

Becoming an Effective Leader in Mathematical Instruction

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The Indiana Mathematics Initiative (IMI) is a federally funded program sponsored through the National Science Foundation. The goal of the IMI movement was to increase mathematics teaching and learning among select administrators, teachers, and students across Indiana. The goal was met and exceeded the expectations of the IMI leadership team. Countless benefits also accompanied the Indiana Mathematics Initiative, of which emergent leadership among teachers was one.

This paper outlines my personal experience with the IMI development as well as my own leadership emergence. In the first section of this paper I will describe my journey as an active participant of the Indiana Mathematics Initiative Select Cadre team. This section will describe how the group evolved and progressed based on professional needs. The second section of this paper details my classic paradigm shift; I outline how I changed my teaching practices, especially in the area of mathematics. The third section of this paper focuses on my development as an effective teacher-leader. My progression will focus on networking, collaborating, and reflecting as to how these areas helped me grow as a professional. The final section of this paper will delve into leadership and its effects on students.

IMI Select Cadre Progress

My story begins in Elkhart, Indiana, in a mediocre math program. I began the IMI process with the notion to improve math instruction. What I gained was a profound understanding of the teaching and learning process and a new career in educational leadership.

My journey into educational leadership began with IMI. The first rumblings of the IMI project began to surface during the 2001–2002 school year. For me, I knew what we were doing in Elkhart was not preparing our students in mathematics, and every source of data collection supported this fact. When the opportunity came about to change mathematics instruction through the IMI project, I was extremely interested.

The IMI project in the Elkhart Community Schools began in the 2nd and 5th grades. These special grade levels were selected in order to prepare students for ISTEP testing at the 3rd and 6th grades. I was a 5th grade teacher, and I truly thought I was ready for the challenge. I signed up for this journey that I continue to follow.

As part of the IMI project, teachers agreed to pilot a standards-based curriculum. The one chosen by the teachers and school districts was *Everyday Mathematics*. In the summer of 2002, I left for Hammond, Indiana, to begin my extensive professional development, learning how to use this curriculum. The training took place with three full days of extensive guidance on implementing a standards-based curriculum, and was given by an *Everyday Mathematics* consultant. This training also planned for the next steps of professional development.

During the school year of 2002–2003, I learned much about instituting change. On several levels, the change process and growing professionally are truly difficult. There were many days when I had to scrap my lesson for the day because I needed to dig deeper due to the steepness of the learning curve. There was much of the content that I had to master, and this, I learned, took time and commitment. IMI and *Everyday Mathematics* offered eight days of professional development during that school year to help with preparation and content development. This was crucial to the success of the project.

During the summer of 2003, I received professional development in the content areas of geometry and algebra to help with instruction. This was important for the quality of instruction for my fifth graders and directly affected my development and their achievement. This is to say that with increased professional development through IMI, I saw a direct correlation to increased student achievement by my fifth grade students.

During the fall of 2003, I went to Ann Arbor to further my leadership role in the IMI project. Because the schools in Ann Arbor were fully implementing a standards-based curriculum, a select group of IMI participants was invited to study and observe schools there. Through this process in Michigan, we were developing into the future leaders of our districts in mathematics instruction. We were now referred to as the “Select Cadre” within the IMI project. We were honing our leadership skills, unaware of the opportunities that would come our way as a result.

Each summer IMI provided a multitude of opportunities for professional development. The members that were asked to present at the IMI summer institutes were professionals from all over the state. During the summer of 2005 I was asked to present a workshop on the document that I had worked on with several members from the IMI Select Cadre. Our collaborative work was a direct result of our IMI experience. The document we created was a handbook for parents, new teachers, and substitute teachers providing information and tools to help with the understanding of our standards-based curriculum. Presenting to large groups of educators was an excellent opportunity as well as a catalyst for education leadership.

During each of the following years, the IMI Select Cadre participated in increased professional development. Topics were offered to address our professional and instructional needs. Some of the excellent opportunities that we experienced were working with the professionals from the Indiana Department of Education, superintendents of large Indiana school corporations, and several university liaisons. Some of the work that this entailed included in-depth analysis of student responses on the applied section of the mathematics ISTEP test, intense study of teaching and learning, and an investigation of the vision and data-driven decision making from a superintendent’s perspective. This type of professional development helped me make connections in my professional career and led me further down the path of school leadership.

The IMI staff also provided many professional retreats for cadre participants. These math-based retreats focused on student achievement, effective teaching, and math content development. One particular area of growth for me was math content development. I grew immensely in my math knowledge using a standards-based curriculum. Developing my math content, as a result, improved my mathematics instruction by helping students switch from concrete understanding to abstract mathematical understanding. It helped me teach *why* a concept or answer was true, instead of just applying an algorithm.

Paradigm Shifting

Becoming an IMI participant called for a new way of thinking with regards to student achievement. During teacher training at the undergraduate level, I was instructed to teach to average ability and to teach for mastery. The IMI group and the standards-based curriculum make us of a developmental model of instruction that offers learners much exposure to several levels of mathematics concepts.

Everyday Mathematics is based on an instructional system that spirals concepts and as well provides opportunities for concepts to be mastered over an extended period of time. *Everyday Math's* beginning, developing, and secure skill system gives learners ample time and opportunities to master complex mathematical schemes. As an educator, the beginning, developing, and secure model helped me naturally to differentiate instruction for the varied learners within my classroom.

Before becoming an IMI educator, I used to begin on chapter 1 of a textbook and cover as much material as possible within a school year. Concepts were touched on briefly and then the next chapter was presented. With our standards-based program, concepts are covered extensively throughout an instructional year. For example, fractions are taught through two units, and then covered through "math boxes," which are daily practice activities. Students are constantly reviewing mathematical ideas, allowing them enough time to grasp the most difficult mathematical ideas. This type of teaching was new and novel to me and inspired me to examine the way I taught other subject areas.

The *Everyday Mathematics* curriculum also presents an excellent teaching model. For example, each lesson gives students an opportunity to focus their thinking through the math message, then math fluency is addressed through mental math reflexes, and the lesson is most generally taught through concrete instructional methods. After the lesson presentation, students are expected to work in groups or pairs to practice the concept. Independent practice, re-teaching, and/or enrichment activities are always provided for any and all types of learners. I have applied this model of instruction to other subject areas as well.

Another important paradigm shift was regular use of games to reinforce skills and achievement levels. *Everyday Mathematics* has a wealth of games that target a myriad of mathematical concepts. On game day students go to four, twenty-minute game stations. I was placed at the game station that reinforced the newly taught skill. This is an excellent way to assess student progress and provide instruction based on individual needs. Students can practice computational, algebraic, statistical, and measurement skills in one class period. The game day instructional piece is a powerful component to excellent teaching.

The biggest shift for me personally was moving away from whole group teacher-focused instruction to small group student-focused instruction. The IMI group and using a reform-minded curriculum prompted the question, "Who is doing the thinking/work?" By staying focused on this essential question, I transformed my instruction. This idea is what changed my thinking about teaching too. I changed into the ultimate facilitator and let the students control their own learning. This relinquishing of power and control paid off in full measure with new student achievement. This paradigm shift has changed my professional world, which has led to personal growth as well.

Effective Teacher/Leader: The Importance of Networking, Collaborating, and Reflecting

Effective teacher/leaders do many things, but through the IMI Select Cadre work I learned the importance of networking, collaborating, and reflecting. School improvement and student achievement are greatly influenced through these basic practices. The IMI project offered many opportunities for learning through these important practices.

Networking

Networking with other educators has proven to be a powerful practice to increase student achievement in my school district. Not only did I make professional connections with educators in my district but also with talented teachers throughout our state. This proved to be quite effective when it came to problem solving, while learning to use a standards-based curriculum and newly learned teaching practices. By having a network of educators, a multitude of solutions was presented to even the most complex problems.

Another powerful network connection was made with Indiana University and other nationally acclaimed educators. Individuals at the university level helped provided researched-based practices to help the IMI educators with their teaching. A wealth of perspectives and experiences were shared with the IMI Select Cadre throughout our many professional development opportunities. For example, one of the many ideas that I put into practice was the connecting of popular children's literature with a significant mathematical concept.

Collaborating

Collaboration was also used to increase teacher effectiveness. Collaboration was expected and practiced between district teachers to help problem solve and plan for effective instruction throughout the Elkhart district. Planning and sharing together helped pave the way for significant increases in math performance on state tests.

Collaboration and discussion took place through peer mentoring and coaching. Teachers involved with the IMI project partnered to practice newly learned concepts about the curriculum and about effective teaching and learning. I had several teachers visit my classroom and help me with a specific area that I identified as a personal area for improvement. In turn, I also visited many classrooms and offered the same type of support. This peer coaching still continues in my professional life as an administrator. Although sometimes I must formally evaluate teachers, I truly see what I do as a "coaching" role for increased student achievement through improvement of teaching practices.

This concept of creating a nonthreatening environment to experiment with new techniques and ideas without the threat of evaluation is crucial to real change in education. Relevant conversations about effective teaching in the name of increased student achievement are what I strive for as a school administrator.

Collaboration also took place via the message board. The message board or forum was a place where IMI teachers from different districts could communicate by posting questions and comments on a variety of topics relevant to teaching and learning. The message board was a powerful method to help with complex issues, with math concepts, and instructional practice. The message board helped with technology development by increasing knowledge on how to access and post information through the IMI message system. Local, state, and national educators posted information to address a myriad of questions and needs.

Reflecting

Reflection was the most influential practice for me personally. As teachers participating in the IMI project, we were expected to reflect on our practice through monthly online “learning logs.” At the beginning of the process, I dreaded the thought of reflecting through the IMI log site, but I came to realize that through reflection, I grew the most personally and professionally. After I wrote my log entries, a university representative read my responses and offered suggestions as well as posed questions for future thoughts. Through this regular reflection and response system, my teacher effectiveness grew. Regular data collection also confirmed teacher effectiveness as measured by increased student achievement.

Reflection logs forced me to revisit lessons and think in depth about results of instruction. For example, there was one unit that I taught in which only 6 out of 22 students were proficient on their unit test. The test focused on fractions and their relationship to decimals and percents. Through the reflection log process, many professionals offered advice on how to reteach and revisit these concepts through small group instruction. Prior to the IMI experience, I wouldn’t have had the diverse input that the IMI group provided.

Reflection logs helped me plan next steps and make informed decisions about how to proceed with instruction. The fraction unit taught me that informal assessment throughout the unit would have been useful in responding to student needs. By assessing needs more frequently, I could have provided necessary scaffolding to better support the individual learner. The reflection process helped me realize the importance of using quick assessments to help learners reach the ultimate learning goal.

Emergent Leadership Development

The entire IMI experience opened the door for me and helped me emerge as a budding school professional. Many of the diverse experiences provided through the IMI project helped me realize my potential as an effective educational leader. The IMI experiences inspired me to return to college to obtain my administrator’s license. My district, Elkhart Community Schools, recognized my development through IMI and has promoted me to assistant principal.

I developed my leadership ability by obtaining new skills that helped me focus on new concepts, which, in turn, led to new results. Elkhart Community Schools continues to improve in math achievement as measured by state standardized tests. Strong leadership is a key component to increased student achievement.

Another skill developed through the IMI project was leading professional development for my school, district, and across the state of Indiana. This experience has helped me immensely in my current position. One specific idea that I learned is that staff members, like their students, need to experience concepts first hand instead of being told what is successful. The “experiencing” portion of professional development helps with the “buy in” process, so that teachers come to believe in what they are learning.

The area in which my leadership ability has directly influenced student achievement is the cells of students that traditionally don’t do well on the ISTEP. Students in poverty, special education, and English language learners have done better on standardized tests because of more effective teaching practices. All populations of children have increased their achievement levels, and that is why I am a leader in education. I have learned that inspiring and encouraging others to do their professional and personal best can be the most momentous factor in raising student achievement levels. Helping adults realize their role in helping students is our challenge as leaders in education.

Concluding Thoughts

This purpose of this paper was to walk the reader through the Indiana Mathematics Initiative professional development process. This paper focused on the experience, transformations, and growth of one educator located in northern Indiana. The process has left me deeply changed and hungry to share my story in order to help other professionals to grow in the name of increasing student achievement. I am convinced that such rich professional development is the key to future educational success.

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