

Building a Professional Learning Community through Text Protocols

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Overview

This paper will describe how text protocols can be used with professional learning communities to facilitate discussion around common readings. The learning communities were made up of elementary and middle school teachers that were involved in teaching mathematics. This included both regular education classroom teachers and special education teachers at both elementary and middle school levels. All special education teachers were involved in classroom instruction through inclusion programs.

The purpose of the professional learning community was to increase teachers' knowledge of standards-based mathematics curriculum and instruction. Funding for this project came through the Indiana University - Indiana Mathematics Initiative (IU-IMI), an NSF-funded Math-Science Partnership Grant Project.

School system background

Bartholomew Consolidated School Corporation (BCSC) is a school system of approximately 12,000 students serving most of Bartholomew County, including the city of Columbus, in south-central Indiana. It includes eleven elementary schools, two middle schools, and two high schools. At the last mathematics textbook adoption (2004), BCSC was the only one of the nine original districts involved in IU-IMI that did not adopt the *Everyday Math* curriculum following a one-year IMI-sponsored pilot program. What was adopted instead was a dual adoption from Houghton-Mifflin that gave individual teachers the option of using either the traditional Houghton-Mifflin math program or *Math Expressions*, a standards-based program developed through the Children's Math Worlds research project and written by Karen Fuson, professor emeritus, Northwestern University.

Textbook adoption in BCSC has traditionally been done by a teacher-voting system, whereby each teacher gets one vote. The primary reason the adoption followed the dual option path was that teachers, especially those not involved with the *Everyday Math* pilot prior to adoption, were very intimidated by expectations for students and teachers in a standards-based program. Based on math teacher experience and expectations, the proposed program seemed foreign to them. In particular, many teachers were unfamiliar with the integral role that the process standards play in daily mathematics lessons.

The dual adoption has created some problems in the ensuing four years since adoption. Foremost among those problems is that in most elementary schools a student finds himself or herself going in and out of standards-based math and traditional math classrooms from one year to the next. It also creates some confusion for parents and makes it difficult to establish uniform parental expectations. Additionally, for special education teachers who often work in multiple classrooms with multiple teachers as part of the inclusion program, it creates a situation where they are working with multiple math programs, often at the same grade-level.

Vision and Goals of the Professional Learning Communities

The goals of IU-IMI included informing teachers about standards-based mathematics and assisting them in its implementation. IU-IMI project goals also included developing teacher leaders within each participating district. The professional learning communities (established around text readings) aligned with these IU-IMI goals. Additionally, it continues to be the vision of the IU-IMI teacher leaders within BCSC that all BCSC teachers involved in the teaching of mathematics become more informed about the NCTM standards and standards-based mathematics curriculum instruction. Specifically, it is a goal of that teacher-leader group that, by the time of the next mathematics textbook adoption, there would be more informed discussions on a wider level at all elementary schools, relating textbooks to the NCTM standards, in general, and to the NCTM process standards, in particular.

It was a further goal of this project to increase teacher understanding about *Math Expressions*, its implementation in the classroom, its use of alternative algorithms, its emphasis on communication through “Math Talk,” and its emphasis on student understanding and mathematical reasoning. This included teachers that are currently using the program as well teachers who are not using the program, who may have students who have been in the program.

Professional Learning Communities set-up and procedures

The Professional Learning Communities met six times from November through May during the 2007–08 school year. The meetings were held once per month except for the month of April. All elementary teachers that are involved in mathematics instruction at the eleven elementary schools were invited to attend. This included regular classroom teachers and special education teachers. Likewise, all mathematics and special education teachers at the middle school level were invited. Principals and assistant principals at both levels were invited as well. The breakdown of participants is shown in Table 1 below.

Table 1

	Elementary classroom teachers	Elementary special needs teachers	Elementary Principals	Secondary classroom teachers	Secondary special needs teachers	Secondary Principals	IMI-IU Staff	Total
12:30	8	2	0	1	1	0	3	15
3:15	32	3	0	4	0	0	3	42

The organizer/facilitator was one of the high school/middle school mathematics department chairs who also serves as the IU-IMI district coordinator. Through IU-IMI funding, teachers were given the option of attending a session from 12:30 to 2:45 with release time from their classroom or attending a session from 3:15 to 5:15 with a stipend. The first thirty minutes of each session were devoted to reading time. All participants were sent an electronic copy of the reading a week before the session and most used the 30 minutes to reread the article in preparation for the discussion. This was especially true in light of the particular protocol that would be used and the specific requirements for that protocol. The specific protocol to be used was given to teachers as they arrived and prior to the 30-minute reading time. This allowed the teachers time to relate the reading to the specific requirements of the protocol (see text protocols).

The program was titled “Mathematics Education Research: From Theory to Practice.” In keeping with that title and the goals of the program, individual reading was completed and followed by small group discussion. Groups were formed after the reading time. The 12:30 session was usually divided into two smaller groups and the 3:15 session was divided into four to six smaller groups. The groups were randomly assigned and changed from session to session. Different techniques were used in assigning groups, such as participants lining up by the distance they had travelled from their places of residence or distance from their places of birth to the session, or according to the number of siblings in their family as they grew up. Once teachers lined up they counted off, formed groups, and spent a couple of minutes introducing themselves within their groups. The participants then spent the bulk of the time in a discussion about the reading, based on the protocol being used for that session. The last twenty minutes of each session were spent with each group reporting out some highlights of their discussion and with a short activity to help teachers bring the discussion to the application stage.

Facilitator background

The facilitator for the meetings was the IU-IMI district coordinator for Bartholomew Consolidated Schools. His teaching background includes twelve years of teaching 7th and 8th grade mathematics and 18 years of teaching 9th–12th grade mathematics. He currently teaches high school mathematics and serves as a department chair for middle school and high school math departments. He has received training through the National School Reform Faculty on the use of protocols in facilitating groups. He has also worked with professional development of in-service teachers locally and throughout the state and has worked with pre-service teachers as an adjunct faculty member of the mathematics education department at Indiana University. Through the IU-IMI partnership grant he has had many opportunities to work with elementary teachers who are implementing a standards-based mathematics program.

The Readings

Because many elementary teachers have not read the *Principles and Standards for School Mathematics* (NCTM, 2000) and because one of the major differences between traditional mathematics curriculum and reform curriculum projects is the emphasis on process standards, the decision was made to focus most of the readings on the process standards from the *Principles and Standards*.

For each of the first five sessions, teachers were asked to read the general introduction for kindergarten through grade 12 for one of the process standards, along with the grade band section for the same process standard that corresponded to the grade they taught. That meant that, coming into the discussion, teachers had all read the introduction and had also read parallel, but not identical, material on the same topic for their grade level. It did not seem to hinder discussion that the teachers had not read exactly the same passage. It seemed more valuable to have teachers from multiple grade levels in each discussion group.

Table 2 shows the process standard covered for each month, along with the protocol that was used for that standard. (See the Protocols section below.) The final meeting in May gave teachers a chance to review and reflect on all five process standards and to reflect on the implementation of these process standards through classroom observations. Because of the unique situation that only some teachers in the district were implementing the reform curriculum (*Math Expressions*), the month of April was set aside for classroom observations. Through MSP funding, teachers were given class release time to observe other elementary math classes. This

meant that teachers using the traditional mathematics program could observe a teacher implementing the *Math Expressions* program. It also meant that teachers using *Math Expressions* could observe another teacher who was implementing *Math Expressions* at the same grade level or at a different grade level.

Table 2

Month	November	December	January	February	March	May
Reading Topic	Problem Solving	Communication	Connections	Representation	Mathematical Reasoning and Proof	Review and Reflect
Protocol	Save the Last Word for Me	The Final Word	Making Meaning - Story Telling Version (adapted)	Text-based Seminar	Choice: Save the Last Word for Me or The Final Word	Text-based Seminar

Teachers also observed a sixth grade teacher who had been using reform mathematics (*Everyday Math* and *Math Expressions*) at the lower grade level and had since been transferred to grade six, where a traditional curriculum had been adopted for grades six through eight. That particular sixth-grade teacher was selected because she continues to include process standards in her lessons to a high degree.

The reading for the sixth and final professional learning community session of the year was excerpts from *Connecting Research and Practice in Mathematics Education — Research Synopses* (<http://www.edu.gov.on.ca/eng/studentsuccess/lms/ResearchSynopses.pdf>).

Protocols

A protocol is an agreed upon guideline for a group discussion or for work together. The protocols used were taken directly or adapted from the work done within the district by Daniel Baron from the National School Reform Faculty, Bloomington, Indiana. A secondary goal of the project was to familiarize teachers with the protocols themselves, so that the teachers could adapt and use them in situations in their own schools and classrooms. A brief summary of each protocol is given here. A more detailed description can be found at the National School Reform Faculty website (www.nsrffharmony.org/).

The guiding principles for all protocols include the following.

- All participants are given an equal voice.
- Participants can support each other’s learning.
- Learning from readings is maximized through a focused discussion.
- Individual learning is highest when we put ourselves in a zone of risk with mutual trust.
- Time for silence and reflection is beneficial.

Save the Last Word for Me Protocol

After reading the article, each participant picks a passage that highlights a “most significant” idea from the article. (It is helpful to pick a couple of back-up passages so that participants don’t duplicate passages.) Participants are put into groups of four. The first participant reads his/her passage to the group but makes no further comments at this time about why he or she chose that

passage. It is helpful to direct other participants to the page and paragraph of the passage so they can see it as it is being read. After a minute for all participants to reflect on the identified passage, each member of the group (other than the person who shared the passage) has one minute to comment on the passage, sharing what it means to them or what questions it raises. Following that sharing, the person who brought the passage to the group takes three minutes to share why he/she chose the passage and to reflect on the passage or respond to comments shared by other group members. This process is repeated with each person in the group sharing his/her passage followed by the individual responses. Each round should take about eight minutes with a group-size of four each.

The Final Word Protocol

After reading the article, each participant picks a passage that stands out to him or her. (It is helpful to pick a couple of back-up passages so that participants don't duplicate passages.) Participants are put into groups of four. For three minutes, the first participant shares his/her passage with the group and explains in what way that part of the article seemed significant. Following that each member of the group has one minute to comment on the passage or on the comments the first person made about the passage. Following that sharing by the other three group members, the person who originally shared the passage has one minute to share any follow up or reaction to what has been shared. The process is then repeated with each person in the group sharing his/her passage, followed by the individual responses. Each round should take about eight minutes with four in a group.

Making Meaning Protocol – The Storytelling Version (Adapted)

After reading the article, each participant is asked to reflect and write a journal entry relating what was read to (1) a personal learning experience from his/her childhood or (2) a personal experience from the classroom in which he/she teaches. A direct connection should be made to a specific section or idea from the reading. The first person takes three minutes to share the idea or passage from the reading and the personal learning or classroom experience. The participants take two minutes to ask clarifying questions about the story. All participants except the storyteller have five minutes for an open discussion around the questions, "Why do you think the storyteller found this experience to be so profound?" and "How does this connect to the idea from the reading?" The storyteller sits quietly and takes notes. Following this discussion, the storyteller has three minutes to share his/her thoughts, new insights, and connections to the reading. This process is repeated with each participant taking the role of the storyteller. Each round should take about thirteen minutes.

Text-based Seminar Protocol

After reading the article, participants are given a framing question or a set of framing questions and given at least fifteen minutes to review the article in light of the framing questions. An open discussion follows the reflection time. All participants are given the following protocol guidelines to follow.

1. Listen actively.
2. Build on what others say.
3. Don't step on others' talk. Silences and pauses are OK.

4. Let the conversation flow as much as possible without raising hands or using a speaker's list.
5. Make the assumptions underlying your comments explicit to others.
6. Emphasize clarification, amplification, and implications of ideas.
7. Watch your own air time in terms of how often you speak, and in terms of how long you speak.
8. Refer to the text; challenge others to go to the text.

The task of the facilitator is to keep the discussion moving, to refocus on the framing questions as needed, and to emphasize guideline #8 — refer to the text in sighting evidence.

In using this protocol to discuss the reading on the process standard of mathematical representations, the framing questions listed below were introduced along with the following quote:

Students learn mathematics through the experiences that teachers provide. Thus, students' understanding of mathematics, their ability to use it to solve problems, and their confidence in, and disposition toward, mathematics are all shaped by the teaching they encounter in school. (From *Principles and Standards for School Mathematics*, "The Teaching Principle", p. 16)

Framing Questions

1. Why is it important that my students use different kinds of representations while learning mathematics? (Make sure you support with evidence from the reading.)
2. What do I do as a teacher to encourage or discourage students in making connections across multiple representations?
3. In what ways do our textbooks encourage or discourage sense-making through multiple representations?
4. What would I need to do to bring more representations into my math class?

This protocol was also used for the final session following participant observations of classrooms implementing a reform math program. The following framing questions were provided to the participants.

1. What connections did you see between the reading, the process standards, and your classroom observation?
2. In what ways did you see the incorporation of the process standards impacting student engagement and learning?

Choice: Save the last Word for Me or The Final Word Protocol

This protocol is used after participants have become familiar with the two individual protocols. Following the reading and the choosing of a passage, an individual shares his/her passage with the group and then announces which of the two protocols he or she would like to follow. That means he/she can either begin by sharing his/her thoughts about the passage, listening to others, and then giving their own response (Save the Last Word for Me) or he/she can begin by listening to others' thoughts on the passage and then sharing his/her own thinking on the passage and the ideas of others (The Final Word Protocol). Save the Last Word for Me allows for a more open discussion based on the reading and the sharing of others. The Final Word protocol focuses the discussion more tightly to the text.

Close of each session

Because introduction to the protocols themselves was a secondary purpose of the sessions, after completing a protocol there was time for debriefing on the protocol itself. In general, the teachers found the protocols useful. Some of the reasons given were the protocols kept the discussion focused, no one person dominated the discussion, even quiet people shared, it made participants think more deeply about the reading. Some negative reactions included the feeling of being too constrained and sometimes the discussion did not flow as freely as it might have without protocols.

Each session also closed with some type of reflection on applying the topics of the discussion to the classroom. Sometimes this was a general quick sharing of personal goals in applying the latest reading and discussion ideas. Sometimes each discussion group came up with several big application ideas that came up out of the group discussion. Sometimes the session ended with a “chalk talk” or “silent board messaging” in which a question was posed like “What things can I do so that the process standard of (fill in a standard) has a greater focus in my lessons and has a greater impact on my students’ learning?” Each teacher has a marker and what follows is a silent discussion, where participants write on the white board their thoughts on the question and their reactions to others’ writings.

Teacher Response

Teacher response was measured in three ways: (1) informal feedback at the end of each session, (2) the opportunity for teachers to replicate the sessions, and (3) a survey at the end of the sixth session.

Teacher response was favorable. Teachers made comments about this experience being one of the most worthwhile professional developments in which they had participated. The only suggestion for improvement offered during the course of the sessions was a request to send the protocol to be used a week prior to the session date, along with the reading. Other participants thought it was effective to do the reading and then revisit the reading in light of the protocol. Although most participants read the article before coming to the session, there was strong, positive feedback for setting aside time at the start of each session for reading and reflecting on the article.

One of the strongest affirmations by participants was that in April, when there was no scheduled session scheduled, it was suggested that teachers could use that time to set up a one-session article discussion in their own schools. They could use one of the readings on the process standards from *The Principles and Standards* or use a different article. One suggested article was “10 Big Math Ideas” by Marilyn Burns (*Scholastic*, April 2004), which included all of the process standards in a general discussion of planning math lessons. Teachers from half of the schools involved in the monthly article discussions planned and executed their own text-based discussion using one of the protocols. The teachers felt that the discussion at the monthly meetings was valuable enough to bring it to a larger group of teachers at their home school.

Finally, a survey of all participants was given after the sixth monthly session. Participants were asked to respond to the following set of questions:

1. What are some personal learning experiences you had from participating in the theory-to-practice sessions?

2. On a scale of 1 to 5, with 1 being totally unaware, rate yourself on how aware you were of the math process standards, their place in mathematics instruction and learning, and the teacher's role in implementing them, before the readings and discussion through theory-to-practice sessions.
3. On a scale of 1 to 5, with 1 being totally unaware, rate yourself on how aware you now are of the math process standards, their place in mathematics instruction and learning, and the teacher's role in implementing them.
4. Give a specific example to illustrate your answer to questions 2 and/or 3.
5. Are there any ways not mentioned in item 4 in which participating in theory to practice influenced your own practice as a teacher?
6. In what ways did the protocols used help our discussions and learning from the articles we read?
7. In what ways did the protocols we used hinder our discussion and learning from the articles?
8. On a scale of 1 to 5 with 1 being strongly disagree and 5 being strongly agree, rate the following statement. *The text-discussion protocols made the article discussions a more productive experience.*

Questions 2 and 3 were asked so participants could self-assess their pre-knowledge and post-knowledge of the process standards. Questions 4 and 5 were asked to capture specific examples and classroom applications of the ideas being discussed in the sessions. This was a measure of the teachers' own perceptions of the impact the sessions had on their teaching practices.

The mean score for participant responses to the pre-knowledge question (#2) was 2.1, with a standard deviation of 0.9. The mean score for the post-knowledge question (#3) was 4.1, with a standard deviation of 0.2. That showed a mean growth of 2 on a 5-point schedule. A matched-pairs t-test with 32 paired pre/post responses showed a significant self-perceived gain in knowledge about the process standards with a p-value of 0.0005. Some of the specific examples given by participants to illustrate their answers to the pre-knowledge and post-knowledge questions are given below.

To be quite honest, before these sessions, I didn't even know that the math process standards existed, as embarrassing as that may sound. Now, being aware of the process standards and having taught Math Expressions for a year, I know how important it is to have math talk during the lesson.

I was not aware of math process standards, but since these [sessions] I use Math Talk more often and help students discover connections.

I've physically "stepped back" so kids could lead discussion. I've become more of a facilitator.

I feel that I understand "connections" within math better and that I need to look for more "teachable" moments for "aha!" moments to occur.

I have a much better understanding of how the process standards and the content standards work together and build from year to year.

In questions 6, 7, and 8, participants were also asked to reflect on the effectiveness of the protocols. The mean of all responses to question 8, rating the effectiveness of the protocols in making the article discussions a more positive experience, was 4.5, with 5 being the highest rating. In response to question 6 —“In what ways did the protocols used help our discussions and learning?” — the overwhelming response was that the protocols kept the discussion more focused on the topic for that session. Another common response spoke to the equal voice that the protocols emphasize. The protocols prevented any one individual from monopolizing the discussion. Question 7 asked in what ways the protocols hindered the discussion and learning. The majority of the respondents either left this question blank or wrote statements like “I can’t think of any negatives.” Two respondents said that some of the protocols restricted the discussion too much. One respondent stated that “Since we had to keep moving, some thoughts might have been cut short.”

Teachers also made comments in the survey about their own personal learning and how they applied the theory discussed at the sessions to their own classrooms. The most common responses included incorporating more “math talk” into daily lessons, encouraging students to explain their thinking, setting up lessons and discussions that encourage connections, building lessons that involve student inquiry or discovery, and valuing as well as modeling different approaches to solving problems. The feedback about the sessions in general was very positive. Teachers looked forward to future sessions and made suggestions on specific topics to read about and discuss.

It was suggested that all teachers attend sessions like this with any new math adoption. If a reform curriculum is adopted, sessions like these would certainly help teachers get the big picture of the learning and teaching principles that underlie the curriculum. That knowledge would go a long way in encouraging full implementation by classroom teachers. One teacher wrote, “I absolutely loved hearing from other teachers — their struggles, their successes, etc. — it reiterated the fact that we are in this together, and must work together to do what is good for children.”

Teachers were also appreciative of the built-in time for reading the articles. For several teachers, that aspect of the program was the determining factor in their participation. Without that time at the beginning of each session, teachers felt too pressed for time to complete the reading and attend the session. Other teachers found it useful to have time to review the article immediately before the discussion. This quote from a teacher sums it up: “I absolutely love how our time is valued. It is important that we were given time to read or reread the articles during our workshop times, as that helped the information to be fresh in my mind — it also made me not feel pressured to FIND time to read the info before coming — thanks a million!!!”

A common suggestion for future sessions was for teachers to have regular theory-to-practice readings and discussions using the protocols at the building level.

In summary, this was one of the most successful MSP-funded professional development programs offered at the district level. Choosing the readings and choosing a protocol took relatively little preparation time, but the teacher growth and district payback were phenomenal. In a time when we as educators are being asked to make research-based decisions on our curriculum and instruction, this discussion format using protocols offers a focused and energizing way to accomplish that in a collegial, community setting.

Sources

Principles and Standards for School Mathematics, National Council of Teachers of Mathematics, 2000.

National School Reform Faculty Website, on protocols, www.nsrffharmony.org.

“10 Big Math Ideas” Marilyn Burns, *Scholastic*, April 2004.

Connecting Research and Practice in Mathematics Education — Research Synopses
www.edu.gov.on.ca/eng/studentssuccess/lms/ResearchSynopses.pdf.

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