

Mathematics Professional Learning Communities: Opportunities and Challenges in an Elementary School Context

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Abstract

School-based professional learning communities (PLCs) have become an important means of “building capacity” among teachers in a wide variety of areas, including those with a subject focus. Very often, these PLCs are mandated by administration, and operate under an established structure. This paper describes an attempt by a mathematics coordinator and school level “lead” teachers to establish relatively informal PLCs in mathematics in an effort to improve mathematics teaching, and thus student learning, in an environment that focused very much on literacy. The four PLCs created are discussed, as are the opportunities and the challenges that go with the relative freedom offered to the teachers. Sustainability is a central challenge to these groups.

Introduction

Professional learning communities, or PLCs, have gained considerable standing within the general education community in the last ten years or so. As DuFour, DuFour, and Eaker (2008) note, the concept of a PLC was once limited primarily to use by educational researchers, but has now become widely used to describe almost any gathering of educators. Most educational leaders insist, though, that professional learning communities must have student learning as their principal focus (e.g., DuFour, DuFour, & Eaker, 2008; Fullan, 2007; Schmoker, 2006). Interest in changing teaching practices must be for the purpose of improvement in student learning. In the province of Ontario, The Literacy and Numeracy Secretariat (LNS), established by the Ministry of Education in 2004 for the improvement of student achievement, has focused heavily in recent years on supporting the establishment of school-level PLCs for the purpose of “engag[ing] in processes of inquiry and learning focused on improving student achievement” (LNS, 2007, p. 2). Since school boards are expected to pursue this end quite vigorously, this often means they mandate that schools establish such PLCs to address particular school level issues related to student learning. A case in point is the school board in which the following study took place. What happens, though, when the initiative is much less formal?

This paper describes the development of four elementary school-level groupings of teachers formed to address issues pertaining to mathematics education. These were not mandated by the school board, but instead arose out of the interest of a mathematics coordinator and elementary mathematics “specialists” within the schools, and the feeling that “building capacity” (LNS, 2007) was not happening fast enough. Given the development parameters for these groups, which will be expanded upon further, key foci of the paper are purpose and sustainability.

Ontario and School Board Contexts

Provincial Context

In Canada, the formal school curriculum is set at the provincial level. The latest revision of Ontario’s elementary (grades 1 to 8) mathematics curriculum occurred in 2005, with an increasingly explicit focus on “reform mathematics” and mathematical processes. The work of NCTM and reform mathematics educators such as Van de Walle (e.g., Van de Walle & Folk, 2005) have significantly influenced Ontario mathematics for the past several years.

The LNS was given the explicit goal to “help boost student achievement” in the province by “work[ing] directly with schools and school boards across the province to *build capacity* and implement strategies to improve reading, writing, and math skills” (LNS, n.d.). The LNS produces a large number of research-based resources for schools and teachers.

School Board Context: Literacy, Numeracy, and PLCs

The school board within which this study took place is geographically large, and predominantly rural, although a majority of its students are located in or near the one city in the region. Especially since the establishment of the LNS, the board has focused extensively on literacy. At the time of this study the school board had one elementary literacy coordinator and four literacy coaches working with teachers in schools. In addition, many of the schools had an in-school literacy resource or ‘lead’ teacher who had completed additional training in this area. In contrast, the school board had one mathematics

coordinator to service all 36 elementary schools, although some schools did have an in-school mathematics resource teacher.

The school board has become a major advocate for school-based professional learning communities, mandating their development and implementation in a variety of contexts such as literacy and “turnaround,” as reported by teachers. In these “official” PLCs, the focus is very much on student learning. For example, a poster created by the school board and displayed in at least one of the schools in this study reads, in part: “The Four Critical Questions of EVERY Professional Learning Community: What do we want students to learn? How will we know when every student has learned it? What will we do if a student has not learned it? What will we do if a student has learned it?” The flip-side of a focus on literacy PLCs, however, has been the absence of mandated, school-level, mathematics-based PLCs.

The Informal Mathematics ‘Professional Learning Communities’ PLCs: Their Establishment

To help increase school-level focus on numeracy, in January 2008 the elementary mathematics coordinator invited four teachers who had just completed additional “specialist elementary mathematics” training to become “lead mathematics teachers” in their respective schools. Shortly thereafter a second teacher joined to co-lead at one of the schools. The coordinator and the lead teachers themselves referred to these teacher groups as PLCs. Although informal, teacher release time was provided for all the teachers taking part (one half day per month), with more as planning release time for the lead teachers. The mathematics coordinator was eager to explore ways to “build capacity” in reform-oriented mathematics teaching and this appeared to be a way to start that process. Unlike many other school board based PLCs, the focus of each of these PLCs was determined by the schools themselves, usually by the lead teacher in consultation with the administration and with colleagues. The mathematics coordinator was to have a limited role in the ongoing process, meeting only occasionally with the lead teachers in sharing sessions.

It is important to highlight the informal, almost serendipitous nature of the establishment of these school-based mathematics groups. While numeracy levels among students was of interest to the board, no mathematics PLCs had previously been established. Only because he was aware that these five teachers had recently completed specialized elementary mathematics training was the mathematics coordinator able to take the initiative to invite them to assume lead roles at their schools, and arrange financial support for the groups. The question was, would these groups be able to sustain themselves, and “gel” as mathematics-based professional learning communities?

PLCs: Researching their Establishment

The mathematics PLCs were established and just beginning to function as the research began in late winter 2008. The intention was to tell each PLC’s story, particularly from the perspective of the lead teachers, and to explore themes of (i) commonality and difference among the four schools, and (ii) sustainability and viability. Methodologically, the intention was to adopt a participant observer approach. As the researcher I was to observe as many of the mathematics community meetings as I could and was permitted to attend, remaining out of the experience except when explicitly called upon to offer a perspective on a mathematics education-related question. I was also to attend and observe meetings held by the mathematics coordinator and lead teachers. In both cases data were to be gathered through field notes. A final data source was audio-taped individual interviews with lead teachers.

The research reality was quite different. Teacher health issues, busy schedules, limited communication capacity, and teacher concern over outsider presence--all ‘facts of life’ in schools—meant considerable change. Through the end of the school year in June, four lead teachers, at three schools, were interviewed (two people twice), and one “PLC” meeting was observed. One active group of teachers did not want me present at their meetings, two schools had difficulty holding mathematics meetings for reasons such as teacher absence and readiness, and the coordinator and lead teachers were unable to find time to schedule meetings after the first two winter early organizing gatherings, which I was unable to attend. Nevertheless, the data gathered do help tell the story of these four mathematics “communities.”

PLCs: The Participating Lead Teachers’ Views

Opportunities to talk professionally with other adults are relatively uncommon in at teacher’s typical environment: alone in a classroom with children. The power of a group such as a PLC is, as one

teacher put it, “a chance for teachers to get together to collaborate” (Teacher A). Teacher C described a PLC as “a group of teachers and colleagues that kind of get together and have the chance to talk about different learning...” Teacher B felt that the “biggest thing” about a PLC was the opportunity for teachers “to communicate” with each other. Teacher B particularly liked the non-mandated, voluntary nature of the mathematics PLC at school B--it was not “driven by someone else’s agenda.”

Emergent Themes

A number of themes began to emerge from the data collected through the spring of 2008, described in the following sections.

School-based Mathematics Community Building

While capacity building in mathematics at the school level was a major reason in all schools for initiating these local, teacher-based PLCs, the learning community meetings, the key to this capacity building, were highly dependent on the nature of the school and the teachers involved. Four sub-themes—mathematics lead teachers, continuity, focus, and participation--were identified.

Mathematics Lead Teachers: Credentials and Training

It was critical to the possibility of success that within each of the schools, qualified lead teachers in mathematics were available. The school board elementary mathematics coordinator was able to identify four, and eventually five, teachers with official “additional qualifications” in elementary mathematics. Thus, they had the credentials and training to be sanctioned by the board to serve as lead mathematics teachers, and be granted teaching release time in order to plan for learning communities.

Continuity: Ongoing versus Interrupted

Across the four schools the frequency and continuity of the PLC meetings varied extensively. Over the period February to June (the end of the school year) the number of meetings at each school ranged from one to four. Availability, and a willingness to commit and to remain committed--in addition to training--were also key to the success of the groups. Teacher absence, delays in completing requirements in preparation for a follow up meeting, ongoing demands on teachers’ time, and the degree of commitment to the process were among the major factors that contributed to this variance.

Focus: Connected versus Dispersed Sessions

I refer to a series of PLC meetings as “connected” when they focus on and develop a single mathematics theme, or are a closely linked set of topics. “Dispersed” meetings, on the other hand, are those which have relatively few close links to each other.

The two most active groups provide examples of both. The volunteer group of teachers at school B chose problem solving as their focus, and successive meetings centred on developing and implementing a single model, with problems modified for grade appropriateness. The teachers at school A, whose attendance was requested by the principal, focused broadly on reform mathematics teaching. The specific topic for each meeting was chosen by the teachers at the previous meeting, usually with little continuity (e.g., fractions, division of whole numbers). The question is, does it make a difference to the nature and strength of the learning community?

Participation: School Mandated versus Voluntary

Although the overall professional learning community initiative was not mandated by the school board, in some schools (A and C) the initial topic was identified by the lead teacher in consultation with the principal, and certain teachers were asked by the principal to participate. On the other hand, at a third school (B), the lead teacher polled her school colleagues for a topic of most interest, and the response was a focus on problem solving. In addition, participation at this school was voluntary. At the fourth school (D), the teachers’ chose geometry as the focus. Does it make a difference to the development of the local mathematics learning community if the teacher group is requested to participate—potentially in a topic not of their choosing--or if it is strictly voluntary?

Administrative Support

This initiative grew from the personal interest of a mathematics coordinator in seeing mathematics teaching strengthen within schools. Seizing upon the opportunity to invite recently credentialed “elementary mathematics specialists” to take on voluntarily the role of lead teacher, four mathematics professional learning communities were given the chance to establish themselves.

Passive Administrative Support

Teaching release time was critical to the formation of these communities--a monthly half-day for all participant teachers, with additional planning time for the lead teachers. This financial support (for “supply” or “substitute” teachers) was provided by the school board, on the recommendation of the mathematics coordinator, and was available to all the teachers who took part. His status as a professional development official working at the school board level was thus critical to getting these school-based communities started.

School-level administrators also provided passive administrative support for the development of the local mathematics communities by supporting the intention of the strategy, by specifically supporting lead teachers who agreed to accept the opportunities and challenges of becoming leaders in mathematics within the school, and by providing space for the teachers to meet for a half day.

Active Administrative Support—A Challenge

School administrators, especially at some of the participating schools, also took an active role in the process, working initially with the lead teacher to identify a mathematics topic on which to focus, and at times, identifying the teachers who should participate. On occasion, the principal also attended the meetings.

There were also challenges to the level of active support provided by administrators. At the board level, where student literacy levels were the dominant focus, the mathematics coordinator, working alone in mathematics, found himself generally unable to provide the ongoing support to lead teachers originally envisioned. Although it was never the intention for him to run the mathematics meetings at the schools, even arranging meeting times when he and the lead teachers could meet to share their experiences proved very difficult. Nevertheless, regular coordinator-lead meetings might have helped maintain focus and commitment.

The active involvement of school administrators, especially at the start, was also a double-edged sword. The authority of the principal ensured that teachers would take part, but sometimes was construed as “one more thing to have to do.” In places where teacher ownership was able to take over once things got started, this concern appeared to fade.

What Has Happened Since?

Only two of the schools succeeded in holding meetings with any regularity between February and June, 2008. Some lead teachers expressed a desire to see the projects continue in 2008-2009, but none did, at least in the form they were constituted in 2007-2008. A new mathematics coordinator took over in September 2008, and the lead teacher B, at one of the active schools, was transferred. While there had been administrative support, it was not enough to bridge the changes. The impetus to continue was unfortunately very much reduced in most schools. Commitment levels are clearly critical--commitment on the part of the board to ensure that the coordinator has time to work with lead teachers; commitment to ensure that the weight of the success of a group within a school does not fall entirely on the shoulders of a single person, a lead teacher, perhaps inexperienced at leading. A commitment by all to see that the groups are well focused, and have meaningful goals. PLCs have a strong focus on student learning; while all the groups were well-intentioned, they typically lacked that definition, potentially experiencing a critical tension in terms of sustained purpose. This study also suggests that a strong sense of purpose may be more important than being voluntary or mandated.

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