

Report to: Jacob Hubert, High School Principal
From: Pippen Consulting, Randy and Sue Pippen
Re: North Boone School District 200 Mathematics Program Audit
Date: January 17, 2011

Thank you for the opportunity to look at your data and prepare a mathematics program audit. This report will contain observations and recommendations. It may also raise questions for further study. Since we were unable to visit the math classrooms, we will make generalized recommendations for improving instruction, based on the observations we have made in other schools with similar data.

Documents and data were examined from the following sources and served as the basis for our report: Capron Elementary School, Poplar Grove Elementary School, Manchester Elementary School, North Boone Upper Elementary School, North Boone Middle School, North Boone High School, course descriptions, Explore and Plan scores, district and high school report cards, and semester exams. In some cases, we can only ask questions or suggest further study.

It is common for state testing scores to be higher in the elementary grades and then fall off into high school. The challenge is to not let the scores fall below acceptable levels too early. Due to the adoption of the Common Core State Standards by the State of Illinois, we need to be looking at the recommended topics at each grade level and implement changes K-2 next year, followed by other grades. The state does not have an implementation schedule yet, but the new testing will be in place in 2014-2015 with pilot testing in 2012-13 and 2013-14, according to the Partnership for Assessment of College and Career Readiness of which Illinois is a governing member.

Observations:

Although the three elementary schools are different in size and percents of low-income students, the ISAT scores are good. Sixty-minute math periods are appropriate and common for elementary schools, but should be considered minimum. If possible, add ten minutes to the math periods. Has a study been done on the similarities/differences of Saxon elementary math compared to Everyday Math? The latter has very good results in state testing and is a viable alternative if teachers have had significant staff development and the program is delivered with fidelity. That may also be the case with the Saxon elementary, but it does not have the track record of Everyday Math. Has the source of the discontent with Saxon been explored and discussed? Are teachers trained to use it with fidelity in all schools? Is instruction being delivered through exploration and manipulatives? Students will need to be proficient as well as have deep understanding of the structure of mathematics – in other words, it must make sense.

Recommendations:

- 1) Although the ISAT scores are good, look for ways to add time to mathematics by doing mental math while lining up for lunch, recess and special classes. Look for resources such as Math Minutes or Mad Minutes to implement.
- 2) Compare the topics of the Saxon elementary program to the topics of the Common Core State Standards by grade level and make adjustments. Be sure to implement manipulatives and exploration to cement understanding.
- 3) If a change in programs is being considered, we would advise waiting until Everyday Math has a chance to upgrade to the Common Core Standards, and then consider them at the top of the list.

Observations:

North Boone Upper elementary scores are in the upper 80s to low 90s, which is not bad, but need to be higher to sustain students through middle school. The apparent discrepancy between 5th and 6th grade scores the last two years seems to indicate a disconnect between the Saxon and Prentice-Hall programs. See recommendations below. Again, sixty-minute periods are considered to be minimum, and seventy to seventy-five minutes would allow for better understanding and exploration to facilitate using manipulatives and exploration.

Recommendations:

- 3) Investigate the gaps/overlaps between the Saxon 5th grade program and the Prentice-Hall Course 1. Due to the accelerated topics of the common core standards, look for ways to get more students into Course 2 at the 6th grade, possibly by accelerating more students at the 5th grade into Course 1. Other schools are doing that in order to get more students ready for algebra in the 8th grade. Under the Common Core Standards, much of the traditional algebra course will be taught in the 8th grade and not considered to be high school algebra. The Common Core State Standards do not recommend that eighth graders take high school algebra, but provide a path for those schools who want to accelerate some of their students.
- 4) Add mental math to every upper elementary and middle school math class with a few minutes a day for students to learn and practice mental math strategies. Resources are available to help teachers decide which strategies to use.
- 5) Be sure to implement manipulatives and exploration at all grades to cement understanding.

Observations:

North Boone Middle School seems to have declining scores across grades 6th through 8th. This is puzzling since 40% of the students are in pre-algebra instead of 7th grade math. It may come

down to your definition of pre-algebra. The use of only five of the eight modules for seventh grade and into eighth grade seems to be too little, too late. It was not clear to us what the text was for the pre-algebra course, but if it is Connected Math, then the eight modules intended for seventh grade need to be followed by a Pre-Algebra text in the eighth grade. The real dilemma here is that the updating to Common Core Standards will take time and it seems to move each current grade level material one grade down, eliminating repetition. The calculator policy seems appropriate, but the administration of the policy needs to be uniform, something we cannot measure.

Middle school scores need to be in the 90% range to translate into PSAE meets/exceeds, but that will all be irrelevant with Common Core Standards and new testing. What is relevant is the amount of repetition in current curricula and the lower expectations for middle school students.

6) Investigate the actual content of 7th and 8th grade coursework and compare it to the new Common Core State Standards. Adjust as needed. All students need to reach the Common Core level, so leveling should be eliminated and lower students given more support.

7) Although it seems difficult, it is imperative that more time be devoted to math in the middle school. Some schools have double blocked math and reading with science and social studies double blocked on alternate days. Forty-five minutes is not enough. More time is needed and it needs to be every day. We can provide you with contact information for one district that has implemented the plan in seven middle schools successfully.

8) It is commendable that there is time during the school day to help students who need it. Even better than the end of the day is over the noon hours with some creative scheduling. Everyone is tired at the end of the day and not as productive.

Observations:

North Boone High School has PSAE scores much lower than the elementary and middle school scores would predict. One major indicator that it would happen is the range of Explore scores – 55% fall in the 16-and-up range with 17 being the college-ready score for Explore. PSAE meets and exceeds percents are much lower than that. Improving the middle school program will help prepare students better for high school.

It is commendable that the Algebra A and B have been eliminated as well as the Integrated Algebra and Integrated Geometry. Common Core State Standards will require all students to complete Algebra 1 at a higher level than is currently taught, so the Concepts courses will also have to be eliminated eventually. The key will be the support provided to students during the day.

It is not clear to us if the same book is used in high school algebra as middle school algebra, but it is not essential as long as the same topics are taught.

It is great that there is help for students after school, however, as long as it is optional, it will be less effective than if it is required based on criteria of homework completion or grades. It is problematic to require students to stay after school if they do not have transportation. Some schools have required before-school or after-school help with parent knowledge/agreement on a two-day-a-week basis and found success with that plan. Even better is time during the school day. Help for students needs to begin in the freshman year to bring them up to standards. Juniors and seniors will be resistant if they have not been convinced that in earlier grades the help was beneficial to them.

The current thinking about grades is that they should reflect learning, therefore discipline and attendance should not be a factor. Generally grade penalties for attendance and behavior only work on the kids who already care. Homework should also not be a factor in grades, but recorded and reported to parents if not being completed. The grade consequences will occur naturally if a student is not practicing.

Since more than 75% of your students intend to go to some level of college, it is important that they successfully complete a regular algebra course as freshmen. More than 50% of your students should be enrolled in a pre-calculus course, not necessarily at the honors level. For the number of students in pre-calculus, the number in calculus is very small. There are too many students in the “concepts” courses, close to 50% in algebra and more than 30% in geometry. With the Common Core State Standards, all students will need to be in regular courses. Since there are 40% of the eighth graders in algebra, why are there so few in Geometry as freshmen? Are they repeating algebra and if so, why?

Failure rates are above the acceptable level in Algebra and Geometry. The goal should be 2% or less.

Explore scores are good indicators of college readiness, 17 or higher, and PLAN scores are also good indicators to see if students are making the necessary growth of 19 or higher. Your scores appear to predict lack of success on the ACT. Instructional practices may be part of the picture if procedures are emphasized and understanding is not the goal. Because of the nature of ACT questions, students need to have a lot of experience with creative thinking about problem solving instead of focusing on a set of procedures. We have not observed classes in your schools, but our experience is that most teachers instruct through the “I do, you do” model which does not support thinking and problem solving.

We did not see any evidence of curriculum mapping or curriculum documents. It will be critical to align all courses with the Common Core State Standards as soon as possible. Even more important than the topics listed will be the mathematical practices of understanding, connections, attending to precision and making sense of mathematics.

The semester exams presented seem fairly typical in that they are multiple choice and intended to be scored quickly. They are too long and do not reflect the most important topics of each course. As in most schools, one or two items each on a huge number of topics make the exam

impossible to prepare for and rarely yield good results. It also appeared that there were different exams based on the teacher of the course.

Recommendations:

- 9) Add a few minutes of mental math strategies and practice to each high school math course every day.
- 10) Examine the content of each high school course compared to the Common Core State Standards. Geometry will be the easiest one to adjust right away because of its nature as a separate course. Emphasis in Algebra 1 will need to shift from quadratics to exponentials and many more connections with graphing and sense-making.
- 11) Open conversations about grading practices with all staff. Policies need to be discussed with administrators in the light of making grades reflective of demonstrated learning only.
- 12) Investigate methods for getting more students into regular level courses with support as a step toward eliminating lower level courses and lowering the failure rate.
- 13) Investigate methods for getting more time for the middle school algebra and guaranteeing that the content of the middle and high school algebra courses are the same.
- 14) Look for ways to require students to get help within a few days of an impending failure rather than waiting for the quarter or semester. Money spent on students repeating failed classes is better spent reducing failures. Perhaps paraprofessionals could be hired to cover duty periods to free teachers to help students.
- 15) Seek professional development on teaching for thinking and understanding rather than step-by-step procedural instruction.
- 16) Consider creating curriculum maps for improving understanding, thinking, problem solving and making connections within mathematics, aligning the topics with the Common Core State Standards.
- 17) Consider identifying a small number of “super” topics for each course and make them the focus of exams. Inform the students of the topics, help them prepare, and then ask four or more questions on each topic that vary in type and application. Fewer topics should lend the feeling of emphasis on importance and improve student success on exams. Meaningful data collection can also be done with fewer topics and more focus on important topics so that the data can inform instruction.

18) Create one exam for each course for each semester so that all students are measured by the same instrument no matter who was the teacher. The content should match and the measures should match. The instruction can vary by teacher, but not the content.

Concluding Comments

As a small school district, North Boone has significant advantages such as getting to know the students well. One disadvantage is that the work teachers need to do in curriculum and instruction cannot be distributed to multiple teachers and the results shared.

Since we did not visit any classes, we cannot comment about observations. However, as we have observed in numerous schools, the traditional model of “I do, you do” teaching is common. Most teachers work very hard to communicate clearly exactly what students are to “do” in mathematics. Current research and the new Common Core State Standards emphasize that understanding is the key to retention, so instruction has to support deep understanding and the ability of the student to make connections and explain how and why procedures work as well as be able to perform them. Teachers cannot convey this understanding for the students. Instead, the students must be guided to reaching their own understandings. Significant professional development will be required to develop those instructional practices.

Professional development and time will be required to create meaningful curriculum maps aligned to the Common Core State Standards as well as to define the understandings that students must reach in each course.

There is much work to be done to implement best practice teaching and assessment according to the new Common Core State Standards, and the timeline is short. We look forward to visiting the district and assisting with the work ahead.

Please contact us if you have any questions or if we can assist you with the work to be done.

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