Designing PLCs for Enhanced Student Success: What do we know and how can we learn more?

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MSP Knowledge Management and Dissemination Project

Goal: To synthesize knowledge generated through the Math and Science Partnerships and integrate it into the broader knowledge base for education reform

- Teachers as Intellectual Leaders
- Involvement of STEM faculty
- Deepening Teacher Content Knowledge

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Knowledge Acquisition

- Reviews of research
- Surveys
- Interviews
- On-line “panel” discussions
- Case studies

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New Area of Focus: PLCs

- What are MSPs learning about the design, implementation, and impact of PLCs?
- Situating knowledge from MSP PLCs in the broader field, based on recently-completed synthesis using similar knowledge acquisition processes.

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What do we mean by a PLC?

- Professional Learning Community
- That's where the consensus seems to end
- People have different views concerning the structure of PLCs, the work of PLCs, and the focus of PLCs
- Consider the following:

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A PLC should focus on problems of classroom practice, by working with artifacts (e.g., student work, instructional materials, or lesson plan) or applying what is learned in other professional development to classroom practice

- If you agree, under what conditions does this statement hold true?
- If you disagree with this statement, why?

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Clearly…

- We have different ideas about what constitutes a PLC
- We have different experience about the centrality of classroom practice in the work of PLCs
- We have different sources of knowledge that we draw on to inform PLCs

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STEM Teachers in Professional Learning Communities: A Knowledge Synthesis

- National Commission on Teaching & America's Future (NCTAF)
- WestEd

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Definition of PLC

- ***Professional*:** engaging educators in the development of their professional practice
- ***Learning*:** focused on both the learning of the educators and the learning of their students
- ***Community*:** involving not only collaborative work, but also a common vision, goals, and purpose

What do we know about the effects of PLCs on…

- Teacher content and pedagogical content knowledge?
- Teachers' attitudes, perceptions of preparedness, professional and collegial interactions?
- Teachers' instructional practice?
- Students' achievement?

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- How robust is the research base about PLCs involving STEM teachers?
- What further research and development are needed?

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Searching the Literature

- Locating studies of the phenomenon of interest was far from straightforward.
- Long list of search terms included:
  - PLC
  - Lesson study
  - Study group
  - Critical friends group
  - Collective inquiry

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- The synthesis study examined the subset of the identified research studies that appeared to meet the definition of PLCs and either:
  - Entirely involved STEM teachers; or
  - Provided results specific to the participating STEM teachers

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Characteristics of the Research

- The majority of studies were:
  - Qualitative
  - Focused on inservice teachers
  - Relatively new (published in the last 5 years)

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Characteristics of the Research

- The studies were fairly evenly distributed by grade range.
- There were twice as many studies in mathematics education as in science education.

Characteristics of the Research

- The studies were more likely to focus on PLC design choices and effects on teacher knowledge/attitudes/beliefs than on effects on classroom practice or student achievement.

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- The NCTAF team applied standards of evidence to the empirical studies (n=30):
  - Documentation of treatment
  - Internal validity
  - Generalizability
  - Warrants for claims

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- The purpose was not to critique individual studies, but to assess the strength of the field's knowledge about particular relationships, e.g., impact of PLCs on teacher knowledge.

- No study is perfect

- If multiple studies, in different contexts, with different “flaws,” find similar results, we have more confidence in that finding than if the knowledge is based on a single study, however well designed.

Methodological Strength

- Similar to other areas of education research, the PLC research did not fare well in a standards of evidence review.

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- Articles typically did not describe the “it” in detail, e.g., whether the PLC was mandatory or voluntary; how often, when, and for how long participants met; the nature of their work; whether there were designated facilitators, and if so, their specific roles, training, etc.

"Among the most prevalent weaknesses were sample bias, attrition bias and/or researcher bias. Many authors did not adequately describe the sampling procedure." (NCTAF, 2010)

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NCTAF Key Findings

- Participation in PLCs can lead to positive changes in STEM teachers':
  - understanding of or preparedness to teach content,
  - attitudes toward teaching methods,
  - extent of deliberation about students' mathematics or science thinking

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NCTAF Key Findings

- Participating in PLCs can lead to changes in STEM teachers' instruction:
  - more "reform-oriented" (although rarely defined clearly)
  - increased teacher instructional attention to students' reasoning and understanding
  - use of more diverse modes of engaging students in problem-solving

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NCTAF Key Findings

- There were only a small number of studies of STEM-focused PLCs on students.
- All of these were in mathematics, possibly because assessment data are more readily available.
- The studies provide existence proofs, but are far from definitive.

Knowledge Acquisition

- Findings from empirical research
- Insights from expert practitioners

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Utility of Practice-based Insights

- Practice-based insights provide guidance for design and implementation of PLCs and other interventions.
- Focusing research on problems of practice helps to bridge the research to practice divide.
- Practice-based insights can be considered hypotheses for research – to be systematically studied with different populations in a variety of contexts.

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NCTAF/WestED Study

- Collected Practice-based Knowledge
  - On-line “panels” of expert practitioners
  - Published accounts of expert knowledge/advice
  - Published descriptions with lessons learned

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NCTAF Practice-based Results

- PLCs were universally recommended.
- At the same time, there were cautions about their design and implementation.

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As I share insights from the NCTAF study, consider which of these resonate with your experience ...

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NCTAF Key Insights

- There are key elements to consider in designing STEM PLCs
  - PLCs with teachers from multiple subjects (even just mathematics and science) can limit the depth or effectiveness of work on content knowledge or PCK.
  - Sharing a common vision for what constitutes worthwhile student learning is essential, with the PLC working on problems around that vision.

NCTAF Insights

- High quality facilitation is essential, and requires skill in working with adult learners.
- Having protocols for STEM PLC group functioning is important, but must be carefully considered and monitored.
- Administrator support is important.
- A sense of collective responsibility to the PLC with all contributing and feeling accountable for the work is important.

- Which of these insights resonate with you?
- What else do you want to know?

Talk with 1 or 2 people near you.

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Guidance for design

- Practice-based insights help fill the gaps in the empirical knowledge base.
- Although research will never be able to provide complete guidance about what will work in a particular context, it can be far more informative than it currently is.

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Why don’t we know more?

- Even when individual studies are well-designed and well-implemented, it is difficult to look across them and figure out the extent to which the findings might generalize.

Why don’t we know more?

- There is a tension between design for change and design for learning.
- For example, from a system change perspective, if you plan on having two cohorts, it makes sense to start with the schools that are “ready.”
- But doing so makes research on program effectiveness problematic; it will not be possible to disentangle the effects of differences in readiness from the impact of the interventions.

How can we learn more?

- Need to have multiple studies of a particular phenomenon (e.g., a PLC model) in different contexts to understand what works for whom, under what conditions

MSP Contributions to the Knowledge Base

- Many MSPs have empirical evidence that their interventions are effective, and those findings should be shared.

- Full descriptions of interventions, target audience, and context, and discussions of lessons learned about design, implementation, and sustainability would also be extremely helpful to the broader field.

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How can we learn more?

- As a field, we need to identify the variables that might matter, and document them in our descriptions, including the treatment, the characteristics of participating teachers (content background, teaching experience, grades taught, etc.), and the characteristics of the school context.

How can we learn more?

- Individual MSPs would add even more to the knowledge base if they systematically studied their treatments under different conditions – with more and less experienced PD providers, teachers with stronger and weaker content backgrounds, etc.

How can we learn more?

- Similarly, MSP projects would add more to the knowledge base and increase the likelihood of going to scale if they studied different configurations of their interventions:
  - What are the affordances and limitations of single grade and multiple grade PLCs?
  - How much drop-off in impact is there with a reduced level of treatment?

How can we learn more?

- The fact that MSPs have similar goals and similar interventions provides an opportunity for more transformative research, accelerating the generation of knowledge about what works, for whom, and under what conditions.

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How can we learn more?

- Setting up cross-site studies has the potential to add considerably to the knowledge base, providing information about the effectiveness of interventions such as a particular PLC model in different contexts.

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How can we learn more?

- Among the advantages of cross-site research:
  - STEM disciplinary faculty who are new to social science research will likely appreciate the guidance that the research design and protocols provide.
  - Projects that are too small to get project-representative results can still contribute to the knowledge base.

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In closing

- Both MSP empirical research findings and MSP insights will be helpful to the field.
- We will soon be surveying the MSP community (NSF MSPs and DoE MSPs) about PLCs.
- If you would be interested in participating, or would like more information, please give us your name and email address.

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