Strategies for Improving Student Learning

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Abstract: **A shared aim, alignment of curriculum, instruction and assessment, and data-driven instruction are keys to high student achievement in mathematics and science in the Ambala district. This paper will address structures and strategies one district used in improving student achievement in mathematics and science learning, from the development of a shared aim and a systematic focus on curriculum, instruction, and assessment to intensive analysis of assessment data for making instructional decisions to meet student learning needs**

Key words: **Science, Mathematics, Curriculum, Instruction, Assessment.**

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Introduction

A shared aim, alignment of curriculum, instruction and assessment, and data-driven instruction are keys to high student achievement in mathematics and science in the Jenks School district.

A shared aim creates a systematic focus for the district. In 1997 the district made a value paradigm shift from a focus on teaching to a focus on learning. With this shift, the criterion for success in the district became the increased learning of the students, not that the concept or skills were taught. The right questions for each staff member in the district are: What is in the best interest of the students? How does this innovation support continued improvement in student learning.

Alignment brings a systematic approach for continuous improvement. The Curriculum, Instruction, Assessment and School Climate System illustrated in Figure 1.1 forms an integrated structure for continuous improvement and learning excellence in the district. Specific design, decision making, and deployment steps built into the processes of the system ensure a focus on strategies for improving student learning, multiple cycles of refinement, and integration with the school district's goals, strategic objectives, quality pillars (leadership, continuous improvement, systems/process focus, and customer focus), core values, mission, and vision.

Curriculum Development

The system begins with curriculum development, as the research regarding designing a consistent, coherent curriculum is powerful and compelling. By specifying the knowledge all students should share, then and only then can a district assure equal access to knowledge. These standards represent the desired academic outcomes toward which all students should strive and for which diagnostic assessments should be developed. (Reeves
2002)

The curriculum needs to be system focused. The "community of classrooms" requires that its members share some common knowledge; this knowledge makes communication and progress possible. By organizing the planning and decision making around the entire period of a child's education a district creates a comprehensive, systemic approach that raises achievement for all students.

The curriculum at each grade must build on what the students have learned in the previous grades. If learning is to progress on any principle besides random chance, then there needs to be a sequenced body of knowledge. Together, teachers ensure a logical, progressive sequence of learning experiences for all students. (NAESP Communicator, October, 1997)

Continuous improvement will be more focused. It isn't realistic (for the what and how of curriculum development to be the job of the teacher) because the task is too big to be accomplished by individual teachers snatching a few minutes here and there working off a generalist's knowledge base. (Kovalik, 1997)

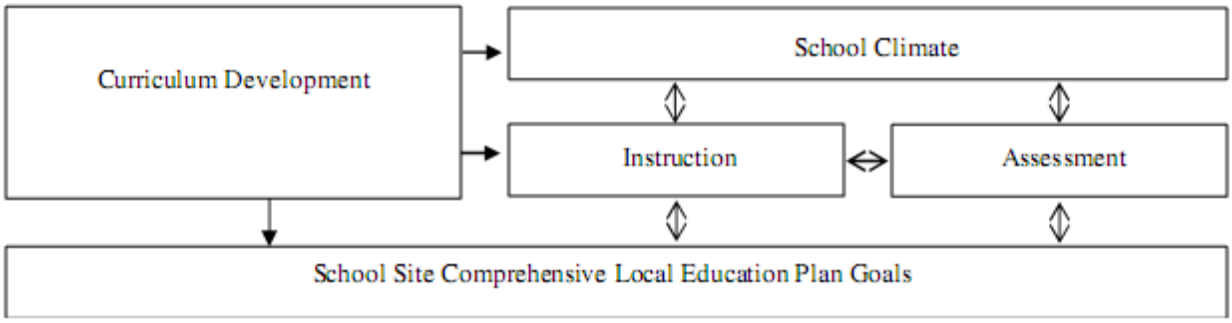

Figure 1.1:The Jenks Public Schools Curriculum Development, Instruction, Assessment and School Climate System forms an integrated structure for continuous improvement and learning excellence.

Curriculum development is a year long process in the district, with the committee meeting monthly from September to April and following the six-year curriculum review cycle set by the state. Committee members include many stakeholders: parents, teachers, teacher specialists, curriculum resource instructors, and administrators from each school site. This broad representation is key to deployment of the curriculum. The year-long process begins with the development of an aim statement, using brainstorming, the affinity and Pareto processes, and small group to large group consensus building. The aim statement guides and focuses the work of the committee as well as teachers in the classrooms during the implementation years. The fall semester work also includes review of the national standards and research in best practice teaching and learning, development of district content and performance standards based on the national standards, and articulation and vertical alignment of the district's performance objectives. In the spring semester the committee completes the program review/selection process and plans deployment of the curriculum with professional development training, a presentation to the school board, and development of essential elements and pre- and post-assessments. An end- of-the-year evaluation completed by each committee member assures continuous improvement in each step of the curriculum development process.

The Focus on Instruction

The focus on instruction, the second component of the system, enhances the capacity for learning for all students because it deepens the ability of teachers to implementclassroom management structures that romote student ownership for learning. It also strengthens teachers' skills in planning engaging lessons using research-based instructional strategies, assessing learning in multiple ways, and differentiating instruction based on students' readiness levels, interests, and learning profile preferences.

Two key features of this component are the role of the curriculum resource instructor and the implementation of sustained, intensive, classroom-focused training.

Curriculum resource instructors have a primary responsibility of working with teachers to improve student learning through modeling, coaching, and collaboration. Four lenses guide development of sustained, intensive, classroom-focused training:

1. Multi-year training initiatives help the district address needs brought about by changing demographics and research in best-practice structures and strategies. The differentiated classroom based on the work of Dr. Carol Ann Tomlinson and the Data Teams process from The Leadership and Learning Center are two examples of multi-year initiatives in the district.
2. Sustained, intensive, classroom-focused professional development each year during the first two weeks in June supports integration of research-based teaching strategies for each of the core content areas: mathematics, writing, reading/literature, science, social studies, the arts.
3. The implementation year for a new textbook/program is also a sustained focus and ongoing training gives teachers the ability to use the new program resources with confidence and agility and to add research-based instructional strategies to their teaching techniques.
4. Collaborative learning teams, based on the work of Rick DuFour, are also beginning to occur more frequently. These learning teams are teacher-led and may be a book study, a curriculum mapping process, an opportunity to model and practice research-based teaching strategies, and/or a data team.

Assessment

Ongoing knowledge of student learning is the key requirement of the third component of the system:

assessment. With this knowledge, teachers have the ability to adjust their instructional plans to meet the needs of small groups of students and individual students. Three levels of assessment provide this ongoing knowledge and support goal setting and development of action plans for improved student learning.

At the district-level, tracking and analysis of state testing results has been in place for many years, not only growth in overall scores, but also analysis of student segments and the objectives for each content area tested.

Ongoing assessment also drives daily instruction and gives teachers knowledge of students' mastery of skills and concepts. Pre-assessment (findingout) determines students' current levels of readiness or interest in order to plan for appropriate instruction. Formative assessment (keeping track) helps teachers accumulate data about student progress to continue instructional decision making. Summative assessment (making sure) measures students' mastery of skills and concepts.

The Curriculum Development, Instruction, Assessment and School Climate System builds the foundation for data-driven instruction and implementation of many creative and innovate structures and strategies for addressing learning needs in science and mathematics. Through curriculum development, the district has rigorous standards and performance objectives in mathematics and science and has adopted research-based programs that support mathematics and science teaching and learning.

The Radar Chart: A Key Analysis Tool

The radar chart has been instrumental in improving student learning in biology, as measured by the end of instruction test required by the state. In 2003 the district scored near or below the state in the twenty-six objectives tested on the end of instruction exam. Objectives one through five test inquiry process skills and objectives six through twenty-six assess content knowledge. (Figure 1.2)

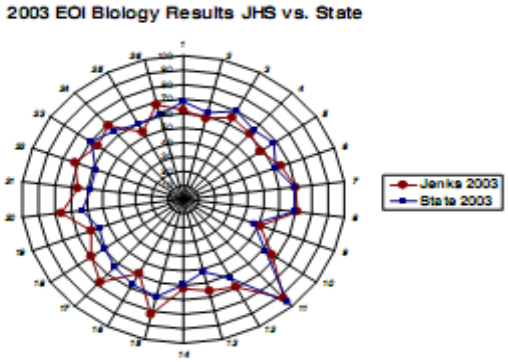

Figure 1.2 The Radar Chart provides a visual analysis for state testing results.

The curriculum resource instructor for science at the high school used the radar chart to illustrate the data comparisons for each of the objectives, and then met with biology teachers to brainstorm, discuss and hypothesize about changes in pacing, instructional techniques, and assessment practices that could lead to improved student learning. Through this 2003 analysis, it was discovered that environmental science objectives are an integral part of biology; these objectives had been saved for the course that follows biology. Analysis also revealed that the end of instruction exam really asked students to demonstrate their science knowledge through drawing conclusions, evaluating hypotheses, and interpreting charts and diagrams, rather than recalling factual information or responding to vocabulary.

Major changes in pacing and more inclusion of inquiry experiences resulted from the analysis. Figure 1.3 shows results from the 2006 testing, with significant improvements in all the objectives. Interestingly, Objective eleven tests lab safety awareness and knowledge, which is strength for all students in the state.

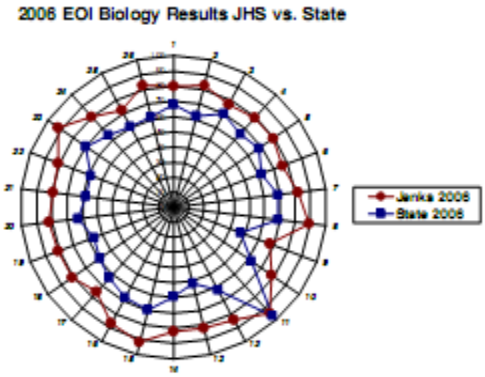

Figure 1.3 Biology Test Scores Show Dramatic Improvement.

Focusing on Mathematics

Intensive analysis and charting of mathematics results, the Saturday School, and the Algebra lab elective have resulted in exciting advancements in student learning for mathematics. With the 2004 adoption of *Everyday Mathematics* in pre-kindergarten through sixth grade classrooms, the district began seeing increasing numbers of students who were ready for Algebra I in sixth, seventh, and eighth grades. Because of this readiness, Algebra I is now an eighth grade mathematics course, although some students take the course in sixth and seventh grades.

Saturday School was implemented to support students who struggle in pre-algebra and algebra. At the close of the first quarter of instruction, students who are struggling (C or below in the course) receive letters about the Saturday School opportunity. Enrollment in Saturday

School means that the students attend school for seven Saturdays in a row from 8:00 to 12:30 with no more than two hours of absence. Class sizes average about 15 students and teachers re-teach the objectives and remediate the learning gaps of the students. Students and their parents may select the Saturday School grade as a replacement of the previous quarter or semester grade. During the first year of implementation (2005-2006), eighty-eight students enrolled in Saturday School. These eighty-eight students averaged 29.3% on their pre-test in Algebra and were at-risk for failure on the end of instruction required state test taken in April. When the results from the state exam were analyzed for these students, twenty-seven had scored advanced, thirty-one were at the satisfactory level, and thirty students scored at the limited knowledge level. No students scored in the unsatisfactory range, a remarkable achievement for students who were at-risk for failure. The program showed similar results for the 2006-2007 school year.

The Algebra Lab elective began at the high school as a support for those students re-taking Algebra I or taking Algebra I for the first time. With this structure, students have a dual enrollment, a mathematics course and a lab elective class. The close collaboration between the teachers of the two classes and the use of a variety of motivational activities and review processes in the lab electives have resulted in improved achievement for the students. In the 2005-2006 school year, 42% of the students, with the lab experience passed the end of instruction test, while only 20% of the students without the lab experience passed the test. Currently, Algebra lab is available for students taking both Algebra I and Algebra II.

Failure Is Not An Option

Another powerful shift for mathematics learning evolved after several years of studying the work of Thomas Guskey and working with Dr. Douglas Reeves of the Leadership and Learning Center. According to Dr. Reeves, "Comparison of human performance to a standard is the only appropriate way to evaluate student achievement. Standards are fair and focused on proficiency. Grading and reporting should always be done in reference to specific learning criteria. At all levels of education, teachers should identify: what they want students to learn, what evidence they will use to verify that learning, and what criteria they will use to judge that evidence." (Reeves, 2002) Guskey adds, "No studies support the use of low grades as punishments. Instead of prompting greater effort, low grades more often cause students to withdraw from learning. Practices of using grades as weapons of last resort for students who do not comply and therefore must suffer the consequences of a failing grade, have no educational value and, in the long run, adversely affect students, teachers, and the relationship they share. Teachers can better motivate students by considering their work incomplete and then requiring additional effort. Students perform at a failure level or submit failing work in large part because teachers accept it. Zero is seldom an accurate reflection of what a student has learned or is able to do. Instead, zeros are typically assigned to punish students for not displaying appropriate effort. If assigning zeros is combined with the practice of averaging to attain a student's overall grade, students readily see that receiving a single zero leaves them little chance for success because such an extreme score drastically skews the average. No evidence demonstrates that assigning zeros helps teach lessons of responsibility and accountability." (Guskey, 2000).

from other assessments i.e., slate, games), and articulating the role of homework in mathematics and the grading process.

The role of homework was quite a discussion process. As teachers reviewed their grading practices and reflected on Guskey's words ("Zero is seldom an accurate reflection of what a student has learned or is able to do." Guskey, 2000), they discovered that homework was an area where they were "accepting failing work" and were assigning zeros that were averaged into the students' final grades. So, the decision was made to NOT give a grade for homework. Homework was still reviewed in class and homework completion was still expected; however, the homework assignment was not to be averaged into the overall grade. Where homework would be reflected would be the character trait portion of the report card i.e., responsibility.

Results from the pilot year show that teachers exhibit a heightened awareness of the standards and of those students who are meeting the standards and those who are not, that scoring practices have increased in consistency, and that teacher collaboration is more focused and deliberate. The paradigm shift from teaching to learning has occurred, as evidenced in collaboration discussion questions: Why aren't they achieving proficiency? How are you teaching that skill/concept? How can we adjust instruction so the student understands the concept? I didn't think of modifying it that way. What factors are contributing to the N? How might I offer feedback in a timely manner? What additional services can we provide this student?

Conclusions

Excellence in science and mathematics learning does not occur overnight and it does not occur because of one person or ten people. It occurs when everyone in the district collaborates in exceeding their all time best each day of every year. Excellence becomes the standard when

practices and processes are refined continuously, when individuals and their ideas are respected and valued, and when all decisions are based on what is in the best interest of the student. As Aristotle said so eloquently many centuries ago, "We are what we repeatedly do. Excellence, then, is not an act but a habit."

References

- Guskey, Thomas R. "Grading Policies That WorkAgainst Standards….And How To Fix Them," *NASSP Bulletin* (Volume 84, No. 820, December 2000)
- Kovalik, Susan. *Integrated Thematic Instruction: TheModel*. (AZ: Susan Kovalik and Associates. 1992) NAESP Communicator, October, 1997
- Reeves, Douglas B. *The Leader's Guide to Standards*(Jossey-Bass, 2002)