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Reading and Math Interventions at the Secondary Level: A Research Brief

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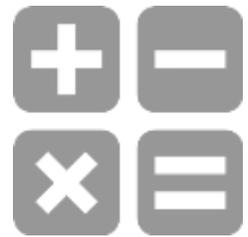


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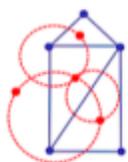
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at the **SECONDARY LEVEL**

a research brief



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READING and MATH INTERVENTIONS at the SECONDARY LEVEL

a research brief by Ashlee Lester, B.S. and David Naff, M.A.

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Starting in the early 2000's with the No Child Left Behind (NCLB) act, federal and state education authorities promoted the use of accountability policies that require schools to meet certain measures of academic progress overtime. Annual Yearly Progress (AYP) and Annual Measurable Objectives (AMOs) have become the new measure of school success. These policies rely heavily on students' Math and Reading achievement at particular benchmark grades, leading local educational agencies (i.e. school divisions) to place increased emphasis on the reading and math results of state-mandated testing. In Virginia, pressures to meet AYP and AMOs by improving school performance on the Standards of Learning assessments – especially in academically underperforming schools – has to led to the adoption of various reading and math interventions designed to support student learning. While there is some broadening of school success criteria in the newly authorized Every Student Succeeds Education Act, it is likely that achievement in math and reading will still be a top priority in our education system. Therefore, even amidst changing policy, the importance of identifying and implementing effective interventions still exists.

At the secondary level, reading and math interventions play a unique role in student achievement. While there may be students that struggle with math and reading at the secondary level, in most cases secondary course work has moved beyond these basic skills. For example, high school English classes are literature-based, and the teachers at this level are not trained to teach reading skills. For this reason, many local school divisions have had to develop interventions that restructure the form and the content of the curriculum, and draw on new resources for addressing these needs. Strategies include increasing instructional time in math and reading, integrating math and reading skills across the curriculum, and purchasing off the shelf curriculums, many of which are computer based.

However, while the implementation of interventions has been widely accepted, some ambiguity still exists around which programs are most effective for school divisions to implement with their students¹. With hundreds of reading and math interventions available to school divisions, it can be challenging to select the most appropriate intervention for local schools. As a result, divisions often adopt multiple interventions that can sometimes appear to be fragmented. In accordance with the *Regulations Establishing Accrediting Standards for Public Schools in Virginia* (SOA), the Virginia Board of Education has published a list of recommended instructional interventions. While this list is beneficial, it still provides school divisions with a potentially overwhelming number of intervention options and provides little evidence that demonstrate their efficacy.¹ As a result, school divisions are left to do their own research to decide which option is most appropriate to implement with their students.

Further, the implementation of any intervention has associated costs, both in terms of time and money. For these reasons, it is vital that school leaders have as much information as possible on the effectiveness of various interventions before making decisions about which to administer with their students. The purpose of this brief is to provide an introduction to some of the current literature that exists on the efficacy of reading and math interventions, as well as suggestions for continued study in this field.

What forms of interventions exist?

Reading and math interventions take various forms in schools. Some interventions focus on double dosing, or doubling up on students' exposure to curriculum. Other interventions concentrate efforts on additional professional development for teachers. Still others emphasize the importance of small group interventions and one on one tutoring. Provided below is a list of common intervention types.

- 1. Double Dosing** – Interventions that focus on “double dosing” rearrange students’ schedules in order to give them more exposure to core subjects. The advantage to this form of intervention is that it allows for more learning time in core subjects that students are struggling with. This can provide more opportunities for individualized attention and slower pacing where necessary. However, the main drawback is that by spending additional time in reading or math; time spent on other subject areas or activities is often reduced. This model also requires shifts in school staffing that may be disruptive.
- 2. Instructional Training** – Instructional training programs focus on providing additional professional development to teachers and training them to integrate skills into the classroom context. These programs are advantageous because they support teachers’ abilities to make daily changes in the classroom that promote achievement in core areas. For example, these trainings may encourage teachers to use small group intervention strategies or make larger classroom wide changes to promote achievement. However, a drawback of these interventions is that the training can be expensive and time intensive for teachers and administrators.
- 3. Computer Adaptive** – Computer adaptive programs provide individualized practice to students that are aligned to their level. The benefit of these programs is that they can be bought off the shelf, and implemented in the classroom fairly easily. However, these programs require access to technology; which may be limited in some schools or divisions. Additionally, they can be expensive and largely remove the teacher from the learning experience.
- 4. Mixed Method** – Mixed method programs combine aspects of various forms of interventions to develop a more comprehensive intervention. For example, a program may include professional development that trains teachers on integrating new activities and skills into the classroom as well as utilizing computer adaptive programs. The benefit of these interventions is that they combine multiple approaches to promoting achievement. However, these multiple approaches may be costly in terms of time and money.

What evidence exists on the efficacy of reading interventions?

Slavin, Cheung, Groff, & Lake (2008)² conducted a best evidence synthesis of reading interventions to understand which are effective based on rigorous evaluations. At large, results suggest that reading intervention programs that focus on changing daily teaching practices tend to have much more research support than those that focus only on technology or curriculum. These programs typically are in line with the mixed method or instructional training formats. Two examples of interventions that they identified as having moderate evidence for effectiveness are provided here.

Student Team Reading and The Reading Edge

Student Team Reading and The Reading Edge are both considered instructional program models that rely on professional development and equipping teachers with new teaching strategies. Student Team Reading is a cooperative program designed for middle schools where students work in small teams (four to five students each) to engage in activities such as partner reading, storytelling, and word mastery. Similarly, The Reading Edge, which is an adaptation of Student Team Reading, focuses on the same cooperative structure. However, there is an additional emphasis on grouping students based on their reading levels across grades and classes. The authors discussed four separate studies evaluating these two programs and found that students experienced moderate growth in their reading achievement.²

READ 180

READ 180 is a mixed method model that incorporates both large and small group discussion, and computer activities that create an immersive approach to instruction. The program focuses on providing struggling students with 90 minutes of specific instruction each day. This includes a reading and skills lesson, computer assisted instructional reading, modeled or independent reading, and small group instruction. Across the eight qualifying studies of READ 180, authors reported that students experienced moderate growth in their reading achievement.²

What evidence exists on the efficacy of math interventions?

Similar to the review of reading interventions mentioned above, Slavin, Lake, & Groff (2009)³ published a best evidence synthesis of math intervention programs. Overall results of this synthesis indicate that interventions targeted at altering daily teaching practices and student interactions are more promising than programs emphasizing technology and mathematical content.³ Below two examples of these interventions are discussed as they demonstrated strong evidence of effectiveness.

IMPROVE

IMPROVE is a mixed method approach that focuses on cooperative learning, mastery learning, and metacognitive instruction in combination. The program includes teacher instruction on concepts, group work on metacognitive questions, and formative assessments on units as well as

corrective instruction. An evaluation of the program showed students making meaningful gains on math assessments after participating in the intervention.³

Student Teams - Achievement Divisions (STAD)

STAD is also a mixed method and cooperative learning approach in which students work in small groups of four to master mathematical content. The approach includes teacher instruction, group work, and weekly individual assessment. Once again, evaluation of the program suggests that meaningful student growth as a result of participating in the intervention.³

What does the research tell us on the efficacy of interventions at large?

These two syntheses suggest that programs designed to alter the activities and actions of students and teachers are more effective forms of interventions than those that simply focus on specific content or additional emphasis of content. Therefore, interventions described as mixed method or instructional training programs are more likely to be effective because they change the strategies that teachers implement and the type of exposure that students receive.

However, it must be considered that this evidence is based not only on the determined efficacy of programs but also on the rigor of the evaluation conducted. Therefore, since high quality evaluations are lacking in the literature on interventions, results may not completely reflect the efficacy of all interventions. Future research should include rigorous evaluation designs such as large randomized evaluations, as well as more evaluations on reading and math interventions. Additionally, this research should consider the contextual and cultural relevance of interventions in certain populations. The discussion below suggests future areas for collaboration between school divisions and research institutions on this topic.

Discussion and Persisting Questions

There are abundant reading and math interventions available to local school divisions. However, evidence of which interventions are most effective is often unclear. In the absence of evidence of effectiveness, schools have to be cognizant about how they are spending money and time implementing interventions. While this report offers insight on the general effectiveness of a small sample of interventions, there is still much work to be done to fully understand which interventions schools should be implementing. As seen in the literature, there is a need for rigorous studies on the effectiveness of various programs, and this information must be made readily available to schools selecting interventions for their students. Future research could contribute to a more robust understanding of which interventions might best serve the needs of local school divisions by exploring additional questions, including:

1. Which models and programs are currently implemented in the Richmond Metropolitan area? What is the scale of implementation? What has been the fidelity of their implementation? What are the costs associated with implementation?
2. What is the effectiveness of current math and reading interventions?

3. What other intervention programs exist that have empirical evidence of improving reading and math achievement in students?
4. Which interventions have proven to be contextually and culturally relevant to the variety of student demographic groups in the Richmond Metropolitan area?
5. What resources would be necessary to implement appropriate reading and math intervention?

References

¹ *Instructional Interventions that have Proven to be Successful with Low-Achieving Students*. Virginia Department of Education. Retrieved from www.doe.virginia.gov/federal_programs/esea/title1/part_a/instructional_interventions.pdf

² Slavin, R., Cheung, A., Groff, C., & Lake, C. (2008). Effective reading programs for middle and high schools: A best-evidence synthesis. *Reading Research Quarterly*, 43, 290-322.

³ Slavin, R., Lake, C., & Groff, C. (2009). Effective programs in middle and high school mathematics: A best-evidence synthesis. *Review of Educational Research*, 79, 839-911.

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