THE IMPACT OF MATH ABILITY GROUPING ON SECOND GRADE STUDENT GROWTH

By
CRISTIL ROGERS

Submitted to
The Faculty of the Educational Specialist Program
Northwest Missouri State University Missouri
Department of Educational Leadership
College of Education and Human Services
Maryville, MO 64468

Field Study Committee Members

Dr. Phillip E. Messner
Dr. Kristi Alexander

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ABSTRACT

There are many research studies that support ability grouping, oppose ability grouping, and several that are neither for nor against this strategy. Therefore the basis for my research stems from the essential question, does ability grouping improve the assessment scores of students?

For this study the second grade math assessment scores of two classrooms were analyzed. One study group was exposed to between-class ability grouping while the other group was exposed to within-class ability grouping. These two strategies were the primary grouping method for math instruction in these two separate environments. The pre- and post-test assessment scores of the Place Value District Common Assessment were used as the measurement tool to compare the results for each group.

Through this action research one can conclude that the effects of grouping students by ability level in both with-in class and between-class groups lends to similar results. There is no evidence from this study that suggest using any type of ability grouping has a negative effect on academic growth.
# TABLE OF CONTENTS

ABSTRACT ........................................................................................................................................2

LIST OF TABLES ............................................................................................................................5

LIST OF FIGURES ..........................................................................................................................6

CHAPTER ONE: INTRODUCTION TO THE STUDY ........................................................................7

  Background
  Conceptual Underpinnings for the Study
  Statement of the Problem
  Purpose of Study
  Research Questions
  Null Hypotheses
  Limitations and Delimitations
  Definition of Terms
  Summary

CHAPTER TWO: REVIEW OF RELATED LITERATURE .................................................................12

  Theoretical Context
  Background/Best Practices
  Overview of Related Research
  Implications for Institutions

CHAPTER THREE: RESEARCH DESIGN AND METHODOLOGY ................................................16

  Problem and Purposes Overview
  Research Design
  Research Questions
  Study Group
Ability Grouping

Data Collection and Instrumentation

Data Analysis Methods

CHAPTER FOUR: PRESENTATION AND ANALYSIS OF DATA

Review of the Research Design
Findings
Summary

CHAPTER FIVE: CONCLUSION

Discussion
Conclusions
Recommendations

REFERENCES

VITA
LIST OF TABLES

Table 1: A Comparison of Place Value Pre-Assessment Scores by Differentiated Grouping………………………………………………………………………………………………………………..19

Table 2: A Comparison of Place Value Post-Assessment Scores by Differentiated Grouping………………………………………………………………………………………………………………..20

Table 3: Average Growth Amongst the Sub Groups after Treatment, Within-class Grouping Results………………………………………………………………………………………………………………..21

Table 4: Average Growth Amongst the Sub Groups after Treatment, Between-class Grouping Results………………………………………………………………………………………………………………..22
LIST OF FIGURES

**Figure 1**: Average pre-test assessment scores amongst second grade students in the two different learning environments: within-class grouping and between-class grouping………..20

**Figure 2**: Average post-test assessment scores amongst second grade students in the two different learning environments: within-class grouping and between-class grouping…..21

**Figure 3**: The pre- and post-test results of students A through T in the within-class grouping environment………………………………………………………………………22

**Figure 4**: The pre- and post-test results of students A through T in the between-class grouping environment………………………………………………………………………23
CHAPTER ONE: INTRODUCTION TO THE STUDY

Background

Grouping of students for instruction is done for many reasons, but most grouping plans exist to deal with one central fact of mass education: that students differ in knowledge, skills, developmental stage and learning rate. If a teacher is to present a lesson to a class, then it seems that the lesson should be neither too easy nor too difficult for students. If the class is highly heterogeneous, then one lesson will be easier for some students and more difficult than would be optimal for others (Slavin, 1987). Therefore grouping students based on their academic level or ability should be considered.

There are many research studies that support ability grouping, oppose ability grouping and several that are neither for nor against this strategy. However, like with all other educational strategies, virtually every means of grouping students by ability or performance level has its drawbacks, and according to Slavin (1987) these may be enough to offset any advantages.

There are several different ways to group students. The types of grouping are not exhaustive of all possible grouping arrangements, but they are the most widely used and/or most extensively researched grouping plans at the elementary level (Slavin, 1987).

- Between-class Ability Grouping: Students are divided across grade level in groups based on subject ability levels and/or divided into selected groups such as gifted programs, special education
- Within-class Ability Grouping: Students are divided within the general education classroom into ability level groups, cooperative learning groups, and/or center based learning groups.
For this study, between-class ability groups and within-class ability groups were studied. Between-class ability groups are formed when students remain in heterogeneous classes most of the day but are regrouped across the grade level for selected subjects. According to Slavin (1987) there are three important advantages of regrouping for selected subjects over ability-grouped class assignments. (1) Students remain in a heterogeneous setting most of the day, so they are likely to identify with that group, reducing the labeling effect of all-day grouping. (2) Students are grouped solely on the basis of their achievement in mathematics, not general achievement or ability level, so a meaningful reduction in heterogeneity in the skill being taught is possible. (3) Regrouping plans tend to be more flexible than ability grouped classroom assignments, because changing students between mathematics classes is less disruptive than changing basic class assignments.

Within-class ability grouping is the practice of assigning students to homogeneous subgroups for instruction within the class. Each subgroup receives instruction at its own level and is allowed to progress at its own rate. Though Slavin (1987) tends to support the between-class ability grouping model over the within-class grouping model he states that the research on this type of grouping in mathematics clearly supports this practice as well as the other. Every one of eight studies of within-class ability grouping identified by Slavin (1986), including five randomized studies favored the grouped treatment. Effects of within-class grouping were somewhat higher for low achievers than for average and high achievers, however positive results did occur. So is there a significant difference in the outcome of the students’ academic level when placed in one of these two groups?
Conceptual Underpinnings for the Study

For as long as instruction has been delivered, students, teachers, administrators, and researchers have debated the question of how classes should be organized. Yet still today practitioners and policy makers agonize over how best to group students (Slavin, 1987).

Does anyone benefit from ability grouping? Is anyone harmed by it? The Westchester Institute for Human Services Research (2002) believes the answers are not always clear cut and often depend on who you ask and what learning outcomes are deemed important. To many educators, ability grouping is considered a sensible response to academic diversity. To others, the practice has harmful unintended consequences and should be abandoned.

Through this study a closer look will examine the effects of grouping students by ability level in both within-class and between-class groups.

Statement of the Problem

Though there is extensive research on ability grouping, one cannot conclusively determine whether ability grouping is better or worse than heterogeneous groups. Several meta-analyses and research syntheses have been conducted, and a number of literature reviews have been published. Yet there is still a question that remains unanswered. Shouldn’t there be a way to group students that has more benefits than disadvantages? Shouldn’t there be one set of strategies that work best when grouping students according to their ability? Does within-class ability grouping even improve the academic level of students?

Purpose of Study

The research is not definite and there are still many proponents of this type of ability grouping. There are many unanswered questions. Therefore, the basis for my investigation stems from the essential question; does within-class ability grouping improve the assessment scores of students when compared to students who have been exposed to between-class ability grouping?
Research Questions

Through action research I intend to answer the following questions:

RQ1: Is there a difference in second grade math assessment scores when students are grouped by ability across the grade level, between-class ability grouping?

RQ2: Is there a difference in second grade math assessment scores when students are grouped within-class, differentiated instruction is utilized?

RQ3: Is there an interaction between across grade level ability grouping (between-class ability grouping) and within-class ability grouping in math scores?

Null Hypotheses

HO1: There is no significant difference in the math assessment scores of students who are grouped in between-class ability groups.

HO2: There is no significant difference in the math assessment scores of the students who are grouped in within-class ability groups.

HO3: There is no significant correlation between the second grade math assessment scores of students who are placed in between-class ability grouping and within-class ability grouping.

Limitations and Delimitations

Although this research was carefully prepared, there were some unavoidable limitations. First, because of the time limit, this research was conducted within an academic quarter. A more in depth look across several quarters would lend to more accurate results. In addition, the study was conducted on a relatively small sample size and is limited by how well the participants in the study represent the population. A nonrandom, self-selected sampling was used due to the lack of willingness amongst the educators in the district to participate in the pre- and post- test assessment and report the scores. For this reason, these findings cannot be generalized to the broader community based on this study alone. The results are more significant to the two schools utilized in the study.
Definition of Terms

- **Ability grouping:** the practice of dividing students for instruction on the basis of their perceived capacities for learning.
- **Advanced level:** student performs at a higher level on assignments related to standard, consistently and independently demonstrates understanding of standard
- **Basic level:** student shows some success on assignments related to standard, meets expectations on only some parts of the standard
- **Below Basic level:** student rarely shows success on assignments related to standard, does not meet expectations for understanding of the standard
- **Between-class ability grouping:** students are divided across grade level in groups based on subject ability levels and/or divided into selected groups such as gifted programs, special education
- **District Common Assessment:** an assessment that provides information as to how well students have done; provides information both for student level decision making and for program evaluation. These are typically designed to be administered at the end of a unit, end of quarter or semester, or end of course and are common across the district
- **Heterogeneous grouping:** students in mixed-ability classes
- **Homogeneous grouping:** students in classes grouped by ability
- **Proficient level:** student performs well on most assignments related to standard, meets grade level expectations regarding understanding of the standard
- **Standards Based Grading:** a strategy used that allows teachers, students and their parents to closely monitor students' attainment of specific skills, clearly identifies areas of strength and concern.
Ability Grouping

- **Standards Based Grading Scale:** A grading scale that specifically indicates the level of attainment per given skill; 1- Below Basic, 2- Basic, 3- Proficient, 4- Advanced

- **Within-class ability grouping:** students are divided within the general education classroom into ability level groups, cooperative learning groups, and/or center based learning groups.

**Summary**

Research studies have examined both the positive and negative effects of many types of grouping methods. Yet there are still many unanswered questions in regards to the two most widely used methods, with-in class and between-class learning environments. The basis for my investigation stems from the essential question; does within-class ability grouping improve the assessment scores of students when compared to students who have been exposed to between-class ability grouping?

**CHAPTER TWO: REVIEW OF RELATED LITERATURE**

**Theoretical Context**

In theory, ability grouping increases student achievement by reducing the disparity in student ability levels and this increases the likelihood that teachers can provide instruction that is neither too easy nor too hard for most students. The assumption is that ability grouping allows the teacher (1) to increase the pace and raise the level of instruction for high achievers, and (2) to provide more individual attention, repetition, and review for low achievers. The high achievers benefit from having to compete with one another, and the low achievers benefit from not having to compete with their more able peers (Hollified, 1987).

**Background/Best Practices**

Ability grouping of students is a controversial issue. In theory, ability grouping increases student achievement by reducing the disparity in student ability levels, and increases the
likelyhood that teachers can provide instruction that is neither too easy nor too hard for most students. According to The Westchester Institute for Human Services Research (2002), ability grouping is the practice of dividing students for instruction on the basis of their perceived capacities for learning.

Research studies have examined the effects of many types of grouping methods. Regrouping by subject area, between-class ability groups, allows students to remain in heterogeneous groups for part of the day then they regroup for other subjects. The subjects that they ability group in are usually mathematics (Slavin, 1987). This form of grouping has three advantages: labeling is reduced, students are grouped on the basis of ability on a certain subject, and lastly this is a less disruptive form of grouping.

Within-class ability grouping can be accomplished in several ways and can use a variety of teaching strategies and techniques. After considering programs in which students in a grade level were assigned to different groups within heterogeneous classrooms, Slavin and Karweit (1984) concluded that such grouping clearly benefits students. Kulik and Kulik (1989) separated the within-class grouping studies into those designed for all students and those designed specifically for academically talented students. The program designed for all students showed a small but positive effect on student achievement. This effect was similar for high-, average-, and low ability groups. The with-in class groupings for academically talented students were found to have substantial positive academic effects (Allan, 1991).

Overview of Related Research

Those in favor of ability grouping argue that it allows teachers to challenge high-achievers, while providing remediation, repetition and review for low-achievers. Proponents say that the practice increases student achievement by allowing teachers to better tailor the pace and
content of instruction to students’ needs. It is believed that low-achieving students feel more comfortable and participate more when they are grouped with peers of similar ability. While high-achieving students maintain interest and incentive in homogenous groups, but languish when grouped with slower learners (The Westchester Institute for Human Services Research, 2002). Kulik (1985) addresses the success of ability grouping by stating that “some grouping programs have little or no effect on students; other programs have moderate effects and still other programs have large effects” (p.1). He made several conclusions while researching ability grouping:

1. Although some school programs that group children by ability have only small effects, other grouping programs help children greatly. School should therefore resist calls for the wholesale elimination of ability grouping.

2. Highly talented youngsters profit greatly from work in an accelerated classroom. School should therefore maintain programs of accelerated work.

3. Highly talented youngsters also profit greatly from an enriched curriculum designed to broaden and deepen their learning. Schools should therefore try to maintain programs of enrichment.

4. Bright, average, and slow youngsters profit from grouping programs that adjust the curriculum to the aptitude levels of groups. Schools should try to use ability grouping in this way.

5. Benefits are slight from programs that group children by ability but prescribe common curricular experiences for all ability groups. Schools should not expect student achievement to change dramatically with either establishment or elimination of such programs (Kulik, p.3).

This research suggests that ability grouping is beneficial to the success of the learner. It confirms that schools that adjust their curriculum to include ability grouping will broaden and deepen the students’ learning. It also suggests that teaching to the level of the learner will be successful, boost self-esteem, provide a safe environment to share thoughts and deepen the students’ knowledge base.
Robert E. Slavin’s (1986) also provides a comprehensive review of research on the different types of ability grouping in elementary schools. He had several conclusions regarding the effect of flexible grouping. He states that ability grouping allows the teacher to increase the pace and raise the level of instruction for high achievers, and to provide more individual attention, repetition, and review for low achievers.

Kulik and Kulik (1982) and Kulik (1985) address the issues of attitude and self-concept in regards to ability grouping. Their findings show that grouping has only minor effects on student attitudes and is generally positive. They found that students who were ability grouped for a specific subject had a better attitude toward that subject. They also noted that low-ability students may experience feelings of success and competency when in a classroom with others of like ability, and high-ability students may encounter greater competition for the first time.

On contrast those against ability grouping argue that when low-achievers are separated from their high-achieving peers, they suffer from the loss of the positive example of their peers and from lowered expectations from their teachers (Slavin, 1987). Hollified (1987), believes the practice creates groups of low achievers with low expectations for themselves. He also states that labeling students according to ability and assigning them to low achievement groups may also communicate self-fulfilling low expectations. Doug and Barbara Clark (2008) believe that most students are disadvantaged by classes grouped according to ability. They suggest that the greater the use of ability grouping the lower the performance on math assessments.

Yet there are still researchers that suggest it is unclear if within class math ability grouping increases overall mathematics performances. Gamoran (1992) believes that the research is not definite. The Westchester Institute for Human Services Research (2002) also concludes that the research cannot conclusively determine whether ability grouping is better or
worse than heterogeneous grouping. They believe that the decisions about grouping are best left to teachers, parents, and principals working collectively to decide how to best educate students.

**Implications for Institutions**

For the sake of instructional efficiency, it seems that students should be grouped so that they will all be able to profit from the lesson. Therefore, if ability grouping is going to be utilized there are several factors that need to be considered. Gamoran (1992), states that implementing more flexible grouping systems that utilize reassessment strategies is key to the success of student achievement. While Slavin (1990) recommends that the following elements be included in successful ability grouping plans:

1. Students should identify primarily with a heterogeneous class. They should be regrouped by ability only when reducing heterogeneity is particularly important for learning, as is the case with math and reading instruction.

2. Grouping plans should reduce student heterogeneity in the specific skill being taught, not in IQ or overall achievement level.

3. Teachers must vary the level and pace of instruction according to student levels of readiness and learning rates in regrouped classes.

4. Only a small number of groups should be formed in within-class ability grouping. This will allow the teacher to provide adequate direct instruction for each group.

Gamoran (1992) also believes that neither teachers nor students should be locked into their assignment, and the quality of instruction in low groups must be raised in order for this implementation to yield positive results.

**CHAPTER THREE: RESEARCH DESIGN AND METHODOLOGY**

**Problem and Purposes Overview**

When within-class ability groups are utilized teachers are able to work with small groups that are determined specifically by student achievement levels and needs. This allows teachers to closely observe student work, monitor student attention, provide support for struggling learners,
and provide extra challenges for proficient learners (Sammons, 2011, p. 21). In theory this individualized instruction seems like the strategy for success.

However, the research is not definite and there are still many proponents of this type of ability grouping. Therefore, the basis for my investigation stems from the essential question; does within-class ability grouping improve the assessment scores of students when compared to students who have been exposed to between-class ability grouping?

**Research Design**

For this study the second grade math assessment scores of two classrooms were analyzed. One study group was exposed to between-class ability grouping while the other group was exposed to within-class ability grouping. These two strategies were the primary grouping method for math instruction in these two separate environments.

The pre- and post-test assessment scores of the Place Value District Common Assessment were used as the measurement tool to compare the results for each group.

**Research Questions**

For this research, ability grouping is defined as or refers to the practice of placing students of similar academic ability together for instruction. Through action research I intend to answer the following questions to help shed light on the practice of ability grouping and what strategies work best.

RQ1: Is there a difference in second grade math assessment scores when students are grouped by ability across the grade level, between-class ability grouping?

H01: There is no significant difference in the math assessment scores of students who are grouped in between-class ability groups.

RQ2: Is there a difference in second grade math assessment scores when students are grouped within-class, differentiated instruction is utilized?
HO2: There is no significant difference in the math assessment scores of the students who are grouped in within-class ability groups.

RQ3. Is there an interaction between across grade level ability grouping (between-class ability grouping) and within-class ability grouping in math scores?

HO3: There is no significant correlation between the second grade math assessment scores of students who are placed in between-class ability grouping and within-class ability grouping.

Study Group

For this investigation, data was collected from a suburban school district in the Midwest. The school district borders rural, suburban, and urban areas making it unique in that the students it serves come with a variety of backgrounds and learning experiences. There are five elementary schools, two middle schools, one high school and two alternative schools that serve a total of 4,840 students grade K-12 (Ed.gov, 2009).

The data from two second grade classrooms within the district were evaluated. One classroom was taught using with-in class ability grouping, while the other classroom teacher utilized between-class ability grouping for math instruction.

Data Collection and Instrumentation

After one academic quarter of instruction using the two different instructional strategies, the pre- and post-test scores of the Place Value District Common Assessment were compared. The results were analyzed to test the hypothesis.

Data Analysis Methods

A comparison was made between the pre-assessment scores, the post-assessment scores, and the academic growth amongst both groups. An analysis was made using the t-Test for both the pre- and post- assessment scores (independent samples). An analysis was also made using the
t-Test (correlation samples) to determine if an interaction between across grade level ability grouping (between-class ability grouping) and within-class ability grouping in math scores exist.

CHAPTER FOUR: PRESENTATION AND ANALYSIS OF DATA

Review of the Research Design

After an academic quarter of instruction and two separate ability grouping methods were utilized, the second grade math assessment scores of two classrooms were analyzed.

The pre- and post-test assessment scores of the Place Value District Common Assessment were used as the measurement tool to compare the results for each group and to answer the overarching question; does within-class ability grouping improve the assessment scores of students when compared to students who have been exposed to between-class ability grouping?

Findings

RQ1: Is there a difference in second grade math assessment scores when students are grouped by ability across the grade level, between-class ability grouping?

As shown in Table 1, a significant difference ($t$-Test = 1.3; $p$-value = 0.09) in the pre-assessment scores as measured by the Place Value District Common Assessment was found when compared to the criterion $p$-value of 0.10. These findings suggest that before any specific learning strategy was incorporated, the two classes scored similarly on the pre-test. However, the within-class ability grouping environment had a .2 difference in the mean scores of the students. Therefore, it is presumed that on the post-assessment students will have a mean score of at least .2 higher than in the between-class environment. The null hypothesis was rejected.

| A Comparison of Place Value Pre-Assessment Scores by Differentiated Grouping |
|------------------|---|----|---|---|---|---|
| **Group**        | $n$ | Mean | $SD$ | $t$ | $df$ | $p$-value |
| Within-class     | 20 | 1.3 | .47 |    |     | .09        |
| Between-class    | 20 | 1.1 | .45 | 1.38 | 38 | .09        |

Note: Significant when $p < 0.10$.  

19
Figure 1. Comparison of the average pre-test assessment scores amongst second grade students in the two different learning environments: within-class grouping and between-class grouping.

RQ2: Is there a difference in second grade math assessment scores when students are grouped within-class, differentiated instruction is utilized?

As shown in Table 2, a significant difference ($t$-Test = 1.5; $p$-value = 0.07) in the post-assessment scores as measured by the Place Value District Common Assessment was found when compared to the criterion $p$-value of 0.10. When compared to the pre-test difference in the mean scores, the within-class ability group made a .4 gain overall. It was assumed that the groups would have a .2 difference according to the pre-test results. These findings suggest that the within-class ability grouping environment made slightly more gains than the between-class environment. This conclusion rejects the null hypothesis.

<table>
<thead>
<tr>
<th>Table 2</th>
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<tbody>
<tr>
<td><strong>A Comparison of Place Value Post-Assessment Scores by Differentiated Grouping</strong></td>
</tr>
<tr>
<td>Group</td>
</tr>
<tr>
<td>Within-class</td>
</tr>
<tr>
<td>Between-class</td>
</tr>
</tbody>
</table>

Note: Significant when $p < 0.10$
RQ3. Is there an interaction between across grade level ability grouping (between-class ability grouping) and within-class ability grouping in math scores?

As shown in Table 3, when the pre- and post-test results of students in the within-class grouping environment where analyzed, the mean growth was 2.1. The students on average scored on or above the proficient level according to the standards based grading scale.

Table 3

<table>
<thead>
<tr>
<th>Average Growth Amongst the Sub Groups After Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group</td>
</tr>
<tr>
<td>Within-class</td>
</tr>
</tbody>
</table>

Note: Significant when p < 0.10.

Figure 2. Comparison of the average post-test assessment scores amongst second grade students in the two different learning environments: within-class grouping and between-class grouping.
Figure 3. The pre- and post-test results of students A through T in the within-class grouping environment.

As shown in Table 4, when the pre- and post-test results of students in the between-class grouping environment were analyzed, the mean growth was 1.8. The students on average scored on the proficient level according to the standards based grading scale.

### Table 4

<table>
<thead>
<tr>
<th>Group</th>
<th>n</th>
<th>Mean</th>
<th>$t$</th>
<th>df</th>
<th>$p$-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between-class</td>
<td>20</td>
<td>1.8</td>
<td>-7.63</td>
<td>19</td>
<td>.0001</td>
</tr>
</tbody>
</table>

*Note: Significant when $p < 0.10$.  

Ability Grouping
Because there was no significant difference in the pre-assessment scores or the post-assessment scores as measured by the Place Value District Common Assessment when the two groups were compared these findings suggest that in both environments students learned the material regardless of the grouping strategy. Therefore, the null hypothesis was not rejected.

Summary

Through this action research one can conclude that the effects of grouping students by ability level in both with-in class and between-class groups lends to similar results. There is no evidence from this study that suggest using either type of ability grouping has a negative effect on academic growth.
CHAPTER FIVE: CONCLUSION

Discussion

Grouping students for instruction is done for many reasons. There are several research studies that support ability grouping. There are even more studies that oppose the strategy. While there are still those researchers who conclude that there is no significant difference in the academic growth of students who are grouped by ability compared to those who are not grouped.

The results of this study support those who are in favor of ability grouping. Amongst both subgroups those students who performed at the Below Basic and Basic range on the pre-assessment, scored in the Proficient and Advanced range on the post-test. These results support the foundational theory in that ability grouping allows teachers to challenge high-achievers, while providing remediation, repetition and review for low-achievers.

However, like all educational strategies one must take a closer look at the impact on student performance when making educational decisions and looking at ones teaching methodology. When ability grouping, whether it is with-in class or between-class, the groups must create a true homogeneity on the specific skill being taught and the instruction must be closely tailored to students’ level of performance. Adam Gamoran (1992) states that when given poor instruction, neither heterogeneous nor homogeneous grouping can be effective; however with excellent instruction either may succeed.

Conclusion

There is no evidence from this study that suggest using either type of ability grouping has a negative effect on academic growth. Therefore, if all educators have the common goal, student success, my study results lend to an agreement with educational researchers in that when best
practices are utilized positive educational results can be the outcome regardless of classroom assignment or grouping.

**Recommendations**

- **Parents:** The results of this study suggest that ability grouping, rather it is utilized within-class or between-class has no effect on student performance. Therefore, as a parent one can be assured that either ability grouping method can lend to academic growth.

- **Educators:** The recommendation for educators stem from the study results and analysis. It suggests that ability grouping within the classroom can be successful. In addition, teachers can use between-class ability grouping and see positive results. Therefore, it is recommended that the teacher use whichever instructional strategy of grouping he/she feels best suits their teaching method.

- **Administrators:** Depending on the flexibility of the administrator and his/her expectations the grouping method may differ. Through this research, I conclude that ability grouping can be a successful method of math instruction. As a result administrators can use this as an available teaching strategy amongst teachers and grade levels.
REFERENCES


Cristil Rogers

816-529-1722
crogers@fortosage.net

Address
3637 Trail Ridge Drive
Independence, MO 64055

Personal Code of Ethics
As an educator, I am committed to providing all students with opportunities for personal growth, guidance, and encouragement in order to reach their highest academic potential. In fulfillment of the obligation to the student, I will:

- Provide personal growth opportunities that are tailored to individual needs
- Understand and recognize student individuality
- Encourage students’ passions and build upon these strengths to help fulfill individual goals
- Provide guidance across all aspects: both personally and academically
- Be there to listen and provide support
- Provide encouragement to help students’ reach their academic potential
- Provide learning opportunities that are tailored to student needs and that focus on individual students’ strengths
- Push students beyond what is comfortable in order to impart the belief of, I can.

Education
2010 to Present  Educational Specialist: Secondary Admin.
NW Missouri State University
2006 to 2008  Master of Science: Instructional Technology
NW Missouri State University
2002 to 2004  Bachelor of Science: Elementary Education
Graceland University

Work Experience
Fort Osage R-1 School District  Aug. 2006 to Present
Indian Trails Elementary
- Experience in teaching First, Second, and Fourth grade
- Member of the Leadership and Data teams
- Participation in the ELA and Math cohorts
- Participation in the Leader in Me school wide initiative

Matthews Elementary
- Participation in the New Teacher Program
- Use of a variety of technological resources
- Participation in ELA assessment, curriculum writing
- Member of the Math cohort