Fall 2023

# The Effectiveness of Individual, Small-Group, and Whole-Class Interventions at the Secondary Level

Rebecca Miller

# The Effectiveness of Individual, Small-Group, and Whole-Class Interventions at the Secondary Level

Rebecca Jean Miller

Capstone Project: An Action Research Project

Northwestern College, Orange City, Iowa

**Abstract**

The purpose of this action research project was to determine if academic interventions in reading, writing, and mathematics can have an effect on student achievement at the secondary level. Additionally, the goal was to determine if individual, small-group, or whole-class interventions were the most effective. The researcher gleaned data from the 2022-2023 school year based on two individual interventions, nine small-group interventions, and one whole-class intervention. The researcher is an Instructional Coach and had a part in planning for and/or implementing all of these interventions. This research was conducted to help decide if the use of academic intervention is beneficial at the secondary level and which type of interventions students respond to the most. Also, this research will help with the planning of interventions in the upcoming school years. The research found that all of the academic interventions provided had a positive impact on student growth since the minimum growth on the diagnostic was double the expected growth. Additionally, individual academic interventions showed the most growth and were the most effective over small-group and whole-class interventions.

*Keywords:* secondary interventions, individual, small-group, whole-class

## Table of Contents

# The Effectiveness of Individual, Small-Group, and Whole-Class Interventions at the Secondary Level

According to the National Center for Education Statistics (2019), one out of every five adults (21%) do not have sufficient English literacy skills to complete low-level literacy tasks. Additionally, 30% of adults do not have sufficient mathematics skills to complete basic problems using whole numbers or interpret basic data (National Center for Education Statistics, 2020). Therefore, not all students are leaving or graduating from high school able to perform simple literacy and mathematics skills needed to be successful in today's world. Students at the secondary level use reading and writing as the primary way of learning content and demonstrating their learning (Garwood, 2018). So, a student's struggles with literacy impact their learning in other courses. If a student has a learning disability, disorder, or language impairment, they are more at risk for challenges, learning deficits, and poor academic outcomes (Bakken et al., 2021; Elleman et. al, 2019; Lee & Soon, 2017; Brown et al., 2016). Colleges and corporations report that incoming students and recruits lack the foundational writing skills that are necessary to be successful in their positions (Datchuk et al., 2022. The problem is that students are leaving their secondary education without the needed literacy and math skills to be successful in their post-secondary education and careers.

A way to address these learning deficits and struggles is to implement interventions at the secondary level. Since reading and writing skills are so important for secondary success, increased attention has been given to student literacy development (Garwood, 2018). Thousands of students are participating in various interventions to help them improve their skills. The evidence suggests that there can be success when implementing interventions with adolescents (Fisher & Frey, 2014). Studies have even found evidence that participating in interventions in

high school increases the likelihood of enrolling in and completing college courses (Backes et al., 2022).

With the robust research supporting the use of interventions, there is little research comparing the effectiveness of individual, small-group, and whole-class interventions. The question of which type of intervention (individual, small-group, or whole-class) is the most effective at the secondary level remains. This action research study will strive to answer this gap in research by evaluating the effectiveness of these types of interventions in a small secondary school.

The purpose of this action research project is to use multiple points of data to help determine if individual, small-group, or whole-class interventions are the most effective at the secondary level. The research shows that remediating reading challenges beyond third grade can be very challenging and that older students do not respond to interventions as quickly as younger students (Vaughn et al., 2015). This action research project will not only suggest which intervention is most effective but will also help determine if teaching interventions at the secondary level lead to increases in learning and data.

The resources for this action research plan were compiled using DeWitt Library at Northwestern College. Included in this plan are peer-reviewed articles written within the last ten years. All of the resources discuss using interventions at the secondary level (either middle or high school). Some resources focus on individual interventions, small-group interventions, or whole-class interventions. Other resources include reviews of multiple interventions. Interventions discussed in the resources addressed writing, reading comprehension, morphology, vocabulary, and/or mathematics.

## Review of the Literature

### Individual Interventions

There are limited studies on the effectiveness of individual interventions. Providing individual interventions can be time-consuming and often happens only with the special education population. However, investigating gains not only at a group level but at an individual level provides important information about which instructional approaches are most effective and how the instructional environment contributes to the best learning (Calhoon et al., 2013).

Powell and Gadke (2018) used a repeated reading and listening passage preview intervention individually with three middle-school students. The researchers pointed out that readers have to develop automaticity when it comes to reading fluency in order to efficiently comprehend what they are reading. Recognized since the 1700s, being able to read text has been a hallmark of good readers (Paige et al., 2022). All three of the students in the Powell and Gadke (2018) study had oral reading difficulties, had been retained in their current grade, and had failed their reading/language arts class the year before. Three different conditions were repeated during this study: repeated reading, listening passage preview, and a nonintervention control. This study found that repeated reading was the more effective intervention as all three of the students were able to read more words correctly per minute after participating in this intervention. Based on these results, educators should offer fluency-based interventions to students with reading difficulties to immediately improve their oral reading fluency (Powell & Gadke, 2018).

The second research study used individual and paired interventions based on morphemic vocabulary instruction with middle school students. The authors pointed out that vocabulary acquisition is critical for success in school, very important for comprehending text, and inquired

incidentally by most students (Harris et al., 2016). However, students who lack comprehension skills or have a learning disability can struggle with vocabulary. The purpose of this study was to determine if a vocabulary intervention focused on morphemic vocabulary instruction could assist in word knowledge and the comprehension of sentences with the six middle schoolers in the first study and the four middle schoolers in the second study. Based on these two studies which emulated each other, direct instruction based on morphology that links the meaning of a prefix and root word is effective. Also, students may need more support to apply their new knowledge and understanding to new and unknown words in sentences (Harris et al., 2016).

An individual multiplication intervention comprised of conceptual instructions and understanding along with knowing the facts was used in a study conducted by Mariuche (2018). One student was nine years old, and the other student was 11 years old; both had a learning disability. One student had an increase of 18% in correct responses to multiplication problems, but the other student did not show any growth between the pre- and post-tests (Mariuche, 2018). This latter student's specific disabilities are speculated to have prohibited learning from the multiplication intervention.

Through synthesis of the information and data presented by these students, one can conclude that a certain intervention may work better than another with individual students. Also, some students may respond to a certain intervention while others do not. Since individual interventions are often administered to special education students, this tailored approach makes sense. These students need an individualized program tailored to their specific learning needs.

**Small-Group Interventions**

All Tier 1 students deserve and need the appropriate instructions to develop grade-level academic skills. Even with the appropriate instruction, students can still struggle and may need Tier 2 and/or 3 interventions. These interventions are often delivered in a small-group setting. Supplemental interventions are vital to ensure these students who struggle can learn the skills to be successful in their core academic classes (Reed et al., 2023).

The first small-group intervention research study dealt with improving the reading comprehension of high school students who had low reading comprehension on their state assessment. Having issues with reading comprehension can cause many challenges with accessing everyday information from print (Vaughn et al., 2015). This research study dealt with 77 ninth-grade students who started a reading intervention that lasted for two years. During these two years, the intervention focused on explicitly teaching phonics, morphology, vocabulary, and comprehension skills using their content-area classes. This intervention was taught to students in groups no larger than ten students. The students who received the intervention scored significantly higher (effect size of 0.44) than the students who did not receive the intervention based on a standardized reading assessment (Vaughn et al., 2015). This research study raised an interesting observation: one would think that a long intervention such as this one would yield more of an impact, but research consistently shows that brief interventions that are eight weeks or shorter can be just as beneficial since longer interventions often lose their effects (Vaughn et al., 2015).

Cramer and Mason's (2014) small-group intervention research study dealt with a writing intervention with eight middle school students who had emotional and behavioral disorders. The students worked in pairs and used interventions focused on quick writes, peer revision strategies,

and making writing revisions. All the students who participated in this writing intervention were able to reach mastery level (score of 8.00) on writing assessments (Cramer & Mason, 2014). This study showed that a small-group writing intervention based on peer revision can be very beneficial and have positive effects.

**Whole-Class Interventions**

Finding research studies about the effectiveness of whole-class interventions was easier. If teachers find that their whole class is struggling with content area knowledge and skills, they may elect to implement a whole-class intervention instead of small-group or individual interventions. The following information and data come from five different whole-class studies.

McKeown (2018) studied the effect of a whole-class vocabulary intervention for middle school students that lasted two years. In the first year, 105 students participated, with 62 students in the intervention and 43 students in the control group. The students in the intervention group received academic vocabulary and comprehension skills using the Robust Academic Vocabulary Encounters (RAVE) program (McKeown, 2018). The pretest scores were similar between the groups, but the posttest scores were significantly different in favor of the intervention group. For the second year, 87 students participated with 44 in the intervention class and 43 in the control group. Again, the intervention group's posttest scores showed more growth and their reaction time by word type was higher than the control group's reaction time. The intervention group's reading comprehension score and morphological analysis task averages were significantly higher than the control group's averages (McKeown, 2018). This study shows that a whole-class intervention can have a positive effect as opposed to a class not receiving any intervention.

Murphy et al. (2017) also used a vocabulary intervention for secondary students, but it was a short-term intervention. This intervention was delivered twice a week for 12 weeks; participants included 128 students in the intervention group and 75 students in the control group. The intervention program focused on developing vocabulary strategies to aid in independent word learning and using context skills to identify the meanings of words. At the end of the 12 weeks, all of the students were assessed using four different diagnostics used to assess vocabulary skills. The students in the intervention group significantly improved in all four of the diagnostics, and the control group improved on only two of the assessments (Murphy et al., 2017). This study shows that even short-term interventions can have promising results and growth in students.

The next two research studies were based on whole-class interventions in reading. The first research study was on using a close reading intervention with struggling middle schoolers. One hundred students participated in this one-year-long study; 60 students received the intervention, and 40 students were in the control group (Fisher & Frey, 2014). The close reading intervention involves reading short, complex passages multiple times so the student is able to identify different ideas, answer questions, and discuss the text. After a year of close reading interventions, 64% of the students increased by at least one level (example: Below Basic to Basic), 35% stayed at the same level, and 1% performed worse than the year prior. For the control group, only 12% of the students increased by at least one level, 73% stayed the same, and 15% did worse (Fisher & Frey, 2014).

The other research study on a whole-class reading intervention lasted for three years. In the first year, 768 6$^{th}$-grade students from two large urban cities participated in a reading intervention focused on advanced strategies used to decode multisyllabic words, vocabulary, and

comprehension (Roberts et al., 2013). At the end of the first year, the students receiving the intervention had more growth in letter-word identification, word attack skills, and passage comprehension compared to the "business-as-usual" (BaU) group (Roberts et al., 2013). Based on their data at the end of the first year, the students were then put into small groups of five if they did not meet the end-of-the-year expectations for the previous year. In year three, students who did not meet the expectations in the spring of the prior school year were put into even smaller groups of two or three to receive more specialized reading interventions (Roberts et al., 2013). At the end of the three years, the students who received one or more years of intervention scored an average of 40% greater than the BaU group. Both of these studies on reading interventions show positive growth for the students who received the intervention as opposed to the students who did not participate in the intervention.

Bennett et al.'s (2022) whole-class intervention research study was based on structured writing activities in a history class at the high school level. This study took place in a rural Nebraska high school, which has a similar population to the secondary school in this current research study project (Bennett et. al, 2022). Writing frames and writing guides were used in this six-week intervention. A writing frame provides students with the structure of a paragraph along with already-written story starters. Writing guides give students checklists of the elements required in the paragraph along with step-by-step guidelines. A pretest was given prior to starting the intervention and a posttest was given after the six weeks of intervention. The average increase in score was 3.34 points and students identified as special education or English Language Learners saw even greater increases (Bennett et. al, 2022). This research study shows that even a short-term whole-class intervention can have promising results.

**Mixed-Methods Interventions**

There was much information on integrating interventions through the use of literature reviews and meta-analyses. The majority of these literature reviews and meta-analyses focused on literacy. All of them also gave multiple examples and support for the use of interventions in school.

A meta-analysis by Melby-Lervag and Lervag (2014) showed that interventions targeting skills related to reading comprehension by using different strategies had the largest effects. Bakken et al.'s (2021) meta-analysis of the use of reading and writing interventions with students with intellectual disorders showed that these students benefited mostly from interventions that were focused on decoding and sight word strategies. In a literature review of reading and writing interventions for students with learning disabilities, it was found that these students responded best to highly-structured, explicit, and multicomponent interventions (Kang et. al, 2015). In another literature review of literacy interventions with students with behavioral disorders, Garwood (2018) found that interventions that incorporate some sort of self-regulation and are delivered in a manner that is developmentally appropriate show the most student improvement.

Lee & Yoon's (2017) meta-analysis was on the effects of repeated readings on fluency in students with reading disabilities. The results of this study were consistent with previous findings that supported repeated readings as an effective intervention for students with reading disabilities. Filderman et al's (2022) meta-analysis focused on the effects of reading comprehension interventions on reading comprehension abilities in struggling readers in grades 3-12. The findings in this study supported using background knowledge and strategy instruction to increase reading comprehension in struggling readers. This study also found that the average effect for elementary students, which was 0.47, was quite a bit smaller than for secondary

students, which was 0.67 (Filderman et. al, 2022). All of these meta-analyses and literature reviews used many different studies to support their findings on the effects of various interventions. Additionally, they all support the conclusion that the use of interventions can be beneficial to students who struggle academically.

# Methodology

## Research Question

The following questions shaped my action research study:

- How much of an effect can academic interventions have on student achievement at the secondary level?
- Which interventions - individual, small-group, or whole-class interventions – are the most effective at the secondary level?

## Participants and Research Site

This action research study took place in a secondary building that serves students in grades 7-12. These students participated in a variety of interventions based on their scores on different diagnostic assessments. The interventions took place throughout the 2022-2023 school year.

For the individual interventions, a 7th-grade student participated in an intervention called the Numeracy Project, which focused on strategies to improve number sense. Her scores on the i-Ready math diagnostic and Iowa State Assessment of Student Progress (ISASP) were used to identify her as a candidate for individual assessments. Also, an 8th-grade student participated in a reading intervention focused on phonological awareness and comprehension skills. His scores on the Phonological Awareness Screening Test (PAST), Formative Assessment System for Teachers (FAST) a-Reading and auto reading diagnostics, and ISASP were used to identify him as a candidate for individual interventions.

Students in 9th-11th grades who scored in the non-proficient range on their 2022 ISASP scores in reading, writing, or math participated in interventions. A total of 80 students participated in an intervention during DISCOVER, which is a 30-minute period in the middle of the day that provides enrichment opportunities. Each intervention lasted for four and a half weeks.

The entire 8th-grade class participated in a whole-class intervention focused on phonics skills, vocabulary, and fluency. The FAST assessment from the fall of 2022 identified that a whole-class intervention was recommended due to the high number of students who were not proficient on the FAST autoReading and aReading assessments. The recommended intervention was one focused on phonics and fluency. A total of 35 students participated in this intervention which started in October 2022 and ended in May 2023.

After reviewing the ISASP data from the spring of 2022, small-group interventions were formed and started in October of 2022. Each intervention lasted for four and a half weeks during DISCOVER time which is a 30-minute period in the middle of the day. For DISCOVER Session 3, there was an Algebra 1A intervention with 9th graders and two writing interventions with 10th and 11th graders. In DISCOVER Session 4, there was an Algebra 1 intervention, a 10th and 11th-grade reading intervention, and a 9th-grade writing intervention. The interventions for DISCOVER Session 5 included a 9th-grade writing intervention, an Algebra 1B intervention, and a 10th and 11th-grade math intervention. All of the groups had between six and twelve students and a total of 80 interventions were provided. Some students participated in more than one intervention, so that is why the total number of interventions provided was shared.

The interventions provided during DISCOVER were based on the data from the ISASP scores from the spring of 2022 along with teacher input on what skills the students were struggling with. The writing intervention focused on writing complete paragraphs using correct grammar, capitalization, and punctuation as well as varied word choices. It is also focused on being able to produce writing that has a clear and organized flow with an introduction, body, and conclusion based on the purpose of the writing. The math interventions focused on different skills in the areas of geometry, algebra, statistics and probability, functions, and numbers and quantities based on what the ISASP scores indicated were areas of concern. For the reading intervention, there was a focus on using reading comprehension strategies to find the key ideas and details of a text, determine the craft and structure of a text, and integrate ideas and knowledge with the text.

**Measurement Tools**

Quite a few different standardized assessments and diagnostics were used to collect data for this action research study. This action research study used all quantitative data to answer its research questions. All of the assessments and diagnostics used are evidence-based and provide clear and accurate assessments of student learning.

For the individual math intervention, i-Ready math diagnostic assessments were given in September 2022, December 2022, and May 2023. Also, the ISASP scores from 2022 and 2023 were used to show growth. For the individual reading intervention, FAST reading diagnostic data (aReading and autoReading) from September 2022, January 2023, and May 2023 was used and the ISASP data from 2022 and 2023 was also used. For the small-group interventions, the ISASP data from 2022 and 2023 was used to determine if there was student growth in the academic areas in which they participated in interventions. Additionally, for whole-class interventions, the FAST (aReading and autoReading) and ISASP data were also used.

**IRB**

An IRB exemption was obtained for this action research study on September 26, 2023. The exemption was granted since the data collected is a normal part of the educational setting. Also, the research study did not adversely affect any student's learning. Furthermore, it was unlikely to adversely affect teacher assessments.

**Data Collection**

In order to answer this action research project's questions, quantitative data from the 2022-2023 school year was relied upon. Data from individual, small-group, and whole-class interventions was collected to address these questions:

- How much of an effect can academic interventions have on student achievement at the secondary level?
- Which interventions - individual, small-group, or whole-class interventions – are the most effective at the secondary level?

# Findings

## Data Analysis

### Individual Interventions

For Student A who received a math intervention called the Numeracy Project, data from ISASP, i-Ready diagnostic, and the Numeracy Project was compared year to year to determine the intervention's effectiveness and is shown in Table 1. Student A was a 7th grader in the 2022-2023 school year.

**Table 1**

*Individual Math Intervention*

| Spring 2022 ISASP Math Score | Spring 2023 ISASP Math Score |
|---|---|
| 435 | 516 |

81-point growth = 18.6% growth

| Fall 2022 i-Ready Diagnostic Score | Spring 2023 i-Ready Diagnostic Score |
|---|---|
| 462 | 498 |

36-point growth = 7.8% growth

| Numeracy Project (Started in Oct. 2022) | Numeracy Project (Ended in May 2023) |
|---|---|
| 79 | 149 |

70-point growth = 89% growth

The expected yearly growth for ISASP is 3%, so Student A was well above that expectation. For the i-Ready diagnostic, Student A grew from 4th grade to early 6th grade and showed a progress of 257% towards her expected growth. On the Numeracy Project, Student A started in Stage 5 (5th grade) and ended in Stage 7 (7th grade).

For Student B who received a phonemic awareness (PAST) and comprehension intervention, data from ISASP and the FAST reading diagnostics was compared year to year to show growth and is shown in Table 2. Student B was an 8th grader in the 2022-2023 school year.

**Table 2**

***Individual Reading Intervention***

| Spring 2022 ISASP Reading Score | Spring 2023 ISASP Reading Score |
|---|---|
| 453 | 481 |

28-point growth = 6.2% growth

| Fall 2022 FAST a-Reading Score | Spring 2023 FAST a-Reading Score |
|---|---|
| 514 | 525 |

9-point growth = 2.1% growth

| Fall 2022 FAST autoReading Score | Spring 2023 FAST autoReading Score |
|---|---|
| 519 | 525 |

6-point growth = 1.2% growth

Again, the expected yearly growth in ISASP is 3%. So, Student B doubled that growth percentage. The expected yearly growth on both aReading and autoReading is five points. Therefore, Student B had a bit more growth on aReading over autoReading.

## Small-Group Interventions

A total of nine small-group interventions were implemented during DISCOVER from October 2022 to March 2023. There were four math interventions, one reading intervention, and four writing interventions. A dependent samples t-test was conducted to help determine if there was growth in the targeted skills. The information about the t-tests is presented below each intervention's table. All of the data is reported in Tables 3-11.

**Table 3**

*9th Grade (Algebra 1A) Math Intervention (Session 3)*

| | Spring 2022 ISASP Math Score | Spring 2023 ISASP Math Score | Percent of Growth |
|---|---|---|---|
| Student A | 466 | 484 | 4% |
| Student B | 466 | 521 | 12% |
| Student C | 481 | 506 | 5% |
| Student D | 466 | 498 | 7% |
| Student E | 481 | 569 | 18% |
| Student F | 476 | 484 | 2% |
| Student G | 466 | 473 | 2% |
| Student H | 447 | 457 | 2% |
| Student I | 451 | 478 | 6% |

Average: 6.4%
Pretest (ISASP 2022) – M=466.67, SD=11.22
Posttest (ISASP 2023) – M=496.67, SD=31.12
t(8) = -3.41, p = 0.009

**Table 4**

*10th and 11th Grade Writing Intervention (Session 3)*

| | Spring 2022 ISASP Writing Score | Spring 2023 ISASP Writing Score | Percent of Growth |
|---|---|---|---|
| Student A | 20% | 40% | 20% |
| Student B | 30% | 65% | 35% |
| Student C | 20% | 50% | 30% |
| Student D | 25% | 20% | -5% |
| Student E | 20% | 40% | 20% |
| Student F | 40% | 35% | -5% |
| Student G | 20% | 40% | 20% |
| Student H | 20% | 30% | 10% |

Average: 15.6%
Pretest (ISASP 2022) – M=24%, SD=0.07
Posttest (ISASP 2023) – M=40%, SD=0.12
T(7) = -3, p = 0.020

**Table 5**

*10th and 11th Grade Writing Intervention 2 (Session 3)*

| | Spring 2022 ISASP Writing Score | Spring 2023 ISASP Writing Score | Percent of Growth |
|---|---|---|---|
| Student A | 30% | 65% | 35% |
| Student B | 25% | 40% | 15% |
| Student C | 25% | 60% | 35% |
| Student D | 20% | 60% | 40% |
| Student E | 20% | 60% | 40% |
| Student F | 20% | 60% | 40% |
| Student G | 20% | 30% | 10% |
| Student H | 40% | 40% | 0% |
| Student I | 25% | 40% | 15% |
| Student J | 20% | 5% | 25% |

Average: 23.5%
Pretest (ISASP 2022) – M=25%, SD=0.06
Posttest (ISASP 2023) – M=48%, SD=0.14
t(9) = -4.65, p = 0.001

**Table 6**

*9th Grade (Algebra 1) Math Intervention (Session 4)*

| | Spring 2022 ISASP Math Score | Spring 2023 ISASP Math Score | Percent of Growth |
|---|---|---|---|
| Student A | 476 | 513 | 8% |
| Student B | 476 | 552 | 16% |
| Student C | 485 | 513 | 6% |
| Student D | 481 | 521 | 8% |
| Student E | 466 | 513 | 10% |
| Student F | 476 | 506 | 6% |
| Student G | 481 | 544 | 13% |

Average: 9.6%
Pretest (ISASP 2022) – M=477.29, SD=5.60
Posttest (ISASP 2023) – M=523.14, SD=16.37
t(6) = -6.84, p = 0.0005

**Table 7**

*10th and 11th Grade Reading Intervention (Session 4)*

| | Spring 2022 ISASP Reading Score | Spring 2023 ISASP Reading Score | Percent of Growth |
|---|---|---|---|
| Student A | 497 | 457 | 12% |
| Student B | 504 | 579 | 15% |
| Student C | 465 | 534 | 15% |
| Student D | 483 | 491 | 2% |
| Student E | 453 | 493 | 9% |
| Student F | 501 | 546 | 9% |

Average: 10.3%
Pretest (ISASP 2022) – M=483.83, SD=19.06
Posttest (ISASP 2023) – M=533.33, SD=32.21
$t(5) = -4.97$, $p = 0.004$

**Table 8**

*9th Grade Writing Intervention (Session 4)*

| | Spring 2022 ISASP Writing Score | Spring 2023 ISASP Writing Score | Percent of Growth |
|---|---|---|---|
| Student A | 30% | 30% | 0% |
| Student B | 30% | 30% | 0% |
| Student C | 0% | 30% | 30% |
| Student D | 20% | 35% | 15% |
| Student E | 0% | 25% | 25% |
| Student F | 30% | 40% | 10% |
| Student G | 30% | 40% | 10% |
| Student H | 30% | 50% | 20% |
| Student I | 40% | 55% | 15% |
| Student J | 35% | 25% | -10% |

Average: 11.5%
Pretest (ISASP 2022) – M=25%, SD=0.13
Posttest (ISASP 2023) – M=36%, SD=0.10
$t(9) = -2.97$, $p = 0.016$

**Table 9**

*9th Grade Writing Intervention (Session 5)*

| | Spring 2022 ISASP Writing Score | Spring 2023 ISASP Writing Score | Percent of Growth |
|---|---|---|---|
| Student A | 25% | 60% | 35% |
| Student B | 30% | 25% | -10% |
| Student C | 20% | 35% | 15% |
| Student D | 20% | 25% | 5% |
| Student E | 40% | 40% | 0% |
| Student F | 0% | 20% | 20% |
| Student G | 30% | 20% | -10% |
| Student H | 40% | 40% | 0% |

Average: 7.5%
Pretest (ISASP 2022) – M=26%, SD=0.12
Posttest (ISASP 2023) – M=33%, SD=0.13
t(7) = -1.43, p = 0.197

**Table 10**

*10th and 11th Grade Math Intervention (Session 6)*

| | Spring 2022 ISASP Math Score | Spring 2023 ISASP Math Score | Percent of Growth |
|---|---|---|---|
| Student A | 506 | 530 | 5% |
| Student B | 478 | 502 | 5% |
| Student C | 478 | 552 | 15% |
| Student D | 498 | 530 | 6% |
| Student E | 498 | 489 | -2% |
| Student F | 498 | 537 | 8% |
| Student G | 491 | 537 | 9% |
| Student H | 506 | 523 | 3% |
| Student I | 473 | 482 | 2% |
| Student J | 502 | 531 | 6% |
| Student K | 467 | 502 | 7% |
| Student L | 476 | 548 | 15% |

Average: 6.6%
Pretest (ISASP 2022) – M=489.25, SD=13.37
Posttest (ISASP 2023) – M=521.92, SD=21.84
t(11) = -4.77, p = 0.0005

**Table 11**

*$10^{th}$ and $11^{th}$ Grade Math Intervention 2 (Session 6)*

| | Spring 2022 ISASP Math Score | Spring 2023 ISASP Math Score | Percent of Growth |
|---|---|---|---|
| Student A | 484 | 607 | 25% |
| Student B | 502 | 548 | 9% |
| Student C | 502 | 514 | 2% |
| Student D | 509 | 603 | 18% |
| Student E | 523 | 548 | 5% |
| Student F | 509 | 559 | 10% |
| Student G | 530 | 525 | -1% |
| Student H | 523 | 531 | 2% |
| Student I | 530 | 542 | 2% |
| Student J | 523 | 548 | 5% |

Average: 7.7%
Pretest (ISASP 2022) – M=513.50, SD=14.11
Posttest (ISASP 2023) – M=552.50, SD=29.04
$t(9) = -3.02$, $p = 0.015$

For all of these small-group interventions, the average growth from the pretest to posttest data was above the expected yearly growth of 3%. The range for average growth was 6.4% to 23.5%. For eight out of nine of these interventions, the p values were less than 0.05. These findings are considered significant.

## Whole-Class Intervention

From October 2022 to May 2023, 34 eighth graders participated in a whole-class intervention. A dependent samples t-test was conducted to help determine if there was growth in the targeted sills. The data is presented in Table 12 and the information about the t-test is presented below the table.

**Table 12**

*Whole-Class Reading Intervention*

| | Spring 2022 ISASP ELA Score | Spring 2023 ISASP ELA Score | Growth | Fall 2022 autoReading Score | Spring 2023 autoReading Score | Growth (in points) |
|---|---|---|---|---|---|---|
| Student A | 453 | 526 | 16% | 522 | 531 | 9 |
| Student B | 544 | 585 | 8% | 568 | 563 | -5 |
| Student C | 431 | 481 | 12% | 525 | 538 | 13 |
| Student D | 456 | 455 | -0.2% | 541 | 527 | -13 |
| Student E | 435 | 499 | 15% | 526 | 528 | 2 |
| Student F | 478 | 515 | 8% | 557 | 585 | 28 |
| Student G | 496 | 547 | 10% | 541 | 537 | -4 |
| Student H | 509 | 583 | 15% | 546 | 555 | 9 |
| Student I | 453 | 493 | 9% | 526 | 521 | -5 |
| Student J | 448 | 521 | 16% | 549 | 546 | -3 |
| Student K | 471 | 493 | 5% | 510 | 511 | 1 |
| Student L | 465 | 521 | 16% | 543 | 544 | 1 |
| Student M | 498 | 540 | 8% | 539 | 532 | -7 |
| Student N | 450 | 471 | 5% | 531 | 538 | 7 |
| Student O | 462 | 488 | 6% | 525 | 531 | 6 |
| Student P | 460 | 509 | 11% | 534 | 543 | 9 |
| Student Q | 497 | 505 | 2% | 509 | 522 | 13 |
| Student R | 441 | 451 | 2% | 518 | 503 | -15 |
| Student S | 441 | 479 | 9% | 524 | 537 | 13 |
| Student T | 438 | 465 | 6% | 493 | 500 | 7 |
| Student U | 550 | 577 | 5% | 545 | 542 | -3 |
| Student V | 595 | 661 | 11% | 588 | 589 | 1 |
| Student W | 489 | 538 | 10% | 519 | 517 | -2 |
| Student X | 423 | 461 | 9% | 515 | 514 | -1 |
| Student Y | 477 | 553 | 16% | 553 | 558 | 5 |
| Student Z | 569 | 595 | 5% | 572 | 570 | -2 |
| Student AA | 520 | 547 | 5% | 530 | 553 | 23 |
| Student BB | 453 | 481 | 6% | 519 | 525 | 6 |
| Student CC | 465 | 462 | -1% | 547 | 549 | 2 |
| Student DD | 471 | 521 | 11% | 529 | 561 | 32 |
| Student EE | 550 | 585 | 6% | 529 | 548 | 19 |
| Student FF | 512 | 543 | 6% | 539 | 554 | 15 |
| Student GG | 514 | 596 | 16% | 546 | 548 | 2 |
| Student HH | 474 | 509 | 7% | 513 | 520 | 7 |
| Class Average | 480.9 | 522.6 | 41.7 points = 8.7% | 534.4 | 539.4 | 5 points |

Pretest (ISASP 2022) – M=480.91, SD=41.55
Posttest (ISASP 2023) – M=522.57, SD=47.85
ISASP: $t(34) = -10.67$, $p < 0.0001$
Pretest (Fall FAST) – M=534.44, SD=19.12
Posttest (Spring FAST) – M=539.41, SD=20.55
FAST: $t(33) = -2.75$, $p = 0.0095$

For the pretest and posttest data using ISASP scores, the average for the entire 8th-grade class was 8.7%. The range of growth was between -1% to 16%, and 94% of the students met the expected yearly growth of 3%. The pretest and posttest data on the FAST autoReading assessment showed a growth of 5 points, which is the expected yearly growth. Only 53% of the students met the expected yearly growth goal of 5 points, but some of the students who didn't meet the growth goal were still considered proficient (score of 541 in the spring). Both the ISASP and FAST scores had a p value less than 0.05. So, both findings are considered significant.

# Discussion

## Summary of Major Findings

The first question of this action research study is: How much of an effect can academic interventions have on student achievement at the secondary level? The average growth on each intervention on the ISASP showed a growth greater than the expected yearly growth of 3%. In fact, the minimum growth was 6.2% which is double the expected growth. The highest growth was 23.5% on the ISASP. This data shows that academic interventions at the secondary level can have a profound effect on student achievement.

When looking at the individual student data, a total of 116 interventions were provided to individual students. A total of 92 of these students (79%) met or exceeded the 3% expected yearly growth on the ISASP. There is also individual data using the Numeracy Project diagnostic and FAST reading diagnostics. Both of these sets of data show student growth. This individual student data supports that academic interventions can have a positive effect on student achievement at the secondary level.

The second question of this action research study is: Which interventions - individual, small-group, or whole-class interventions – are the most effective at the secondary level? In order to compare the effect of these interventions, the ISASP data will be used since it is consistently used in each type of intervention. The average yearly ISASP growth for the two individual interventions was 12.4%. For the nine small-group interventions, the average was 11% and the average for the whole-class intervention was 8.7%. Based on this data, individual interventions, as compared to small-group or whole-class interventions, were the most effective at the secondary level.

## Limitations of the Study

One of the limitations of this study is that the interventions were provided to students at different lengths. The small-group interventions lasted only four and a half weeks while the whole-class intervention lasted for six months. This difference in intervention lengths could have affected the results. Another limitation is that some of the small-group interventions did not have the full four and a half weeks due to the number of snow days and late starts that occurred in the 2022-2023 school year. DISCOVER Session 4 was hit with the highest number of late starts and no school days which could have had an effect on the data.

As always when looking at data, it does not tell the personal story of a student. Dips in achievement and data can be explained by a personal situation happening at home, missing school days due to illness, or other situations or concerns. Those individual stories are not told while looking at numbers, percentages, and data.

## Further Study

A suggestion for further studies on the effectiveness of interventions at the secondary level would be to study whether short-term or long-term academic interventions are more effective. It would be interesting to compare a small-group short-term intervention to a small-group long-term intervention. Only one research study from the literature review approached the topic of whether long-term interventions had higher impacts than short-term interventions. Vaughn et al.'s (2015) research suggests that brief interventions that are eight weeks or less have higher impacts than longer interventions such as two years long. It would be beneficial to have more studies on the effectiveness and impact of short-term versus long-term interventions.

Another suggestion would be to have an action research study on mathematics interventions at the secondary level. Finding research studies on this topic was extremely difficult. There are many studies on reading and writing, but not on mathematics.

## Conclusion

This action research study shows that academic individual, small-group, and whole-class interventions can have a positive effect on growth at the secondary level. Individual, small-group, and whole-class interventions in the areas of reading, writing, and math were provided to students in the 2022-2023 school year. All of these interventions proved to be beneficial since students showed beyond-expected growth on diagnostic assessments. Furthermore, the data showed that individual interventions gleaned the highest growth. This action research study proves that interventions at the secondary level are indeed beneficial and necessary for students not proficient or lacking specific skills.

## References

Backes, B., Oliveira, A., & Goldhaber, D. (2022). Ready for college? Examining the effectiveness of targeted interventions in high school. *Educational Evaluation and Policy Analysis*, *44*(2), 183–209.

Bakken, R. K., Naess, K.-A. B., Lemons, C. J., & Hjetland, H. N. (2021). A systematic review and meta-analysis of reading and writing interventions for students with disorders of intellectual development. *Education Sciences, 11*(638), 1-19.

Bennett, E., Vu, P., & Vu, L. (2022). Effects of structured writing strategies in the high school history classroom. *Social Studies Research and Practice*, *17*(2), 210–217.

Brown, S. H., Lignugaris-Kraft, B., & Forbush, D. E. (2016). The effects of morphemic vocabulary instruction on prefix vocabulary and sentence comprehension for middle school students with learning disabilities. *Education and Treatment of Children*, 39(3), 301–338.

Calhoon, M. B., Scarborough, H. S., & Miller, B. (2013). Interventions for struggling adolescent and adult readers: Instructional, learner, and situational differences. *Reading and Writing*, 26(4), 489–494.

Cramer, A. M., & Mason, L. H. (2014). The effects of strategy instruction for writing and revising persuasive quick writes for middle school students with emotional and behavioral disorders. *Behavioral Disorders*, 40(1), 37–51.

Datchuk, S., Young, M. K., & Rouse, A. G. (2022). Writing interventions for students with learning disabilities: A scoping review. *Learning Disabilities: A Contemporary Journal*, *20*(2), 129-148.

Elleman, A. M., Oslund, E. L., Griffin, N. M., & Myers, K. E. (2019). A review of middle school vocabulary interventions: Five research-based recommendations for practice. *Language, Speech, and Hearing Services in Schools*, *50*(4), 477–492.

Filderman, M. J., Austin, C. R., Boucher, A. N., & Swanson, E. A. (2022). A meta-analysis of the effects of reading comprehension interventions on the reading comprehension outcomes of struggling readers in third through 12th grades. *Exceptional Children*, 88(2), 163–184.

Fisher, D., & Frey, N. (2014). Close reading as an intervention for struggling middle school readers. *Journal of Adolescent & Adult Literacy*, 57(5), 367–367.

Garwood, J. D. (2018). Literacy interventions for secondary students formally identified with emotional and behavioral disorders: trends and gaps in the research. *Journal of Behavioral Education*, *27*(1), 23–52.

Kang, E. Y., McKenna, J. W., Arden, S., & Ciullo, S. (2016). Integrated reading and writing interventions for students with learning disabilities: A review of the literature. *Learning Disabilities Research & Practice*, 31(1), 22–33.

Lee, J., & Yoon, S. Y. (2017). The effects of repeated reading on reading fluency for students with reading disabilities. *Journal of Learning Disabilities*, 50(2), 213–224.

Mariuche, R. de A. G., Gizele, A. M., Isabela, S. A., Annelise, J.-C., Antônio, J., & Vitor, G. H. (2018). Heterogeneity of math difficulties and its implications for interventions in multiplication skills. *Dementia & Neuropsychologia*, *12*(3), 256–263.

McKeown, M. G., Crosson, A. C., Moore, D. W., & Beck, I. L. (2018). Word knowledge and comprehension effects of an academic vocabulary intervention for middle school students. *American Educational Research Journal*, 55(3), 572–616.

Melby-Lervåg Monica, & Lervåg Arne. (2014). Effects of educational interventions targeting reading comprehension and underlying components. *Child Development Perspectives*, 8(2), 96–100.

Murphy, A., Franklin, S., Breen, A., Hanlon, M., McNamara, A., Bogue, A., & James, E. (2017). A whole class teaching approach to improve the vocabulary skills of adolescents attending mainstream secondary school, in areas of socioeconomic disadvantage. *Child Language Teaching and Therapy*, 33(2), 129–144.

National Center for Education Statistics. (July 2019). Adult literacy in the United States. Accessed Oct. 11, 2023, from https://nces.ed.gov/pubs2019/2019179/index.asp.

National Center for Education Statistics. (Sept. 2020). Adult numeracy in the United States. Accessed Oct. 11, 2023, from https://nces.ed.gov/pubs2020/2020025.pdf.

Powell, M. B., & Gadke, D. L. (2018). Improving oral reading fluency in middle-school students: A comparison of repeated reading and listening passage preview. *Psychology in the Schools*, 55(10), 1274–1286.

Reed, D., Binning, K., Jemison, E. A., & DeSalle, N. (2023). High-quality formative writing assessment for middle school students in Tier 2 literacy interventions. *Learning Disabilities Research & Practice*, *38*(1), 70-79.

Roberts, G., Vaughn, S., Fletcher, J., Stuebing, K., & Barth, A. (2013). Effects of a response-based, tiered framework for intervening with struggling readers in middle school. *Reading Research Quarterly*, 48(3), 237–254.

Vaughn, S., Roberts, G., Schnakenberg, J. B., Fall, A.-M., Vaughn, M. G., & Wexler, J. (2015). Improving reading comprehension for high school students with disabilities: Effects for comprehension and school retention. *Exceptional Children*, *82*(1), 117–131.