Data Brief
Illinois Math and Science Program – Teacher Leader Institute
Summer Math and Science Institute. July 17 – 28, 2006

Prairie Group
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Part 1. Introduction

This data brief reports a subset of the findings from the external evaluation of "*Developing CPS mathematics and science teacher leaders through University-District partnerships*, a Teacher Leader Institute (TLI) funded by the Illinois School Board of Education's Math and Science Partnership (IMSP). The TLI is a three-year professional development partnership between the CPS Office of Math and Science, the UIC Math department and Loyola University. It aims to extend and deepen the professional development of mathematics and science teacher leaders by equipping teacher leaders to provide direct, job embedded assistance to middle school classroom teachers.

External evaluation for the IMSP-TLI is being undertaken by evaluators from the PRAIRIE Group, University of Illinois at Chicago. This data brief reports on the initial stage of the year long institute, a two-week summer institute carried out from July 17 – 28, 2006, that was offered to 30 science and mathematics teacher leaders: 15 city wide specialists and 15 lead teachers The first week focused on Mathematics and was run by UIC partners; the second week focused on Science and was run by Loyola U. partners. The curriculum for the second week also included initial discussion of the Action Research Projects that are a component of the year long institute.

The summer institute aimed to provide an effective learning environment that would support participants in:

- deepening content and pedagogical knowledge in Math and Science;
- enhancing their effectiveness (roles) as teacher leaders;
- developing a professional learning community of math and science teacher leaders/specialists;
- initiating development of an action research project through which participants will draw on expert knowledge to deepen their expertise and reflect on their practice as teachers and teacher leaders.

Part 2. Evaluation Method

The evaluation of the institute was organized around the following guiding themes and questions:

1. Quality of the Institute:
   - What was the quality of the institute organization and presentation?
   - Did the institute provide an effective learning environment for participants?
   - How did the organization and presentation of the mathematics session (Week 1) compare to that of the Science session (Week 2)?
2. Deepening of content and pedagogical knowledge:
   - Did participants' content knowledge increase/improve, and if so, in what targeted areas?
   - Did participants' pedagogical knowledge increase/improve and, if so, in what ways?
   - Do participants anticipate applying new content and pedagogical knowledge in their roles as teacher leaders and, if so, in what ways?
3. Developing teacher leaders in math/science (roles):
   - How did the institute impact participants in their roles as teacher leaders and/or as classroom teachers?
   - How did the institute contribute to teacher leaders' ability to support math and science inquiry in schools and classrooms?
4. Developing a professional learning community:
   - Did participation in the Summer Institute contribute to building a professional learning community? If so, how did specific activities contribute to building this community?
   - How do participants plan to tap into this community in their role as a teacher leader?

In addition, we report briefly on the institute's initial presentation of two key activities participants will be involved in over the course of the institute year: an action research project and the administering by their teachers of the SEC survey.

Data used to respond to these questions include: Observation of institute sessions for each week;
Short daily reflections of participants (from Days 1 and 3 for each week), and extended written reflections of participants provided at the end of the second week (see Appendix A). The extended written reflections form was completed by 28 of the 30 participants. It bears noting that this form did not ask respondents to self-identify as either a city-wide specialist or a school-based lead teacher. Thus we are unable to report on whether there was a correlation between reflections on the Summer Institute and the participant's professional role.

Part 3: Findings and Analysis

1. Quality of the Institute

(a) Mathematics Session (week 1)

The vast majority of participants reported that the Mathematics sessions were well organized and that there was sufficient discussion. The features most positively identified in the daily reflections were the (small group) discussions and the pedagogical techniques. Several participants also indicated that the presenters were knowledgeable. The high quality of Mathematics sessions in terms of organization (balance between large group discussion, review of cases, and small group discussion) and presentation (clarity, relevance, as well as balance between content and pedagogical knowledge) was corroborated by evaluator observations.

Most suggestions for improvement of the Mathematics sessions revolved around organization, specifically more time for breaks. Another request mentioned in written reflections was for more time for hands-on activity. During observation of the Mathematics workshops, evaluators noted that role-playing was also proposed as a way to enhance the session. (See Section 3 below on leadership roles.)

(b) Science Session (week 2)

Written comments about the organization of the Science session were more uneven than the Mathematics session. 16 of 22 respondents thought the discussions/presentations were good. Participant description of the Science sessions focused on the lecturing, which one participant described as a "passive" lecture style. Many teacher leaders complained that the Science session did not include enough time for group discussion, thus they did not have time to share ideas. While participants found the lecture topics interesting, when there were discussion questions several people commented that they were not focused, were "all over the place" or "lacked organization." As a result, they did not feel that they discussed ideas effectively.

In terms of workshop organization, several respondents commented that there was not enough time to share with a group. Another factor that some considered to weaken the organization of the Science sessions was a lack of cohesion among the presenters. It was suggested that in the future discussion could be guided with the use of focused questions. Evaluator observations of the Science sessions corroborated participants' written comments about the emphasis on lecture around science content. While it was noted that the lecture material was engaging and participants seemed genuinely interested and engaged, the engagement was primarily passive. There was little time for small group discussion, sharing of ideas, or problem-solving.

2. Deepening of content and pedagogical knowledge

(a) Mathematics Session (week 1)

Daily and end-of-institute reflections were consistently positive. Participants indicated that the Mathematics sessions were particularly effective in terms of increasing/deepening participants' knowledge of content and pedagogical practices. Half the respondents to the daily reflections described the content as very effective, while the other half claimed it was effective. The only critical comment was that the content was too "theoretical." Most respondents enjoyed the math content and indicated that they learned a lot. Most also said that the workshop was relevant to teaching standards. Many participants indicated that they learned a lot about how students thought, as well as how to present the material in a way that made sense to the students.

It was apparent from evaluators' observations of the Mathematics sessions that the material was presented in such a way that deep and meaningful engagement with the material was encouraged. For example, during the first day's discussion of shading the three grids to show the relationships between decimals, fractions, and percents, several methods were presented and analyzed for solving each problem. It was noted that some methods are easier to use with some problems than others. One must not only know several methods, but be able to decide which ones are most helpful for a given problem. It was pointed out that using the grid visually was much easier for the second problem than the first, for example. As this is important to emphasize to the students, it is quite relevant for teacher leaders.

(b) Science Session (week 2)

Daily and end-of-institute reflections indicate that participants were satisfied with the content of the Science sessions. Most participants commented that they greatly enjoyed the presenter's lectures. They reported that they learned a lot about content -- especially the environment. Aspects of the content and its presentation considered most useful were the hands-on activities, where they experienced the connection between the lab and the lecture. Many participants also mentioned that they learned how to apply the labs/hands-on activities to the text/material. This is useful for them in teaching science more effectively while doing lab work. While participants found the lecture part of the Science sessions had interesting content, some indicated that it was not too relevant for their work.

Respondents identified as valuable the pedagogical strategies they learned, including hands-on activities that can be used with students, use of vocabulary teaching strategies, use of journals, and some of the content, such as the discussion of environmental pollution.

3. Developing teacher leaders in math/science (roles)

23 of 28 teacher leaders who completed the written reflections indicated that the information provided during the Math sessions was relevant to their practice as teacher professionals. Teacher leaders stated that the Institute taught them how to 1) apply content knowledge, 2) provide training and collaborate with teachers, and 3) develop their roles as teacher mentors and coaches. Two teacher leaders did not answer the question and one was not sure how lessons learned in the Institute would be applied when working with teachers. In the daily responses, participants also noted that the presentation of pedagogy/teaching strategies helped them understand how students think and what their misconceptions are, which in turn will help them teach more effectively.

In terms of the Science sessions, some teacher leaders indicated that they expected to use the new content knowledge in their teaching and discussion with teachers. While they thought the topics and pedagogical knowledge related to lab work were interesting and relevant to their roles as science teachers, they did not find them as relevant to their role as teacher leaders.

In response to the question, "Are there aspects of your professional development as a math/science teacher leader that have not yet been addressed by the TLI that you would like to see addressed?" responses addressed issues of content knowledge, pedagogical knowledge, and the teacher leader role. Five participants indicated they would like more mathematics and science content knowledge. One teacher specified wanting to learn how to use the graphic calculator. Two teachers wrote they wanted to learn how to integrate mathematics and science instruction. Four teachers wanted the TLI to cover more professional development around their role as teacher leaders. Aspects of that role of concern included facilitating grade level meetings, coaching and co-teaching, how to accomplish all that they are being asked to do, and professional development around team building, Ten teacher leaders noted that there were no aspects of their professional development that had not been addressed.

4. Developing a professional learning community

All teacher leaders reported that the Summer Institute contributed to building a professional learning community. They found that the large and small group discussions, hands-on activities, sharing conceptual and practical ideas, and reporting to the larger group built relationships and had them collaborating and networking with others. Only two participants mentioned the action research project as contributing to building a professional learning community.

A few participants mentioned that the Mathematics workshops contributed more to building a professional learning community than the Science workshops. One of the participants attributed this to the small group discussion during the mathematics sessions, a component that was missing from the Science session. One participant indicated that this was because during the mathematics workshops the small groups were mixed up. Based on our observations, we interpret this comment to mean that the participant enjoyed the changes in composition of the small working groups each day.

However, in the course of their observations the evaluators learned that there was a mixed response to the shifting of groups. While some participants felt this expanded the range of their exposure to group knowledge and broadened their professional community, others felt that it disrupted the emerging effectiveness of the small groups.

Meetings were the most frequently reported means imagined for tapping into teacher leaders' professional community. Engagement in action research projects, emails, and asking for assistance were also identified as ways of tapping into this professional community.

Sixteen participants indicated that Summer Institute activities did not inhibit the development of a network or community of Math and Science Teacher Leaders. Two participants would have liked to sit with their action research partners. Two others thought that being told to be quiet inhibited a sense of community. Lack of integration between math and science content, the differences between city-wide and school-level specialists, the action research projects, not knowing people's names, and the limited number of future meetings were also stated as factors that may inhibit the development of a network or community of Math and Science Teachers Leaders.

5. Action Research Projects and the SEC Survey

(a) Action Research Projects

Two teacher leaders indicated that the sessions on Action Research Projects were extremely effective in helping them develop their project. Eight reported they were effective. Fourteen indicated that they were somewhat effective. One participant did not answer the question.

Eight teacher leaders were not sure how the results of the Action Research Project would fit into their work. Six indicated it would guide their work. Five wrote that it would help them to be more reflective toward their practice.

(b) SEC Survey

Nine teacher leaders indicated that they were not sure how the SEC Survey would fit into their work as a teacher leader. Three responded that the survey may inform them about teacher competencies, have teachers reflect on their practice, or provide baseline date on classroom practices. One participant does not want to use it, and four did not answer the question.

It bears noting that several comments about the SEC survey focused on the process/challenges of implementation without connecting it to their work as teacher leaders. For instance, one person noted that, "We may have to get them goodies to continue participation." Others commented that, "It must be driven by CPS and clearly understood that it will not be used in a punitive manner," "I will notify and advise teachers to take it, but will not beg." or "It will be somewhat of a burden but it may be meaningful to teachers." These answers suggest that presentation and/or discussion of the SEC survey did not effectively clarify its relationship to other TLI activities or goals.

Part 4: Questions for Reflection

Organization/presentation and content of Institute sessions:

The Mathematics Session provides an effective model for ongoing organization/presentation and content of professional development sessions. Based on positive responses to the Mathematics session, OMS and Institute partners might consider including the following components in future Mathematics and Science sessions:

- written and verbal reflection on practice, individually, in small groups, and with the entire group;
- applying/using new ideas during the seminar/workshop;
- active participation through attendance, discussion, writing, activities
- participants to move from new ideas to constructing original solutions to problems;
- participants to communicate their understanding and engagement (to each other);
- participants' prior ideas/assumptions to be reflected upon in light of new challenging ideas;
- participants to be engaged as sources of knowledge and experience.
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One of the strengths of the Mathematics section was the balance in the knowledge and abilities of presenters, between those with strong content knowledge and those with strong pedagogical knowledge.

- Would future Institute sessions be strengthened by ensuring that presenters – either individually or as a pairing – exhibit such a balance between content and pedagogical knowledge?

- Given the emphasis of the Institute on the development of teachers' and specialists' leadership in math and science, would future Institute sessions be strengthened if all presenters have knowledge and experience, not only in the subject areas, but also conducting teacher leadership training?

Developing Teacher Leader roles

Applying content or pedagogical lessons learned as a teacher to the leadership role was an area that seemed to be underdeveloped during this initial summer institute.

- Are there ways in which future sessions can include activities – such as role playing or watching video clips showing the interactions between the leader and the teacher – in order to address this more directly?

SEC Survey

Participants expressed a range of perceptions as to the role and value of the SEC Survey in relation to the goals of the Teacher Leadership Institute.

- Are there ways in which OMS and its Institute Partners can make that connection more explicit, and/or support teacher leaders' efforts to conduct the survey so that doing so supports the development of their leadership roles?

Action Research Project

Several participants explored in their comments the possibility that conducting the action research projects could contribute to a professional learning community. OMS and its institute partners might consider some of these suggestions such as:

- Encouraging more joint projects.
- Encouraging teacher leaders to engage in the action research projects in groups.
- Allowing time at future meetings for action research partners to meet.
- Continuing to provide PD on how to conduct action research projects, focusing in particular on (a) how to develop their research question and (b) the relevancy between the projects and their work.

Professional Community

Participants expressed considerable interest in opportunities for continuing their discussions as teacher leaders. Are there ways in which OMS and its Institute partners can foster such opportunities over the course of the year?

- For instance, they might allow time at meetings for teacher leaders to engage in roundtable discussions recapping weekly or monthly events at their schools
- Given the interest in electronic media as the basis for extending and deepening professional community, OMS might consider creating an on-line discussion board for participants in the TLI.

Given the enthusiasm participants expressed for the mixed groupings during the Mathematics Session, in which city-wide and school-level specialists had the opportunity to confer, OMS and its Institute partners might consider ways of supporting the continuation of this "cross-role" dialogue.

Written Reflections Form

IMSP – Teacher Leadership Institute

July 2006

In order to ensure that the Teacher Leadership Institute is meeting your expectations and accomplishing its goals, it is important that we receive your feedback about the Institute. Please take 10-15 minutes to respond to the questions on this Written Reflections form.

Thank you for your participation. If you have questions, contact Bret Feranchak at 773-553-2497.

MATHEMATICS INSTITUTE - University of Illinois at Chicago (First Week)

Please respond to the following questions. If you need more space, please continue your comments on the back of this form. Remember to provide specific examples that we can use to modify and improve the Institute.

Organization

1. How would you characterize the overall presentation of material by the instructors at the Mathematics Institute**?**

Extremely clear and informative **Clear and informative** **Somewhat clear and informative** **Not clear or informative**

How could the instructors improve the presentation of material?_____

_____

_____

2. How effective were the full-group discussions in deepening your content knowledge in **mathematics**?

Extremely effective Effective Somewhat effective Not effective

How could the full-group discussion be made more effective?
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Using What You Learned

3. What new mathematics **content or concepts did you learn during the institute that you may integrate into your teaching or mentoring of other teachers?**_____

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4. What new instructional practices were presented in mathematics **that you may integrate into your teaching or mentoring of other teachers?**_____

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5. What did you find <u>most</u> professionally relevant or compelling about the Mathematics Institute**?**

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6. What did you find <u>least</u> professionally relevant or compelling about the Mathematics Institute**?**

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SCIENCE INSTITUTE – Loyola University Chicago (Second Week)

Please respond to the following questions. If you need more space, please continue your comments on the back of this form. Remember to provide <u>specific examples</u> that we can use to modify and improve the Institute.

<u>Organization</u>

1. How would you characterize the overall presentation of material by the instructors at the Science Institute**?**

Extremely clear and informative Clear and informative Somewhat clear and informative Not clear or informative

How could the instructors improve the presentation of material?_____

_____
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2. How effective were the full-group discussions in deepening your content knowledge in **science**?

Extremely effective Effective Somewhat effective Not effective

How could they be made more effective?_____

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<u>Using What You Learned</u>

3. What new science **content or concepts did you learn during the institute that you may integrate into your teaching or mentoring of other teachers?**_____
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4. What new instructional practices were presented in science **that you may integrate into your teaching or mentoring of other teachers?**_____

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5. **What did you find <u>most</u> professionally relevant or compelling about the** Science Institute**?**

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6. What did you find <u>least</u> professionally relevant or compelling about the Science Institute**?**

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Written Reflections Form – Page 3

Overall SUMMER Institute – Two Week Program at UIC and Loyola

Please respond to the following questions. If you need more space, please continue your comments on the back of this form. Remember to provide <u>specific examples</u> that we can use to modify and improve the Institute.

<u>Using What You Learned</u>

1. How do you anticipate applying lessons learned in during the Institute in your leadership role?

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2. Are there aspects of your professional development as a math/science teacher leader that have not yet been addressed by the TLI that you would like to see addressed?

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3. Did participation in the Summer Institute contribute to building a professional learning community? If so, how did specific activities contribute to building this community?

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4. How do you imagine tapping into this community in your role as a teacher leader?

5. Are there any Institute activities that have inhibited the development of a network or community of Math and Science Teacher Leaders?

6. How effective have the sessions on Action Research Projects been in helping you develop your project?

Extremely effective Effective Somewhat effective Not effective

7. How do you expect to the results of the **Action Research Project** will fit into your work as a teacher leader?

8. How effective have the sessions on the SEC Survey been in preparing you to conduct the survey with your teachers?

Extremely effective Effective Somewhat effective Not effective

9. How do you expect conducting the **SEC Survey** will fit into your work as a teacher leader?

THANK YOU!