Math Recovery: Making Our School Good and Our Students Successful

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Abstract

This article is an overview of how Flin Flon School Division in Flin Flon, Manitoba, used money received through grant funding to revamp its math programming in order to meet the needs of the students within the division. A combination of standardized test scores and individual teacher assessments revealed where student mathematical understanding was lacking. Specific teachers were then trained in particular math programs purchased through this funding. As well, additional math specialist positions were created to help the division's students learn better, and therefore become more successful with the math curriculum.

Having a focused goal, with a structured plan to reach that goal, is integral to designing a school for success. If a school does not have a structured plan to motivate its staff and students, focus can be lost. "Without a goal, a vision for the future, hope can be denied" (Brantmeier, 2013, p. 250), and subsequently the students' achievement suffers. A school has a positive climate when students feel successful and accepted within its walls, because "students who feel extrinsically and intrinsically rewarded tend to value their education experience" (Fan & Wolters, 2014, "Theories of Motivation," para. 1), and this feeling increases student achievement.

Flin Flon School Division identified the problem that many elementary level students were not meeting math skills standards required to experience success in math at the high school level. This lag in skill development posed significant concerns, because "competence in mathematics is a crucial goal for early schooling and directly affects the demands of formal schooling" (Smith, Marchand-Martella, & Martella, R. C. 2011, p. 247), as was being observed at the high school level by the math instructional staff. Success in math programming in "elementary school is a strong predictor of subsequent achievement, school completion, and college enrollment" (McCormick, O'Connor, Cappella, & McClowry, 2013, p. 621), and is therefore critical for high school students' subsequent successes. The teachers identified problems surrounding math achievement, and related them to several factors, including lack of individualized instruction for struggling students, students transferring from other divisions without the adequate level of skills required, and not enough focus on memorization of basic facts. They noted a need for change in the current math education delivery being provided within the school. As a result, the school division decided to make math skills recovery a focus for its time, energy, and monetary allowances. These focuses included the following:

1. collecting data from CATIV (Canadian Achievement Test 4) standardized tests in order to establish what skills students were struggling with at various grade levels, and then using this data to drive teaching practices to improve deficient skills, but with recognition that this testing was to be used a tool to guide instruction, not control it;
2. implementing the Math Recovery program for students, focusing mainly, but not solely, on the primary grade levels, taught by local teachers who received specific training for this program;
3. providing funding for a teaching position within the division of a specialized math teacher consultant, whose role was to help teachers find relevant material to aid in teaching math, co-teach in various classrooms to help diversify student learning, and collect data on student achievement in the area of student memorized multiplication facts, and;
4. purchasing teaching aids, such as the *JUMP Math* program and *Mathletics*, to promote and improve students' learning of math.

All of these strategies and programs are being used in collaboration with teachers and support staff within Flin Flon School Division and Ruth Betts Community School, in order to improve

student learning, and unify the school by making students feel successful and validated. These measures help to create a positive student learning environment and a good school.

CATIV Testing

Starting in 2011, Flin Flon School Division implemented the standardized CATIV test to assess student learning in several areas, including math development. This test was chosen because it is a Canadian curriculum-based test that aims "to improve the measurement and evaluation of student ability and achievement" (Canadian Test Centre, 2014, "Mission Statement," para. 3), and it follows much of the Manitoba math curriculum. The division wanted to pinpoint student skill deficits in math outcomes, and then use this information to "guide action" (Novak, 2014, p. 2), by making adjustments in lessons and curriculum delivery to students. Teachers were instructed to assess student marks on the test, and then use the information as feedback for determining how they could adjust their teaching practices in following years to improve upon areas wherein students were identified as being weak or lacking understanding.

Although the division wanted teachers to use the CATIV as a tool to improve their teaching practices, it was also acknowledged that some of the students who struggled with these tests would fall in the minority category. Ruth Betts Community School provides education to the children of many low socio-economic families, several of whom are new to the community or are relatively transient. The school also has numerous First Nations students, many of whom come with varying skills and abilities at each grade level. Standardized tests, such as the CATIV, can intimidate these students, creating anxiety that is "negatively associated with performance on math assessment" (Galla & Wood, 2012, p. 120). These negative effects "fall most heavily on the poorest children, minority children" (McNeil, 2009, p. 394), and can make them experience feelings of discomfort, failure, and unworthiness. Flin Flon School Division's teachers recognize this dissonance, and try to make the testing experience less stressful for all students, by providing support and comfort in the forms of smaller rooms with individualized teacher support, and extended testing periods for students who may have been absent on original testing days. In this way, positive learning experiences can still fit into a standardized framework.

Math Recovery Program

Identifying student learning issues in the early years and providing adequate and appropriate instructional support are pivotal steps in preventing major learning gaps from occurring in the later years of education. This teaching philosophy is "fundamental to school reform efforts and teaching practices" (Ding & Navarro, 2004, p. 239), and is recognized in Flin Flon School Division. As a result, support for math in the primary grades has been given priority through funding and teacher training. One program that has been implemented with success is the Math Recovery Program (Martland, 2014), whose purpose is to help students build a stronger math foundation. This program focuses on identifying and analyzing children's numerical knowledge, designing and implementing teaching interventions to address students' math deficits, and incorporating assessment in numeracy programs (Wright, Stanger, Stafford, & Martland, 2006). If students' learning deficits can be identified and additional individualized instruction can be given at this early stage of their academic development, significant changes can be made in improving their abilities, thus creating more confident students. These feelings of success are directly related to school climate, as they "engender relational trust and a strong sense of community" (Rhodes, Stevens, & Hemmings, 2011, p. 83) within the schools. Student success in the area of math drives many other aspects that create a positive school environment, fostering a learning atmosphere wherein students will feel confident to challenge more in-depth problems and issues as they grow older, which is when true learning takes place.

Specialized Math Consultant

Well-trained, experienced teachers who are not only available to help the students, but also willing to aid teachers in various capacities, are an invaluable asset that Flin Flon School Division has built into its math program. Starting in 2008, the division applied to Manitoba Education to funding an extra teaching position that would fall under the category of a math specialist. This person supports math programming within the division in various ways, including "combining talents and knowledge" (Harvey, 2012, p. 5) through collaboration to create more effective teaching strategies. This teacher's role includes providing team teaching support in the classroom, facilitating individualized and small-group student instruction, collecting and distributing teaching resource material, and gathering data on student achievement.

Within each school, time is available with the math consultant for any teachers who are interested in team-teaching possibilities in math. Combining lessons creates "memorable lessons and experiences" (Harvey, 2012, p. 5) that enrich student learning. There is therefore more time for individualized instruction with students. The specialist also has various ways of presenting lessons and can give teachers ideas and feedback on the ways that they are presently delivering their lessons. The Manitoba Education, Training and Youth *Success for All Learners* handbook (Thomas, 1996) recognizes that differentiated instruction for a diverse range of students is necessary in order for all students to have the ability to reach learning outcomes. This variation in instructional delivery gives the students a variety of avenues to comprehend the material being presented, which is the essence of best practice in teaching.

Having two instructors in the classroom offers flexibility in organizing small-group work and individualized pairings of direct teacher-to-student instruction. Both teachers can assess the levels that students are at in their math skills, in order to target specific areas of difficulty for working with students on a personal level. Students also have the opportunity to learn in small groups, while still being guided by a teacher. These groups can be organized based on common skill levels, which helps many students to avoid becoming frustrated. They may collaborate with others at their same skill level, without holding anyone back or rushing ahead of others who may be struggling with concepts, creating more harmonious working environments.

Because the math consultant does not hold a regular classroom position, he has time to research resources in addition to the classroom textbooks, curriculum guides, and other materials that teachers are already using. During a professional development session, the consultant showed teachers how to use a computer program that generates innumerable variations of worksheets simply by entering the type of concept and the corresponding numbers. The consultant also provided posters for classroom display and self-generated worksheets. He even enrolled interested students in a Canada-wide math enrichment contest, and supplied instructional time to take these students out of the classroom and help them to prepare for the event, something that would be difficult for an individual classroom teacher to facilitate alone.

Student testing can be difficult for individual classroom teachers, because "documenting student math achievement is a challenging task, particularly if one wants to trace such achievement growth at the individual level" (Ding & Navarro, 2004, p. 238). One of the division's goals is to improve students' automatic recall of multiplication facts. It was identified that lack of skill in this area was seriously deterring students from achieving better math marks at the higher grade levels. Therefore, the consultant took individual students out of class at the beginning of the year and tested their ability to recall multiplication facts during timed testing. The consultant then found resources to help teachers provide more practice to their students during class time. A second round of testing is currently being conducted after students had several months to practice their recollection of times table facts during the previous school year, and comparisons will be made at the end of this school year to see whether any progress has been made (R. Hall, mathematics consultant, personal communication, March 21, 2014). The data will provide teachers with feedback about where to direct learning goals in future years.

Divisional Funding of Math Curricular Material

Good schools use the knowledge that they acquire to make long-term, sustainable change for the benefit of students. Standardized testing creates accountability that "redefines what it means to be a 'good school'" (Lipman, 2009, p. 366), and helps to guide instructional practices. One of the culminating results that occurred through all of Flin Flon School Division's testing of student math achievement levels was the appropriation of funding to continue purchasing materials to improve teachers' math program delivery. These materials included new math textbooks from the series Math Makes Sense (Appel, Brown, Chichak, Harcourt, Jeroski, Kinsman, . . . Wortzman, 2008), which is published and distributed by a Canadian company, and has been created to follow current Manitoba math curricular outcomes.

The division also purchased a subscription to a computer program called Mathletics, which is an interactive math educational website intended to supplement math lessons. The website contains "essential material for school students in Canada" (Mathletics, 2014, H.), and follows much of our curricular outcomes. It also diversifies learning for students who are interested in using technology. This diversification helps to build success pathways for many students for whom more varied connections will foster an interest in math education.

Most recently added to the cache of math instructional resources is a set of student workbooks and teacher directive guides for a program called *JUMP Math* (Mighton, Sabourin, & Klebanov, 2009). This program operates on the premise that "every child has the capacity to be fully numerate and to love math" (*JUMP Math 5.1*, 2009, p. 3), which is essential to success in their math endeavours. It consists of leveled student booklets with step-by-step directions and examples for students to follow when they are learning a new concept and doing the practice work. The exceptional aspect of the program is that the various leveled booklets can be used to tailor IEPs (Individual Educational Programs) for students who are of a certain age, but who are not functioning at that grade level in their math skills. In this way, teachers can incorporate inclusive learning more smoothly into the classroom, which gives students a sense of personal accomplishment and investment in their learning, and thus a connection to the school.

Conclusion

Good schools send graduates on their way not only with the tools and skills that they need to be successful in their future school and job-based careers, but with a feeling of confidence in their abilities and fulfillment from their time spent within that school. Educators are responsible for finding ways to help all students become successful, no matter what level they start out at, or what background or abilities they enter the school with. This is what we are doing in Flin Flon School Division, through all of our current programming measures in math. The success that will accrue from this level of instruction will carry forward into other facets of our students' education, because "numeracy has a profound effect on overall quality of life, self-identity, and the capacity to function in an even more complex world" (Meadows, Herrick, & Witt, 2008, p. 491). This is one of the biggest successes gleaned from a good school program. If we could only find a standardized test to measure student feelings of happiness and achievement, then we would truly find a testing standard that is destined to succeed.

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