Tests of Basic Skills. Scores were acquired for reading, mathematics, language arts, and total study skills. No significant differences were found based on classroom type.

Purl and Curtis (1970) compared reading achievement of 85 students using the Stanford Achievement Test. They studied second and third graders in single-grade classrooms and in K-3 and 1-3 multi-grade classrooms in Riverside, California. No significant difference in scores was found for second or third graders when comparing the students in the single-grade classrooms to those in the multi-grade classrooms. However, some problems exist with this study. First, the sample was small, and the sample from the single-grade classrooms is almost twice as large as that from the multi-grade classrooms. A second limitation of the study is that children in the school district were not randomly assigned to multi-grade classrooms. Their placements were determined solely by parental interest. The final problem with the study is that only the children in upper level grades in the multi-grade classrooms were used in the analysis. No data is available comparing the achievement of the lower level students.

Milburn (1981) also compared the achievement of children in single-grade classrooms with those in multi-grade classrooms. He studied about 700 students from two suburban schools in British Columbia over a five year period. Milburn used the Gates-MacGinitie Reading Test and the mathematical computation portion of the California Achievement Test to compare the reading and mathematics achievement of first through

sixth graders in the two schools. The multi-grade classrooms each contained three grade levels. He found no significant difference in the achievement of students in multi-grade vs. single-grade classrooms.

The lack of any significant differences in achievement scores for students in single-grade and multi-grade classrooms is not a new finding. In an older study, Dreier (1949) looked at student achievement in multi-grade and single-grade classrooms in rural Minnesota. His sample included over 1,500 sixth graders. The students included in the sample came from schools with various numbers of grades in each classroom. In fact, many of the children were in one-room schoolhouses. The students were given the Stanford Achievement Test Intermediate Partial Battery to measure their skills in reading, language, arithmetic, and spelling. Dreier found no significant difference in achievement for any of the subject areas based on the grouping criteria.

Another older research study had similar results. A study by Adams (1953) included 300 students in the Pasadena City Schools. It compared the achievement of fifth-grade students in combination classrooms with those in regular, single-grade classrooms. The combination classes consisted of fourth and fifth graders, so the participants in the study were all in the upper-grade level within the classroom. Reading, arithmetic, and language skills were compared using the Progressive Achievement Test. The achievement scores of the two groups were almost identical in each subject area, leading to the conclusion that children are not held back in their achievement due to being grouped with children at a lower grade level.

When significant differences are found between the achievement of students in single- and multi-grade classrooms, results tend to be mixed. Rule (1983) compared reading and mathematics achievement data of 3,360 elementary school students in Mesa, Arizona. She used the California Achievement Test to assess achievement. Rule's

participants were in grades two through six. A different aspect of her study is that the children were placed in different classrooms based on reading achievement. Therefore, there were three types of classrooms: those for high-achieving students, those for average-to high-achieving students, and those for average-achieving students. Both single-grade and multi-grade classrooms were divided in such a manner.

Upon comparing the achievement of the students in these various classrooms, mixed results were acquired. Of the twelve analyses for reading achievement, only one had statistically significant results. These results favored multi-grade classrooms. Twelve analyses were also done for mathematics achievement, of which five were significant. Four of these favored single-grade classrooms, and only one favored multi-grade classrooms.

Yerry (1964) looked at several aspects of achievement within multi-grade classrooms. Her sample included approximately 500 students in grades one through six in an urban school district. The California Achievement Tests were used to measure skills in reading, arithmetic, English, and total achievement. These tests were given at the beginning and at the end of the school year. The differences between the pre- and post-tests were used as measurements of improvement in achievement. No significant differences were found when comparing the totals for the multi-grade and single-grade schools. There were some significant findings, however. First grade students in multi-age classrooms showed significantly higher achievement gains in arithmetic, language, and total achievement than those in single-grade classrooms. Achievement gains were also significantly higher for fifth graders in multi-grade classrooms.

A study by Schrankler (1976) included over 1000 seven- through eleven-year olds in St. Paul, Minnesota. Three different types of groups were utilized. The first was called

Complete Multi-Age and included an even distribution of five- through twelve-year olds in each classroom. The classrooms for the second type of group were made up of students whose ages spanned two to three years. This was called the Restricted Multi-Age. The control group, called Unit Age, consisted of traditional self-contained graded classrooms. He administered the Metropolitan Achievement Tests to seven- and eight-year olds finding no significant differences in scores for any of the groups. He used the reading, arithmetic, and vocabulary sections of the Iowa Tests of Basic Skills to measure the academic achievement of the nine- through eleven-year olds. No differences were found except in arithmetic, where the Restricted Multi-Age group scored significantly higher at all three age levels.

Other studies finding significant differences between the achievement of students in multi-grade and single-grade classrooms include additional variables. For example, a study by Marcus (1971) compared the achievement of fifth grade students in a traditional graded classroom in Chattanooga, Tennessee, with that of students in the same classroom four years later after an experimental program was implemented. In addition to multi-grade grouping, the experimental classroom included a daily planning period for teachers, teaching teams, elimination of grade level expectations, individualized diagnosis and instruction for each student, large and small group instruction, independent study, and opportunities for student tutorials. Sixty children were included in the study, and the California Achievement Test was used to compare their achievement in reading vocabulary, reading comprehension, total reading, language, and spelling. Mean scores in each category improved after the experimental conditions were put in place. However, there are several limitations to this study. First, the sample was extremely small. A second limitation is that no statistical analyses were completed to determine if the differences in scores were significant. Finally, there is no way to determine which elements of the

experimental classroom resulted in the improved scores.

Another study using an experimental classroom was conducted by Fuller (1993). This study compared a traditional school with single-grade classrooms with a school using experimental classrooms in rural Ohio. The experimental classrooms used multi-age grouping, as well as cooperative learning structures, community groups, full inclusion of children with mild learning disabilities, integrated curricula with thematic units, individualized and whole-language based reading, and authentic assessment. 286 students in first through fourth grades were given the reading comprehension section of the Stanford Achievement Test in the fall and spring of the school year. Although no differences in achievement scores were found for the different classrooms in the fall, in the spring the overall scores of the students in the experimental classrooms were significantly higher than the overall scores of the students in the traditional classrooms. No information was provided comparing the various grade levels, and again it is impossible to pinpoint the factor responsible for the improved scores.

Vogel and Bowers (1972) also conducted a study comparing traditional classrooms with experimental classrooms. Their experimental classrooms had the following characteristics: multi-age grouping with a range of two to three years in each classroom, no grade labels, independent student progress rates, no grade failures or retentions, flexible grouping techniques, and flexibility in the instructional program. The participants were 473 elementary school children in Evanston, Illinois. Vogel and Bowers used the Stanford Achievement Test to compare the overall achievement of the students. The traditional schools had significantly higher overall achievement scores than the experimental group. Again, no data was available comparing the scores by grade level, and there are too many variables to determine what impact multi-age grouping had on the results. Vogel and Bower's results did provide some useful information. They found that the younger

students in the experimental classrooms had the highest achievement scores and the older students had the lowest scores. However, it was not revealed whether these results were statistically significant.

Very few studies comparing the achievement of students in single- and multi-grade classrooms have looked at the impact that the grade level of the students may have. Although most of the studies indicate little significant difference between the achievement of students in single- and multi-grade classrooms, there may be significant differences depending on whether the students are in the upper or lower grade of a multi-grade classroom.

In her study, Rule (1983) compared reading and mathematics achievement of students in the lower grade of a multi-grade classroom to that of students in the upper grade of a multi-grade classroom. For example, fourth graders in a third/fourth grade classroom were compared to fourth graders in a fourth/fifth grade classroom. In reading, no significant differences were found, but in mathematics, a significant difference was noted for average-achieving fifth graders. The results indicated that the average fifth-grade students in a fifth/sixth multi-grade class scored significantly higher than the average fifth-grade students in a fourth/fifth multi-grade class. In fact, the lower level was favored (although not significantly) in all of the comparisons of mathematics achievement.

The results Rule (1983) acquired when comparing lower and upper level students must be interpreted with caution due to some flaws in her study. First, although she compared upper level students with lower level students within multi-grade classrooms, she did not include single-grade students in the analyses. Therefore, she excluded some valuable data. A second problem is with small sample sizes. Rule was unable to complete some of her comparisons because there was not enough data to analyze. The comparisons she did make include sample sizes ranging from 5 to 40. Further research is needed since

no meaningful conclusions can be drawn from her results.

Yerry (1964) also compared the achievement of students based on grade level within the multi-grade groups, and her design is much better than Rule's (1983). She compared upper-level students with lower-level students in combination classrooms, as well as comparing both groups to single-grade classroom students. Yerry's results showed that third graders in second/third grade classrooms showed higher gains in reading, arithmetic, and total achievement than third graders in single-grade classrooms. Second graders in second/third grade classrooms had higher gains in language than those in single-grade classrooms. However, second graders in first/second grade classrooms had significantly higher gains for all four achievement measures than those in the second/third grade classrooms. The inconsistent results of this study warrant further research regarding differences in achievement based upon grade level within the multi-grade classroom.

The study by Milburn (1981) also compared upper and lower level students in multi-grade classrooms with those in single-grade classrooms. He found that, in all cases, the lower level multi-age classroom students scored higher on the reading and mathematics achievement tests than did their same-age counterparts in the single-grade classrooms. No differences were found between the achievement of students in the upper level of the multi-grade classrooms and their same-age peers in single-grade classrooms. A limitation of the study is that no information was provided to indicate if the differences in scores were statistically significant.

It should be noted that many of the studies reviewed tend to address experimental or selected grouping situations for students in urban areas. Most of the research has been conducted in schools with relatively large student populations (thereby allowing a variety of grouping options). Grouping of students in small, rural schools has, however, been largely overlooked.

Purpose of the Research

This study examines student achievement in rural schools in which multi-grade grouping is often an economic necessity. The purpose of the study is to ascertain whether the diversity within multi-grade classrooms has a significant impact on student achievement compared to more homogeneous, single-grade classrooms. The research on multi-age grouping seems to support the notion that there should be no negative effects on the achievement of the students who are placed in multi-age classrooms compared to students in single-grade classrooms. However, very little research has been done comparing the achievement of students based on their level within the multi-grade classroom. The little research that exists indicates that the lower-level students within multi-grade classrooms sometimes perform better than upper-level students within multi-grade classrooms and students in single grade classrooms. Yet, the findings are not consistent nor conclusive. This study seeks to discover whether level within multi-grade classrooms has an impact on achievement, and if so, in which subject areas. It is hypothesized that lower level students in multi-grade classrooms will generally have higher achievement scores than their single-grade counterparts. It is further hypothesized that no significant difference exists between the achievement scores of upper level students in multi-grade classrooms and their same-grade peers in single-grade classrooms.

Chapter 2

Method

Participants

The participants in this study consisted of 254 students attending three rural schools in East-Central Nebraska. The participants from multi-grade classrooms were from two schools and included 19 third graders, 25 fourth graders, 26 fifth graders, and 35 sixth graders. Single-grade classrooms were represented by 35 third graders, 39 fourth graders, 41 fifth graders, and 34 sixth graders, all from one school. Special education students were excluded from the study.

Design

The dependent variable of the experiment was academic achievement. The independent variable was grade level (third, fourth, fifth, and sixth). In the multi-grade classrooms, third and fourth graders shared one classroom, and fifth and sixth graders shared another. Based on this grouping within multi-grade classrooms, third and fifth graders were considered lower level students, while fourth and sixth graders were labeled as upper level students. The schools using single-grade grouping had a separate classroom for each grade level.

Cognitive ability scores were intended to be a second independent variable, however they were not able to be used in the statistical analysis. Schools that administered the Comprehensive Test of Basic Skills (CTBS) to all of the grade levels included in the study were chosen for the experiment. Only schools that gave both the achievement and the cognitive portions of the test were included.

Measures

Schools using the CTBS were selected because the CTBS appears to be a valid group-administered achievement battery which can provide measures of both achievement

and cognitive skills. The Mental Measurements Yearbook (Kramer & Conoley, 1985) asserted that the CTBS was “one of the best developed standardized achievement test batteries available.” The CTBS was also described as having “many positive features,” and being “worthy of careful consideration by schools seeking a comprehensive test battery.” The Mental Measurements Yearbook (Kramer & Conoley, 1985) reported that the reliability data was adequate, and the national standardization and norming procedures were extensive. It also described the validity of the CTBS as comparable to that of similar batteries.

Each of the schools included in the study administered the CTBS to their students in the Spring of the year. The records of these achievement scores were used for statistical analysis. Data for multi-grade classrooms included CTBS scores from the 1995, 1996, 1997, and 1998 administrations of the test. The data for single-grade classrooms consisted of achievement scores from 1997 and 1998. The CTBS total reading, total language, total mathematics, spelling, science, and social studies achievement scores for each subject were utilized in the comparisons. The cognitive skills portion of the CTBS was intended to be used in the statistical analysis to provide an estimate of the intellectual ability of each of the participants.

Procedure

Initially, six components of the CTBS were subjected to multivariate analysis of covariance: (1) reading, (2) language, (3) mathematics, (4) spelling, (5) social studies, and (6) science. The cognitive ability component of the CTBS was used as a covariate in the analysis, however the assumption of homogeneity of hyperplanes of MANCOVA was violated. Therefore, MANCOVA was concluded to be an inappropriate analysis. The statistical analysis was therefore completed using multivariate analysis of variance.

The achievement of the participants was compared based on grade level. Third

grade students in multi-grade classrooms were compared to third grade students in single-grade classrooms. Fourth, fifth, and sixth grade students in multi-grade classrooms were also compared to their same-grade peers in single-grade classrooms. When a significant effect was found for a particular grade level, univariate analyses of variance were completed to determine which subject areas produced significant results.

Chapter 3

Results

The first hypothesis predicted that lower level students (third and fifth graders) in multi-grade classrooms would have higher achievement scores than lower level students in single-grade classrooms. The overall multivariate tests indicated that there was a significant difference between the mean of the third grade students in multi-grade classrooms and the mean of third grade students in single-grade classrooms, $F(6, 47) = 3.90, p < .003$, but there was no significant difference in the mean achievement scores of the two groups for fifth graders, $F(6, 60) = 1.54, ns$.

Having established an overall effect for third graders, a series of univariate ANOVAs was conducted to clarify which achievement measures contributed to the observed differences. Third grade participants in the multi-grade classroom scored significantly higher on the reading test than third grade participants in the single-grade classroom, $F(1, 52) = 6.97, p < .011$. Similar results were obtained for the language test, $F(1, 52) = 6.44, p < .014$. Non significant results were found for the math subtest, $F(1, 52) = 0.73, ns$, as well as for the spelling subtest, $F(1, 52) = 0.31, ns$, the social studies subtest, $F(1, 52) = 0.37, ns$, and the science subtest, $F(1, 52) = 0.45, ns$. These results are illustrated in Figure 1.

The second hypothesis predicted that there would be no difference on achievement measures between the upper level (fourth and sixth grade) participants from the multi-grade classroom and the upper grade participants from the single-grade classroom. As predicted, no significant differences on achievement measures were found between the upper level participants from the multi-grade classroom and those from the single-grade classroom for fourth grade students, $F(6, 56) = 1.68, ns$, nor sixth grade students, $F(6, 62) = 2.05, ns$. Condition means are presented in Table 1.

Chapter 4

Discussion

The first hypothesis stated that lower level students in multi-grade classrooms would generally have higher achievement scores than their single-grade counterparts. The data partially supported this hypothesis. Third grade students in multi-grade classrooms had significantly higher scores than their third grade peers in single-grade classrooms. Further analysis revealed that the subject areas in which significant differences in scores occurred were reading and language. There was no significant difference between the achievement of fifth grade students in multi-grade classrooms and fifth grade students in single-grade classrooms.

The second hypothesis predicted that no significant differences would be found between the achievement scores of upper level students based on classroom grouping. This hypothesis was supported by the data. No significant differences in achievement scores were found between the fourth and sixth grade participants from the multi-grade classrooms and their fourth and sixth grade counterparts from the single-grade classrooms.

One possible explanation for these findings is that lower level students in multi-grade classrooms are exposed to more advanced materials while those in single grade classrooms are not. Likewise, upper level students in multi-grade classrooms and their same-grade peers in single-grade classrooms are generally not exposed to more advanced curriculum. In the multi-grade classrooms, the third graders are typically present when the fourth graders are given instruction. Therefore, these lower level students are indirectly learning what is being taught to the upper level students. Children in single-grade classrooms do not have the opportunity for such second hand learning, nor do upper level students in multi-grade classrooms. Of course, this conclusion does not explain why the fifth grade students in multi-grade classrooms did not have significantly higher scores than

fifth graders in single-grade classrooms. This phenomenon may be due to the difference in the level of difficulty of the curriculum between the various grade levels. Perhaps the information presented to the fourth graders is easily assimilated by the third graders while the sixth grade level information is difficult for the fifth graders to integrate into their knowledge bases.

Milburn (1981) speculated that lower level students may try to emulate upper level students by attempting to attain the level of academic achievement they observe in the older children. Role modeling was also proposed by Beckerman and Good (1981) to explain how classrooms containing students of varying academic levels influence achievement. They theorized that the minority group models the behaviors of the majority, thereby absorbing characteristics such as motivation and attitude, which may influence achievement. It is possible that the influence and effects of role modeling may impact younger students more than older students, thereby explaining why a significant effect was found for third graders, but not for fifth graders.

Beckerman and Good (1981) also contributed a viable hypothesis. They stated that teachers may set the pace of their classes based on the ability of the majority of the students in their classes. In other words, they teach to a relative norm, so the pace may be faster if the class contains a large amount of high-aptitude students, or the pace could be slower if there is a disproportionate number of low achieving students. Based on this theory, it is possible that multi-grade teachers unknowingly set the pace of their teaching based on the ability levels of the upper level students, hence they are teaching lower level students at a faster pace than are the teachers of their single-grade counterparts. Again, this type of effect could have a more of an influence on younger students than older students.

Although a significant difference favoring multi-grade students was found only for third graders, it should be acknowledged that most of the achievement scores were higher

for multi-grade students. Table 1 shows the means for all of the single- and multi-grade students at each grade level and in each academic area. When the mean scores of the multi-grade students are compared to those of the single grade students at each grade level and for each academic area, 22 of the 24 comparisons favor students in multi-grade classrooms. Therefore, it seems important to consider the role that classroom grouping may have on achievement. If students in multi-grade classrooms perform better than their peers in single-grade classrooms, it may be due to more individualized instruction. Teachers in multi-grade classrooms are accustomed to teaching to students at various skill levels, and the number of students at each grade level is typically smaller than the number of students in single-grade classrooms. Therefore, students in multi-grade classrooms most likely benefit from more individualized instruction than those in single-grade classrooms.

One of the most important implications of this study is that the evidence suggests that many students may not be meeting their potential. This study has demonstrated that, among third graders, a significant number of the lower level multi-grade students are assimilating information being presented to the upper level students. It has also provided evidence of a trend favoring students in multi-grade classrooms at all grade levels when their achievement is compared to students in single-grade classrooms. These facts suggest that many students in single-grade classrooms may be capable of learning more than they are being taught, but they are not given the opportunity. Schools have a long tradition of educating students based on the abilities of the majority of the students at a particular grade level. The individual skills and abilities of the students are seldom acknowledged or addressed. Ansah (1989) points out that educators often prefer traditional graded classrooms because the groups are more homogeneous. She stated:

Any grouping which encourages a teacher to teach children as though they were alike can defeat attempts to practice those most

important principals of learning. Some school systems avoid this type of grouping patterns by organizing multiage classes where teachers allow students to do independent research on topics which interest them. In this type of setting, teachers are able to work with smaller groups for more individualized instruction (Ansah, 1989, p. 3).

Miller (1991) supported the notion that individual abilities should be addressed by the school. He asserted, "Clearly if a teacher in either sort of classroom (single-grade or multi-grade) fails to address differences among students, the effectiveness of instruction suffers" (p. 3).

It would appear that the best way to improve the achievement of children is to address their individual differences. It seems that allowing children to learn at their own pace would be one of the best methods of maximizing the potential of each student. Perhaps students could use self-paced curriculum in the subject areas in which achievement gains were proven in multi-grade classrooms: reading and language. Other subjects, such as science and social studies could be taught in traditional group settings to encourage interaction. In any case, educators need to search for methods to address the individual abilities of their students.

It is important that school psychologists make administrators and educators aware of the evidence suggesting that many students are capable of learning more than they are presently being taught. School psychologists can provide suggestions for practical changes which could be implemented to promote the individualized education of students and ways in which the school psychologist can assist with this process. School psychologists could be extremely beneficial in assessing individual student skills and providing suggestions for maximizing student potential through changes in curriculum and instructional methods.

This study helps clarify contradictions in prior research and provide a new direction for future research. Much of the prior research on multi-age grouping went only so far as to support the notion that there should be no negative effects on the achievement of the students who are placed in multi-age classrooms compared to students in single-grade classrooms. Most of these studies did not address the possibility that there may be positive effects correlated with multi-grade grouping. Very few past studies have identified level within multi-grade classrooms as a variable, yet it is clearly associated with significant differences in achievement scores. This variable very likely contributed to the confounding results of a number of these prior studies. The little research that has included level within multi-grade classrooms as a variable has produced findings that are not consistent nor conclusive, most likely due to limitations of the research designs and analyses.

This study provides evidence that not only are there no detrimental effects on student achievement arising from multi-grade grouping, but there may be positive effects. This should be encouraging to teachers and administrators of rural schools who find it necessary to use multi-grade classrooms. It could also be useful to larger schools wishing to maximize the potential of their students. It may be beneficial to look at the possibility of multi-grade grouping as a method of improving achievement.

There are some limitations to the present study which should be addressed in the future. It would have been better to be able to use cognitive scores of the participants as covariates in the statistical analyses to deal with the possibility that individual differences in intellectual ability may have an influence on the results. However, the cognitive scores were not able to be used as covariates because an assumption of MANCOVA was violated. Instead MANOVA was used to analyze the data. The results of the analyses appear to be valid after this adjustment was made.

Further research is needed to determine if the results of the present study can be

duplicated. Future studies examining differences in achievement of students in multi-grade and single-grade classrooms should include the variable of grade level within multi-grade classrooms, because it appears to be correlated with differences in achievement scores. It may be beneficial to examine whether or not similar results can be obtained when the multi-grade classrooms contain three or more grade levels. It may also be useful to duplicate this research in other rural regions and in urban areas, as well. A final suggestion is that future studies in this area attempt to deal with the problems with data analysis and include cognitive scores as covariates.

In conclusion, this study has taken steps toward determining what kinds of effects multi-grade grouping has on academic achievement. The study has pinpointed level within multi-grade classrooms as an important variable. Third grade students in multi-grade classrooms were found to have significantly higher achievement scores than their single-grade counterparts, while the achievement scores of the fourth, fifth, and sixth grade multi-grade students did not differ significantly from those of their single-grade peers. It is possible that the third grade students in multi-grade classrooms were simply maximizing their potential for learning by assimilating the information being presented to the fourth grade students. The results of this study also reveal a trend favoring multi-grade students when their achievement scores are compared to those of single-grade students at each grade level and in each academic area. A possible explanation for this trend is that students in multi-grade classrooms tend to receive more individualized instruction. Therefore, it would appear that one of the most important conclusions that can be drawn from this study is that, in many cases, schools are not optimizing the potential of their students, nor are they addressing their individual needs. The learning of many students may be hindered by the fact that our society is unwilling to stray from traditional grouping and teaching methods. Perhaps it is time to explore and study some different ways of educating our youth.

References

Adams, J. J. (1953). Achievement and social adjustment of pupils in combination classes enrolling pupils of more than one grade level. Journal of Educational Research, 47, 151-155.

Ansah, V. (1989). Multi-grouping and academic achievement. (ERIC Document Reproduction Service No. ED 315 163).

Beckerman, T. M., & Good, T. L. (1981). The classroom ratio of high-and low-aptitude students and its effect on achievement. American Educational Research Journal, 18, 317-327.

Brown, K. G., & Martin, A. B. (1989). Student achievement in multigrade and single grade classes. Education Canada, 29, 10-13.

Cobham, C. A. (1992). Jackson county teachers and the combined classroom experience: A naturalistic inquiry of combination classroom teachers. (ERIC Document Reproduction Service No. ED 352 110).

Dreier, W. H. (1949). The differential achievement of rural graded and ungraded school pupils. Journal of Educational Research, 43, 175-186.

ERIC Clearinghouse on Reading and Communication Skills. (1981). Reading achievement: Characteristics associated with success and failure: Abstracts of doctoral dissertations published in "Dissertation Abstracts International," July through December 1981 (Vol. 42, Nos. 1 through 6). Urbana, IL: ERIC Clearinghouse on Reading and Communication Skills. (ERIC Document Reproduction Service No. ED 210 659).

Fuller, M. L. (1993, August). Restructuring for student success in a rural school: Preliminary analyses. Paper presented at the Annual Convention of the American Psychological Association, Toronto, Ontario, Canada.

Kramer, J., & Conoley, J. C. (1985). The Ninth Mental Measurement Yearbook.

(p 382-389). Lincoln, NE: Buros Institute of Mental Measurements of the University of Nebraska-Lincoln.

Marcus, M. (1971, February). The effects of nongrading team teaching and individualizing instruction on the achievement scores of disadvantaged children. Paper presented at the regional International Reading Association Conference, Atlanta, GA.

Milburn, D. (1981). A study of multi-age or family-grouped classrooms. Phi Delta Kappan, 62, 513-514.

Miller, B. A. (1990). A Review of the quantitative research on multigrade instruction. Research in Rural Education, 7, 1-8.

Miller, B. (1991). Teaching and learning in the multigrade classroom: Student performance and instructional routines (Report No. EDO-RC-91-6). Washington, DC: Office of Educational Research and Improvement. (ERIC Document Reproduction Service No. ED 335 178).

Purl, M. C., & Curtis, J. (1970). A look at combination class effects at Emerson Elementary School. Riverside, CA. Riverside Unified School District Department of Research and Evaluation. (ERIC Document Reproduction Service No. ED 042 863).

Rule, J. G. (1983). Effects of multigrade grouping on elementary student achievement in reading and mathematics. Mesa, AZ: Mesa Public Schools, Department of Research and Evaluation. (ERIC Document Reproduction Service No. ED 250 327).

Schrankler, W. J. (1976). Family groupings and the affective domain. Elementary School Journal, 76, 432-439.

Vogel, F. X., & Bowers, N. D. (1972). Pupil behavior in a multi-age nongraded school. Journal of Experimental Education, 41, 78-86.

Way, J. W. (1979). The effects of multiage grouping on achievement and self-concept. (ERIC Document Reproduction Service No. ED 174 593).

Yerry, M. J. (1964). Effects of interage grouping on achievement and behavior.
(ERIC Document Reproduction Service No. ED 037 802).

Table 1

Means of Achievement Measures as a Function of Classroom Grouping

Condition	Reading	Language	Math	Spelling	Soc. St.	Science
Multi-Grade						
<u>3rd</u> ^a	716.47	728.89	713.52	675.68	729.63	722.16
<u>4th</u> ^b	723.72	737.96	724.32	710.32	745.56	742.76
<u>5th</u> ^c	733.15	747.81	747.62	742.42	756.50	748.96
<u>6th</u> ^d	755.97	756.20	770.77	759.45	768.34	766.23
Single-Grade						
<u>3rd</u> ^e	690.51	702.37	703.83	666.63	723.40	728.63
<u>4th</u> ^f	711.61	714.63	714.92	682.18	711.18	728.08
<u>5th</u> ^g	715.46	733.37	731.07	724.27	745.20	728.68
<u>6th</u> ^h	744.71	747.26	756.94	749.65	769.15	760.53

Note. $a_n = 19$, $b_n = 25$, $c_n = 26$, $d_n = 35$, $e_n = 35$, $f_n = 38$, $g_n = 41$, $h_n = 34$.

Figure Caption

Figure 1. Means of achievement scores of third grade students in single-grade and multi-grade classrooms.

