The Effect of Homogenous Versus Heterogeneous Reading Achievement Groups on 4th Graders Reading Comprehension

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ABSTRACT

The purpose of this study was to investigate the effect of homogenous versus heterogeneous reading achievement groups on 4th graders reading comprehension. The participants in this study were all fourth grade students in the suburban Anne Arundel County Public School (AACPS) system of Maryland. All participants received whole group instruction with teaching points from the AACPS reading curriculum consistent with the Common Core State Standards. There were three groups in the study in which students were to collaborate to solve a single problem related to the whole group instruction of the day. The groups were formed based on student's scores on the AACPS 3rd grade Reading Benchmark assessment. Students who scored below 50% on the pre-assessment were placed into one group, those who scored above 50% were placed in another group, and a third group was formed by randomly selecting students from each group to form a heterogeneous group. After six weeks, students were given a mock benchmark assessment, also created by AACPS, in order to determine if students scores showed the most progress when working in low achievement homogenous groups, high achievement homogenous groups or heterogeneous groups. The results on the mock benchmark assessment indicated no significant difference in reading comprehension across the three groups. The null hypothesis was retained.

CHAPTER I

INTRODUCTION

OVERVIEW

Student collaboration during reading instruction allows for student led learning and positive peer interactions. When students work in collaborative groups, they are able to use each other's strengths to work together on a single problem. Through collaboration, students are able to clarify misconceptions, gain insight into other perspectives on a topic, and voice their own opinions in a safe environment. While many agree that in an intermediate elementary classroom collaboration is beneficial, the composition of the achievement levels in the groups remains split. Researchers such as Duflo, Dupas and Kremer (2009) believe that in low-achievement homogenous groups, a teacher is able to intervene and offset the deficit of high-achieving peers. While in high achieving homogenous groups, students are able to engage in higher order thinking to arrive at a solution. Contrary to this, Wiedmann, Leach, Rummel, and Wiley (2012) found that heterogeneous groups yielded a wider array of perspectives, strategies, and solutions than a homogenous group.

This study is being conducted because the researcher has observed varying effects of homogenous and heterogeneous groups during reading instruction. Often times in heterogeneous groups, low achieving students tend to contribute very little to collaboration because their higher achieving peers intimidate them. In these same groups the researcher observed higher achieving peers become mentors to lower achieving peers. The problem with this scenario is that if the higher achieving peer is benefiting from this mentor relationship or would they benefit more from engaging in higher order thinking with their higher achieving peers?

The researcher teaches in a low-income school with a very high English Language Learner population. When students are learning English, their peers can be a great resource for language acquisition. Colon (2016) found that those who engaged in Peer Assisted Learning Strategies (PALS) exceeded the typical rate of improvement for their age group. This is vital because as working with a high ELL population, greater gains are necessary in order to close the reading achievement gap. With this knowledge the researcher sought to investigate the most beneficial composition for collaborative reading groups in a 4th grade classroom.

Statement of the Problem

Collaborative learning takes place when students work in groups of two or more to discuss concepts or find solutions to a problem. The purpose of this study is to investigate the effect of homogenous versus heterogeneous reading achievement groups on 4th graders reading comprehension. The researcher seeks to examine if students reading achievement is affected by the composition of the group in which collaborative learning takes place.

Hypothesis

The composition of reading achievement groups will have no effect on 4th grade students' reading comprehension.

Operational Definitions

This study investigates the effect that heterogeneous and homogenous reading achievement groups have on a 4th grade students reading comprehension. The operational definitions are presented on the following page.

- ***Heterogeneous reading achievement groups***- Students who scored higher than 50% on the county benchmark assessment working in the same group as those who scored lower than 50% on the county benchmark assessment.
- ***Homogenous reading achievement groups***- Students who scored below 50% on the county benchmark assessment working only with others who scored below 50%. Students who scored higher than 50% on the county benchmark assessment working only with classmates who scored higher than 50% on the county benchmark assessment.
- ***Reading comprehension / Achievement***- Students scores on the pre-assessment, the 3rd grade county benchmark assessment, and students scores on the post assessment, the 4th grade mock county benchmark assessment.
- ***Effect***- The difference between student's scores on the 3rd grade county benchmark assessment and scores on the 4th grade mock county benchmark assessment after being placed in either homogenous or heterogeneous reading achievement groups during reading instruction of the county curriculum for six weeks.

CHAPTER II

REVIEW OF THE LITERATURE

This literature review discusses how the reading comprehension of intermediate elementary students is affected by the composition of the reading groups in which they are placed. The opening section discusses homogenous groups, where students are placed into groups based on academic performance (such as reading level) or other attributes that they have in common. The next section examines heterogeneous groups, where, for example, students of varied reading achievement levels may cooperate in one group. The third section looks at groupings that yielded no notable influence on student achievement. The final section considers types of grouping specifically used during reading blocks and the outcomes that teachers observed.

Homogenous Grouping

Homogenous grouping is the act of placing students into groups based on attributes, in this case academic, that they have in common. This can be a characteristic such as reading achievement, math achievement or language achievement. When students work together with like achievement peers there is no competition or hierarchy among peers. However, students of low achievement groups are less likely to engage in higher order questions and thinking than high achievement groups. There is evidence both supporting that grouping students by similar achievement positively impacts student success and finding that grouping students based on achievement negatively impacts student success.

Positive Effects of Homogenous Grouping

Grouping students by achievement allows them to feel free to take academic risks and attempt new problems without fear of embarrassment in front of higher achieving peers. Like

achievement groups also allow a teacher to tailor instruction to meet the needs of students at that specific level. Duflo, Dupas and Kremer (2009) support this assertion stating that "any negative effects of being with lower-achieving peers were more than offset in tracked settings by the benefit of the teacher being able to better tailor instruction to students' needs" (p. 66). In other words, in classes made up of like achieving students, the teacher was able to make up for the deficit of higher achieving peers by specifically altering instruction to meet the needs of lower achieving students. Lou, Abrami and Spence (2000) also saw the increasing demands on teachers of large class sizes, great diversity, different abilities, varying economic status and a range of linguistic skills. They sought to test the effectiveness of instructing students in small homogenous groups within their larger heterogeneous classes. While not drastic "there was a small but significantly positive effect of achievement-based small group instruction on student achievement, indicating that in general students learned more in classes where small group instruction was used" (p. 106). In general, these two studies found positive effects of homogenous grouping of students.

Negative Effects of Homogenous Grouping

On the other side of the argument, there is evidence to support that homogenous groups have a negative overall effect on student achievement. Students who spend their instructional time surrounded by like-minded peers are not exposed to differing academic language, strategies or content knowledge. Chorzempa and Graham (2006) randomly selected primary-grade teachers from across the United States to survey about their use of within-class achievement grouping during reading. Most teachers reported using homogenous within class groups to best meet the needs of their students. However, many discussed causes for concern such as "students in lower achieving groups spend more time involved in non-instructional activities, are less likely to be

asked critical comprehension questions, and are given fewer opportunities to select their own reading material" (p. 533). Similarly, Meijnen and Guldemond's (2002) concluded that "homogeneous grouping sets strong reference processes in motion, and processes of comparison have considerably greater effects in homogeneous groups, with negative effects on the performance of low achievers (SLD)" (p. 235). Low achieving students or those with specific learning disabilities (SLD) were negatively affected in this study. This seems to be a trend among researchers who uncover the detriment that homogenous grouping has on low- achieving students versus the little effect that it has on higher- achieving students.

Heterogeneous Grouping

Heterogeneous groups are those that contain students of a wide range of academic abilities and instructional levels. The purpose of this type of group is for students to work together and depend on one another's varied knowledge to achieve a common academic goal. Researchers found both positive effects such as greater problem solving abilities and negative effects such as lower test scores of those in heterogeneous groups.

Positive Effects of Heterogonous Grouping

When students are placed in groups of low achievement, and high achievement, low achieving students are exposed to effective strategies and higher order questions while higher achieving students are exposed to multiple perspectives and perseverance. Garrett and Hong (2016) observed downfalls to heterogeneous and homogeneous grouping in math instruction and sought to add more to the sparse evidence on the topic. They investigated the impacts of combination and similar achievement groups on language minority kindergarteners and found that using only homogenous groups was harmful to students because those with little knowledge

of the English language were not exposed to the academic and social language needed to navigate curriculum. Specifically they state that the use of both homogeneous and heterogeneous groups "under relatively adequate time allocation is optimal for enhancing teacher ratings of language minority kindergartners'" (p. 222). Wiedmann et al. (2012) arrived at similar findings with completely different participants. The study was conduced at the University of Illinois in Chicago and split Psychology major students into low, medium and high achievement based on ACT scores, they were then randomly placed into groups to form heterogeneous and homogeneous groups. The study generated results stating that groups consisting of both high and low achieving students generated a "broader range of solution attempts during the invention task" than homogenous groups (p. 717). Diversifying groups and allowing for students of different achievements to collaborate has been found to allow for the input of varying perspectives and skills among students of a wide range of ages.

Negative Effects of Heterogeneous Grouping

When students are asked to collaborate in a group of varying levels of achievement, instruction and tasks are given at one singular level and students above or below average achievement are forced to struggle with content or find content to be insufficiently rigorous. In addition, lower achieving students are often reticent to provide input since they perceive their higher achieving peers' contributions as being more valuable. Sims (2008) discussed exactly this when the California class reduction program provided schools with cash rewards if classes in grades K-3 were made up of less than 20 students. In order to save money, some schools began mixing classes and placing multiple grade levels in one classroom. Sims found that mixing grades in classrooms ended up resulting in a significant test score gap for specific second and

third grade students. Sims suggests that combination classes may lead to lower test scores for students over time.

No Notable Difference in Student Achievement

The studies reviewed to this point find that either homogeneous or heterogeneous grouping is more beneficial with regard to student achievement. However there is also evidence in support of the notion that the grouping of students has no impact at all on achievement. Kaya (2015) sought to examine the types of questions generated in like and differing achieving groups. Students in two fifth grade classes were placed into either homogeneous or heterogeneous groups for the last unit of science of the year. The students were then asked to generate discussion questions based on the unit. Before the unit, both classes received instruction on the taxonomy of questions. Kaya found no significant difference in the number of questions, low order questions or high order questions created by the groups. Matthews (2013) also investigated the effects of within-class grouping and school wide cluster grouping over a three-year period in the areas of reading and math. In the year following the implementation of cluster grouping by ability there was no significant difference in the area of students reading performance, only mathematics.

Farver (2011) investigated intervention groups using a pretest/posttest design with a control group and found that like achievement groups and differing achievement groups returned "no statistically significant differences in reading levels post intervention between the two groups" (p. 3) She expressed the need to study the intervention program in more depth and with a larger sample size to examine its effectiveness.

Reading Comprehension Groups

There are differing types of groups used specifically during reading blocks. Groups are typically formed based on a benchmark reading assessments such as DIBELS Qualitative Reading Inventory and Lexile-level assessments. These assessments are individually administered multiple times per year and examine students in areas such as accuracy, phonics, rate, ability to re-tell, vocabulary, and overall reading comprehension. These sub-test results are compiled to form a singular reading level into which students fall. A teacher can then form groups based on students' reading level. The teacher has the option to form groups of students who all have the same reading level according to the assessment (homogeneous) or form groups consisting of students of a range of reading levels (heterogeneous). Over time, researchers have gathered data on the use of within-class groupings, studies that found positive effects of achievement grouping and those that concluded negative effects of reading achievement grouping.

Use of Within-Class Reading Grouping

Teachers typically choose to place students into groups of those who have similar needs so that students can all work together or be instructed on the same reading skill. Chorzempa and Graham (2006) conducted a survey study in which they randomly selected primary teachers from across the United States to participate in a survey regarding the use within-class achievement groups. Of those who chose to return the survey and participate in the study, 63% reported using within class achievement groups. They sought to gather information on teachers' opinions of using within class achievement groups and found that the verdict regarding grouping strategies falls relatively divided. Some believe that using homogenous small reading groups allows for

students on the same cognitive-developmental level to work together on task appropriate for them to achieve mastery. Meanwhile, others believe that this widens the achievement gap because low achieving students are being exposed to low achieving tasks. They also found that of the 63% of teachers who use within-class achievement grouping, most reported using it because they could focus on the needs of their students. Of those who reported not using within-class achievement groups, 22% reported that they did not do so because central administration actually bans the use of grouping students by reading achievement. Evidently both previous research and the work of Chorzempa and Graham, have concluded both positive and negative opinions on homogeneous and heterogeneous grouping in the area of reading.

Positive Effects of Reading Achievement Grouping

When a teacher chooses to use reading level groups, the groups are typically comprised of those of similar reading levels. For example, the DIBELS benchmark assessments assigns students a letter level A-Z. Students within a few letter levels of one another may be placed into the same group. For instance an M and N level may be placed together and considered homogeneous while an M and W together would be considered heterogeneous. Within these small groups a teacher may work with students on a targeted skill such as reading the entire word and not cutting off endings such as –ed or –s. Another option is to group students based on their achievement on a district- wide benchmark assessment and target specific Common Core State Standards that were missed by each group. Buttaro, Catsambis, Mulkey and Steelman (2010) investigated homogeneous grouping and its link to segregation within schools. They examined the extent to which racially and ethnically diverse schools used within-class homogeneous grouping and concluded that the vast majority of kindergarten classes use homogeneous grouping but the frequency with which they did so varied. All in all they found that “schools

serving primarily minority students that use within-class achievement grouping have higher average gains in reading achievement" (p. 1330).

Negative Effects of Reading Achievement Grouping

When low achieving students are surrounded by those of similar ability they are not exposed to higher level questioning and positive examples of effective reading comprehension strategies. Chorzempa and Graham (2006) note that many teachers reported not using within-class achievement groups because they were "concerned about the negative effects on students in terms of stigmatization, self-esteem and so forth." (p. 533) This suggests that low-achieving students are aware of the group that they have been placed in and experience lowered levels of self-esteem as a result. By placing students in within-class homogeneous groups, levels of students become very obvious and a hierarchy is formed. High-achieving students can begin to view themselves as superior to low-achieving students resulting in decreased motivation and self-esteem of low-achieving students.

Summary

Reading comprehension of fourth graders and intermediate students is important for the success of students in and beyond elementary school. Research findings suggest that the selection of homogeneous versus heterogeneous grouping as being more effective in the area of reading remains split. The ample amount of literature on the topic can be used to make an argument either way depending on achievement and diversity of the population. In this review it is evident that there is a differing impact on low-achieving homogenous groups and high-achieving homogeneous groups. Overall the use of a combination of homogeneous and

heterogeneous grouping appears most beneficial for students because they can experience the positive effects that each model has to offer.

CHAPTER III

METHODS

The purpose of this study is to investigate the effect of homogenous versus heterogeneous reading achievement groups on 4th graders reading comprehension.

Design

A quasi-experimental design was used to compare student achievement after receiving reading comprehension instruction support and forming understanding in either heterogeneous or homogenous reading groups. The independent variable is the type of reading groups and can be operationally defined as students learning in heterogeneous or homogenous groups based on their reading achievement determined by a district-wide reading assessment. The dependent variable is a 4th graders reading achievement, which can be operationally defined as the difference between student scores on the district-wide assessment in third grade (pre-assessment), compared to their results on the district-wide mock assessment in fourth grade (post-assessment).

Participants

This research will take place in a suburban school in the State of Maryland. This is a Title I, International Baccalaureate World School with roughly 750 students in attendance. The school also has a very high English Language Learner population. Participates will be selected at random from the researcher's fourth grade classroom. All students in the class are between the ages of nine and ten. Of these seventeen students, thirteen are Hispanic, three African American and one Asian. There are eight girls and nine boys.

Instrument

The school district provided the pre-and post-assessments. The pre-assessment was taken at the end of the third grade year and was mandatory for all third grade students. The post-assessment was a mock district assessment that was taken in fourth grade after the treatment was administered. Both the pre-and post-assessments measured students understanding of English Language 4th Grade Common Core State Standards. The assessments also tested students understanding of the concepts taught during the intervention. Teacher-made assessments were used throughout the intervention to check for understanding and monitor progress. Information on the reliability, validity and norm references was not available.

Procedures

Students took the mandatory reading skills assessment provided by their school district in the third quarter of third grade and this served as the pre-assessment for this study. This test was taken in the student's classroom independently. The accommodations only included extended time. The skills assessment required students to read two passages and answer part A and part B corresponding multiple-choice questions. They were then required to complete a writing assessment based on the passages that were read. The test was scored using a computer scanner and the third grade teachers using a district-developed rubric scored the writing portion.

The scores of the assessment were then entered into the district database and interpreted by the researcher. Students were then placed into groups of lower than 50% achievement or higher than 50% achievement. From those two groups, students were randomly assigned from both groups to create a heterogeneous group. The groups then became a low-achieving

homogenous group, a higher=achieving homogenous group and a heterogeneous group with participants from both groups.

Throughout the intervention, the researcher taught students explicit reading comprehension skills aligned with the Common Core State Standards and those that would appear on the mock district assessment. After teaching the skills, the three groups (two homogenous and one heterogeneous) practiced the reading skill. Skills included inference, theme, main idea, character traits, structure of text, point of view and vocabulary. Groups worked together on each skill as the researcher took notes of strategies that the various groups used in addition to group dynamic and accuracy of using the skill.

After six weeks, all students were given the mock district assessment that mirrored the skills they had been practicing during the intervention. The assessment was the same format as the pre-assessment and was also developed by the district. The same scoring technique was used, with a computer scanner checking multiple choice questions while the fourth grade teachers scored the writing based on the district provided rubric.

CHAPTER IV

RESULTS

Overview

The purpose of this study was to investigate the effect of homogenous versus heterogeneous reading achievement groups on 4th graders reading comprehension. The researcher sought to examine if students reading achievement was affected by the composition of the group in which collaborative learning took place. There were three groups and these groups were composed of five to six students each. For each of the groups, there was data on a pre-test and a post-test in percentages. A gain score was computed by subtracting the pre-test from the post-test. Independent *t* tests were run to compare the groups.

The groups were composed in the following manner: Group 1 was composed of students scoring below 50% on the pretest; Group 2 was composed of students scoring above 50% on the pre-test; and Group 3 was composed of students selected randomly from the students that remained in the convenience sample.

Tables 1 and 2 compare Group 1 to Group 2. Tables 3 and 4 compare Group 1 to Group 3 and Tables 5 and 6 compare Group 2 to Group 3.

Table 1

Measures of Central Tendency for Comparison of Group 1 to Group 2

	Group	N	Mean	Std. Deviation
Gain	1.0	5	5.4000%	11.45862%
	2.0	6	-12.3333%	14.10910%

Table 2

Test of Significance for Comparison of Group 1 to Group 2

	t	df	Sig. (2-tailed)	Mean Difference
Gain	**2.253**	**9**	**.051**	**17.73333%**

Not significant

Table 3

Measures of Central Tendency for Comparison of Group 1 to Group 3

	Group	N	Mean	Std. Deviation
Gain	**1.0**	**5**	**5.4000%**	**11.45862%**
	3.0	**5**	**1.0000%**	**35.58792%**

Table 4

Test of Significance for Comparison of Group 1 to Group 3

	t	df	Sig. (2-tailed)	Mean Difference
Gain	**.263**	**8**	**.799**	**4.40000%**

Not significant

Table 5

Measures of Central Tendency for Comparison of Group 2 to Group 3

	Group	N	Mean	Std. Deviation
Gain	2.0	6	-12.3333%	14.10910%
	3.0	5	1.0000%	35.58792%

Table 6

Test of Significance for Comparison of Group 2 to Group 3

		F	*t*	df	Sig. (2-tailed)	Mean Difference
Gain		2.481	-.848	9	.418	-13.33333%

Not significant

There were no statistically significant results for any of the comparisons in this study. Lower achieving students collaborating with lower achieving students, higher achieving students collaborating with higher achieving students and samples from each group working in a heterogeneous group yielded no statistically significant results.

CHAPTER V

DISCUSSION

The purpose of this study was to investigate the effect of homogenous versus heterogeneous reading achievement groups on 4th graders reading comprehension. Data for three groups that composed the experiment were analyzed in Chapter IV and no statistically significant results were found. The null hypothesis was retained.

Implications of Results

The analysis of this study shows no significant impact or difference between heterogeneous and homogenous achievement groups on a 4th graders reading comprehension. Although the results on the post assessment did not signify significant differences between the three groups, the most progress from pre-test to post-test was shown in the low achievement homogenous group. Throughout the study, the low achieving homogenous group progressed from only being able to recall general feelings and themes to supporting their answers with specific text evidence. This indicates that low achieving students benefitted from collaborating with like ability peers. In general, the majority of the students in the high achieving homogenous group showed lower scores on the post-test than on the pre-test. This suggests negative effects of the study and raises the question if high ability peers benefit from working with one another. Overall, the researcher did observe positive effects on student's abilities to work in groups and effectively communicate with peers and stay focused on an academic task.

Threats to Validity

There were several threats to both the internal and external validity of this convenience sample including selection, instrumentation, multiple treatments and treatment diffusion.

Students were selected via a convenience sample from the researchers class. There was a very small sample size of sixteen students. Students were placed into groups based on their third grade reading benchmark results. From the beginning of the treatment, the groups were uneven, being that the lowest achieving students worked collaboratively with the lowest achieving students, the highest achieving students worked collaboratively with the highest achieving students and finally the heterogeneous groups was randomly selected from the two homogeneous groups. A larger sample size of even groups may have yielded very different results.

The pre-test was students' third grade reading benchmark assessment that was administered and proctored by a different examiner than the post-test which was administered and proctored by the researcher. Different scorers also scored the pre-test and the post-test and scoring bias, especially on the writing portion of the benchmark should be taken into account when interpreting the results.

Throughout the school day students receive both whole group instruction, where the study took place, and small group instruction that is mandated to be homogenously grouped. Students were first instructed as a whole class and split into their study groups to practice the skill, and then after whole group instruction was over they would move into their homogenous groups. In these small groups, students work with those of like achievement and were instructed also on the 4th grade Common Core State Standards. The bi-modal structure of reading instruction in the researchers convenience sample was a threat to validity.

Another threat to validity was treatment diffusion. As mentioned above, in a small class of only sixteen students, participants worked with classmates from different treatment groups throughout various literacy centers. The effect of the whole group reading instruction groups

may have been influenced by student interactions throughout other literacy instruction and practice.

Connections to the Literature

Other researchers, specifically Farver (2011) and Kaya (2015) have conducted similar studies to this one, using heterogeneous and homogenous groups, and have found no statistically significant results. Similar to the results of this study, Farver also used a pretest/ posttest design to examine the effects of heterogeneous and homogenous groups. Farver also found no statistically significant results between the groups on the post-test. Farver followed up by stating that the intervention she used should be further studied and applied to a larger sample size. This same holds true for this study as the instruction was a county curriculum rather than a formal intervention. Kaya also found similar results in the amount of higher-level questions that students of either homogeneous or heterogeneous groups were able to generate. Neither group generated higher-level questions than the other after the treatment.

Implications for Future Research

Additional research should be conducted to examine the effectiveness of heterogeneous versus homogenous reading achievement groups. In the future, a researcher should consider conducting and scoring both the pre and the post-test to ensure consistency. In addition, a larger sample size with a uniform treatment may yield drastically different results. For example, if all fourth grade classrooms in the school system taught only heterogeneous or only homogenous reading achievement groups, this would provide more representative results. Including a variety of age groups in this sample may also help to determine if heterogeneous or homogenous reading achievement groups are more effective.

Conclusion

The results of this study implied no significant difference between homogenous versus heterogeneous reading achievement groups on 4th graders reading comprehension. Although reading achievement results were not statistically significant, students showed progress in quality of responses and the ability to collaborate on academic tasks. Students in the low achievement group showed the most progress from the pre-test to post-test, while students in the high achievement group showed the least progress. Therefore, it is important to evaluate the achievement of students prior to placing them into collaborative groups.

REFERENCES

Buttaro, A., Jr., Catsambis, S., Mulkey, L., & Steelman, L. (2010). An organizational perspective on the origins of instructional segregation: School composition and use of within-class ability grouping in american kindergartens. *Teachers College Record, 112*(5), 1300-1337.

Chorzempa, B., & Graham, S. (2006). Primary-grade teachers' use of within-class ability grouping in reading. *Journal of Educational Psychology,98*(3), 529-541.

Colon, G. (2016). Peer Assisted Learning Strategies for ELL's. *Educator's Voice 76*(4), 449-453.

Duflo, E., Dupas, P., & Kremer, M. (2009). Can tracking improve learning? *Education Next, 9*(3), 64-70.

Farver, C. (2011). The impact of a transition plan on reading test scores (Doctoral dissertation) . Retrieved from: http://www.proquest.com/en-US/products/dissertations/individuals.shtml (Accession Number: ED534197)

Garrett, R., & Hong, G. (2016). Impacts of grouping and time on the math learning of language minority kindergartners. *Educational Evaluation and Policy Analysis, 38*(2), 222.

Kaya, S. (2015). The effect of the type of achievement grouping on students' question generation in science. *Australian Educational Researcher,42*(4), 429-441.

Lou, Y., Abrami, P., & Spence, J. (2000). Effects of within-class grouping on student achievement: An exploratory model. *Journal of Educational Research, 94*(2), 101.

Matthews, M., Ritchotte, J., & McBee, M. (2013). Effects of school-wide cluster grouping and within-class ability grouping on elementary school students' academic achievement growth. *High Ability Studies, 24*(2), 81-97.

Meijnen, G., & Guldemond, H. (2002). Grouping in primary schools and reference processes. *Educational Research and Evaluation: An International Journal on Theory and Practice, 8*(3), 229-48.

Sims, D. (2008). A strategic response to class size reduction: Combination classes and student achievement in California. *Journal of Policy Analysis and Management, 27*(3), 457-478.

Wiedmann, M., Leach, R., Rummel, N., & Wiley, J. (2012). Does group composition affect learning by invention? *Instructional Science, 40*(4), 711-730. doi://dx.doi.org.goucher.idm.oclc.org/10.1007/s11251-012-9204-y