

What the School City of Hammond Has Learned about Professional Development in Mathematics

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The School City of Hammond has had a long history of providing workshops for teachers. In 1990 the district created the Leadership Academy to support school improvement and professional development efforts in the district as well as individual schools. The Leadership Academy is staffed with one administrator, an administrative assistant, and two teachers who are on full-time release from classroom responsibilities.

Through the years we have discovered that there is a great difference between workshops and professional development. In taking a close look at these differences, this document will highlight the reflections on the learning that has taken place about meaningful professional development in general and about development in mathematics, in particular.

A portion of the learning that has taken place regarding professional development in mathematics revolves around our work with the Indiana Mathematics Initiative (IMI), a state-wide collaborative of nine urban districts in Indiana with Indiana University Bloomington. This collaborative has been dedicated to the proper implementation of standards-based mathematics programs and the building of the mathematical content knowledge of educators. With the culmination of the IMI project, as with any collaborative effort, the fear becomes that the individual districts will not be able to sustain the forward momentum that was in place with our participation in IMI. The hope then is that these lessons regarding mathematics professional development will not be lost but built upon, as we continue growing as a community of mathematics learners and educators within our district.

This document focuses on the areas of professional development that are listed below. It attempts to dissect mathematics professional development and to examine the majority of its parts in terms of where we have been historically and where we are now after our participation in IMI.

Focus areas of the document include:

- Goals of professional development
- Frequency of professional development
- Participants in professional development
- Facilitators of professional development
- Focus areas of professional development
- Evaluation of professional development
- Impact of professional development

Goals of Professional Development

The goals of professional development in the School City of Hammond have always been centered on the improvement of instruction in order to increase student learning and student achievement. Historically, though, the district never examined any data to see if there was any direct correlation between the mathematical professional development of teachers and student learning and achievement. If student achievement levels did not increase, concerns were not raised about the quality or focus of the professional development in which teachers were participating.

With the district's involvement in IMI, we started examining achievement data of students taught by teachers participating in the IMI project. These teachers were receiving extensive professional development in terms of frequency, duration, mathematical content, and proper implementation of a standards-based program. The IMI project postulated that learning and student achievement would increase for students whose teachers had participated in these extensive professional development sessions.

As a district, we saw a direct correlation between the increase in student learning and achievement and the professional development of the teachers. Percentages of students who were in classrooms with teachers who received professional development through IMI averaged a 61% passing rate on the mathematics portion of the Indiana Statewide Testing for Educational Progress (ISTEP+) in the fall of 2005 for grades 3 through 6. This was in comparison to a 52% average passing rate for the entire district, which included the above-mentioned 61% who were in "IMI teacher-trained classrooms." The comparison of the two groups is not totally valid, because the IMI teacher participants were hand-picked and their numbers were small compared to the total number of teachers in the district. Nevertheless, these results clearly indicated to the district that the IMI model of professional development was an effective one.

As we continue mathematics professional development in Hammond, we will examine data to assist us in determining the effectiveness of professional development. This examination will help us in determining, in part, the audience and focus for our on-going district mathematics professional development.

Frequency of Professional Development

Before its involvement with IMI, the School City of Hammond historically has not consistently offered mathematics professional development for teachers. While there have always been individual teachers who have attended math conferences or workshops at outside locations, the majority of the mathematics professional development within the district has been once every six years when new math materials were adopted.

Hammond has also historically offered one-shot workshops. These one- or two-day events were offered when a "new" strategy was the popular or hot topic of the time. There were no follow-up sessions, only the initial offering of the information.

We have learned that professional development must be ongoing each year, with no less than four opportunities for every appropriate teacher to attend. We have also learned that these sessions must be scattered throughout the school year to support teachers and their concerns as the year progresses.

The frequency of workshops in the IMI model was for an initial professional development opportunity to be offered early in the school year. This allowed teachers to gain the basic foundational knowledge that was needed to begin implementation of a program or strategy. A second session was held in late fall, a third in winter, and a fourth in early spring. The

scattered frequency of these sessions allowed time for teachers to utilize and/or practice the program and/or strategy and return with concerns and questions to support them in their continued efforts.

We no longer offer one-shot workshops in Hammond. We always provide an initial training and then follow-up sessions to support the teachers. While this method is more costly, the impact on teacher implementation and thus on student learning make this increased-frequency method worthwhile.

Participants in Professional Development

Professional development is for teachers! While we believe this to still be true, we are becoming more aware of the need for an ever-broadening group of people to participate in math professional development.

Through our work with IMI, we were required to provide mathematical professional development for a wide group of adults. This group included parents, principals, and district-level staff.

Each school in the district was required to have two “Parent Game Nights” during the school year. These game nights focused on the implementation of math games that were embedded in our standards-based mathematics program. They assisted parents in seeing the importance of playing math games for the teaching and review of math concepts and skills. As parents participated in these sessions, they were learning about the importance and value of alternative methods of teaching mathematics, how to actually play the math games, what mathematical content was embedded in the game, and actual math content knowledge. During these sessions, teachers also focused on the alternative algorithms and taught parents how to solve mathematical problems utilizing them. These sessions then became very important as a way to not only “sell a standards-based math program” but also to increase our parents’ mathematical content knowledge. Many of the parents in our urban district shy away from helping their children at home with school-related work because of a feeling of inadequacy where mathematical knowledge was involved. These after-school sessions then also increased parents’ confidence when assisting their children with “homework.”

Principals and district-level staff had historically not been included in mathematical professional development in Hammond. Through IMI-sponsored events, these two groups were included in professional development that focused on a variety of mathematical topics including:

- What is the Indiana Math Initiative?
- How can the Indiana Math Initiative assist you in your role?
- What is a standards-based mathematics program?
- What are the specific components of our elementary standards-based program?
- How can you support teachers in the implementation of a standards-based math program?

These sessions were held approximately two to three times per school year in different regions of the state, thereby allowing principals and district staff from several IMI districts to attend at the same time and network with each other.

While we have come to understand the importance of mathematical professional development for principals and district level staff, we have also seen that the focus of the sessions must be different and broader for these two groups than for teacher participants. We have also learned that the timing of the sessions is important as well. Principals will not, and often cannot, attend sessions that are offered during the school day, but after school sessions

where food is provided are better attended and offer a focused audience rather than one that is constantly interrupted by calls from school.

Facilitators of Professional Development

The School City of Hammond has always believed that teachers would only listen to consultants brought in from “outside” the district to facilitate workshops. The common belief was that teachers did not view their colleagues as experts and thus would not view them as a credible and valid source of learning.

The Indiana Math Initiative also utilized outside consultants and facilitators in working with the IMI Select Cadre teachers—the elementary teacher leaders who participated directly in the IMI project—on the implementation of a standards-based program. This method obviously made sense in order initially to build the knowledge base within the multi-district IMI-trained leadership group. Once this select cadre of teachers was trained and had time to practice the implementation of the standards-based program, many of them participated in consultants training and thus were able to facilitate sessions within their own districts. This has allowed Hammond to become self-sustaining in terms of training new teachers in the implementation of a standards-based program that helps to ensure the sustainability of a mathematics movement in the district. And as outside consultant fees increase and district professional development dollars decrease, this method has also become cost effective.

Other teachers who were a part of the IMI cadre but chose not to participate in consultants training are involved in mathematics professional development through mentoring new mathematics teachers. While this is a one-on-one endeavor, it is critical in the support of first-year teachers who are overwhelmed many times with the complexities of a standards-based mathematics program.

Another method that Hammond has used to develop teacher facilitators within the district is to have teacher leaders collaborate with IMI staff. We have utilized this strategy at the secondary level where a middle and high school mathematics teacher (both IMI Secondary Liaisons—the secondary teacher leaders who participated directly in the IMI project) have co-planned and co-facilitated mathematics professional development for Hammond teachers for two years with an IMI staff member. This method has been productive in that it allows for planning and facilitator training in a hands-on approach. It also, however, starts to build the credibility of the in-district facilitators with the other math teachers in Hammond. Hopefully as this passing-of-the-torch approach continues, we will utilize more Hammond secondary math teachers in this method and thus build our own cadre of trainers, as we have at the elementary level.

These models of professional development regarding facilitators have assisted Hammond teachers in appreciating the expertise that is “within” their own collegial group. These models have started a cultural change in Hammond, where our math teachers, at all levels, are becoming a community of learners led from within their own ranks.

Focus areas of Professional Development

As stated earlier the focus of mathematics professional development in Hammond was historically centered on textbook adoption. Since previous adoptions were traditional programs with a “drill and kill” approach, the professional development consisted of a textbook representative walking teachers through the various materials that came with the program and a blessing of “go forth — teach — we will see you in six years.”

Focus on Implementation

Our participation in IMI and the adoption of a standards-based mathematics program at the elementary and middle school levels have brought changes in the focus of our mathematics professional development in Hammond. The first year of adoption was focused on the proper implementation of the math programs. Yes, we examined the materials that were provided with the program, but the focus was on planning on how to best utilize those materials to increase the mathematical understandings of students. We also examined the proper implementation of the program through the success students were or were not having in mathematics. The question became: “How can I better implement this particular component of the program to increase student learning?” These changes helped teachers to plan better and to focus on student learning.

Focus on Mathematics Content Knowledge

One of the goals of IMI was to increase the mathematical content knowledge of elementary teachers. As a district Hammond had not previously taken this variable into consideration in planning professional development in mathematics. One positive result that occurred at the elementary level in Hammond was a natural increase in mathematical knowledge of teachers with the implementation a standards-based program. Since we had been utilizing arithmetic programs for many years in Hammond, teachers were not exposed to mathematical thinking through their daily teaching. We often heard teachers talking about their own mathematical learning, as they were teaching the standards-based program. Through our work with the IMI collaborative, the select cadre was also expected to organize and implement mathematical content sessions for elementary teachers in the district. Even though these sessions were not mandatory for all teachers in the district, our feedback forms from the after-school sessions indicated an increase in their knowledge base for math content. Hammond has now also included content work in the implementation professional development sessions, where teachers actually do the math work that is expected of the students and explain it to a colleague. This has become a vital part of the planning process of a standards-based program.

Focus on Best practices and Teaching Strategies

At the secondary level, IMI has focused on the utilization and implementation of best practices and instructional strategies in mathematics. We have only started tackling the secondary level, particularly high school, but are following the lead of IMI and directing our focus on the same areas. While we have had a higher level of resistance at the secondary level in adopting a standards-based mathematics program, the focus of best practices and instructional strategies applies to any program we are using. Relying on the strategies of Robert Marzano and the problem-solving process, we have been able to start slowly with our secondary teachers. These are generalized strategies, for example, the assignment of homework, that do not apply only to the teaching of mathematics. As this group of secondary math teachers becomes more of a community of learners, we will advance to best practices and instructional strategies that are more specific to mathematics or a particular course. First though, we want to instill in this group of secondary math teachers the importance of professional development and the opportunities it affords them and thus their students.

Focus on Using Assessment Data

IMI's overall focus was to increase students' mathematical achievement. So, through the many years of the collaborative, examining the mathematical data from each district's annual standardized test scores has been a crucial indicator of achievement. Hammond has been incorporating this into our secondary math sessions in order to derive the areas of need for professional development.

In addition to the standardized data, we have been utilizing district assessment data and actual student work in the professional development sessions to examine and reflect on what students know and are able to do. The use of these two additional pieces is helping secondary teachers to ask: What is it students understand and what do they still need assistance with in mathematics? We are also beginning the long and hard process of having teachers reflect on and talk about the strategies they used when instructing and what could be done differently to increase student understanding. Allowing time for the teachers to then develop a plan for changing that instruction, following through with it in the classroom, and then once again examining student work to look for the effectiveness of the newly revised instruction is becoming a standard mode of operation in the secondary math professional development sessions.

Evaluation of Professional Development

Hammond has always felt it important that all professional development sessions be evaluated in part by participants' evaluations and feedback. For a number of years, we utilized the Concerns Based Assessment Model (CBAM) which analyzes the concerns of the participants and places them into categories — from concern about the food and room temperature to concern about the effect the learning will have on student achievement. While this model of evaluation gave us some feedback, it still did not address the specific feedback that we wanted to know from the participants.

We now utilize a more specific feedback form at the end of each session that addresses what the teachers have learned in that session, what concerns they still have about that learning, ways in which they will utilize the learning before the next session, and other they feel they need assistance with. The facilitators and other district staff then read and reflect on this feedback. This is used then, along with the reflections of the facilitators and attending district staff, to plan the next professional development sessions.

Impact of Professional Development

Certainly there is no greater impact that one can hope for from professional development than the increase in student learning and achievement. This has always been the focus of IMI, and one which Hammond has modeled.

Hammond has seen an increase in our math standardized test scores at the elementary level in the past four years. Is this due to the adoption of a standards-based program, better mathematical professional development, or a combination of both? The district asserts that the combination of both is necessary to increase student learning and achievement, for we believe that, no matter how great a program is, it will not have any impact if it is not implemented correctly.

We have also seen a decrease in math standardized test scores at the middle and high school levels in the past four years. We have only worked on math professional development at these levels for one year. The great gains we are making at the elementary level makes us even

more certain of the need for both good mathematical programs and professional development for teachers at the secondary level in order to make strides in student learning and achievement there also.

While an increase in student learning and achievement is the overall goal of mathematical professional development, and while we know good mathematical professional development directly effects student learning, professional development is noteworthy in and of itself. Its benefits are briefly outlined below.

We have seen an increase in the positive attitude that teachers have regarding professional development. Many teachers now request support and question what we will be focusing on next school year. They have come to see professional development as a way of doing business in the School City of Hammond.

Instructional practices have started to change. While this is certainly a slow process and a minimal number of teachers are resisting, we have seen more of a willingness to try best practice strategies. We have also seen a willingness to bring in student work as evidence of the use of a strategy and to reflect on how the implementation of that strategy can be improved to increase student learning.

A commitment by the district administrators to the ongoing need for professional development in mathematics at all levels is now assured. The district has always believed in the importance of professional development but has never examined its role in it. Through our work with IMI, the need for active district support of a professional development plan that will keep moving the teachers forward has become evident.

Hammond has seen a great change in the role of teacher leaders and principals through our work with IMI. While administrators have traditionally managed their schools, now they are challenged to become instructional leaders as well. They have been challenged to know why good standards-based mathematical programs are essential for the students as well as what best mathematical practices look like in the classroom, and what they can do to support teachers.

Teacher roles have changed, as we have seen many teachers become facilitators of mathematical professional development, both at the district and building level. This has allowed these same teachers to become math leaders among their colleagues and to expand their role within the school and district. These teacher leaders have taken ownership of the mathematical movement in the district, which will ensure the future sustainability of standards-based mathematics programs and professional development in Hammond.

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