Defense of Practice:
Teacher Leaders and Administrators’ Articulation of Continuous Improvement to Increase Students’ Mathematical Thinking

Katie Laskasky, Katharine Clemmer, and Tatiana Mirzaian
Loyola Marymount University
Los Angeles, CA

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Math Leadership Corps (MLC)

Vision:
We envision a future where all students have the mathematical reasoning and procedural skills to design creative solutions to complex problems.
An Intersectoral Partnership

14,363 students in 23 schools

Culver City Unified School District
El Segundo Unified School District
Da Vinci Schools
Wiseburn Unified School District

Cotsen Foundation
For the Art of Teaching
LMU|LA School of Education
Leonetti/O’Connell Family Foundation
The Louis L. Borick Foundation
Math Education Problem: Students are underperforming in mathematics

2011 Trends in International Mathematics and Science Study (TIMMS)

- U.S. 11 out of 57 countries in fourth grade math
- U.S. 9 out of 56 countries in eighth grade math

2011 Programme for International Student Assessment (PISA) by Organization for Economic Co-operation and Development (OECD)

- U.S. 27 out of 34 countries (15 year olds)
- U.S. Ranked Below OECD average in mathematics
Different Approaches to a Complex Problem

• More money to fund programs,

• Hire the best personnel, and

• Laws and policies to hold educators accountable for reaching the goal of improving math education for all students

Fowler, 2009
External Accountability

2002: No Child Left Behind (NCLB)

2009: Race to the Top grants

2015: Every Student Succeeds Act (ESSA)
Internal accountability

1. Individual’s sense of responsibility;
2. Parents’, teachers’, administrators’, and students’ collective sense of expectations;
3. Organizational rules, incentives, and implementation mechanisms that constitute the formal accountability system in schools

Carnoy, Elmore, & Sisken, 2003, p. 4

MLC is taking a public learning stance.

Knapp & Feldman, 2012
Our study

**Purpose:** Describe how K-12 math instructional leaders, including district and site administrators and teacher leaders, engage in problem solving, using an internal accountability process called the “Defense of Practice”

**Research Question:** How do math instructional leaders solve complex math education problems related to student learning?
Definition of Defense of Practice

A process for leaders’ to articulate specific decisions about student learning and the reasons why they make them
Structure for Defense of Practice

• State a goal that elicits teacher and/or student actions during rigorous mathematics and aligns to the school math focus,

• Provide rationale for actions and evidence of student engagement and achievement over time,

• Articulate next steps based on data, and

• Provide a self-reflection on the process of continuous improvement and how feedback has supported students and teacher learning

• Ten minutes to defend

• Defend each semester
## Sample

<table>
<thead>
<tr>
<th>District</th>
<th>District Administrators</th>
<th>Site Administrators</th>
<th>Elementary Teacher Leaders</th>
<th>Secondary Teacher Leaders</th>
</tr>
</thead>
<tbody>
<tr>
<td>District A</td>
<td>1</td>
<td>4</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>District B</td>
<td>1</td>
<td>3</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

**District A**
- 3,876 students,
- 4 schools,
- 85% underrepresented minorities,
- 45.1% qualify for free and reduced lunch, and
- 8.7% English Language Learners

**District B**
- 3,415 students,
- 3 schools,
- 45.7% underrepresented minorities,
- 11.5% qualify for free and reduced lunch, and
- 5.7% English Language Learners
Data Generation and Analysis

• PowerPoint presentation slides – May 2016

• Codes aligned with problem solving and self-regulation from social cognitive theory

Zimmerman & Campillo, 2003
Finding 1: Data use when goal setting and evaluating

Variety of Data:
Instruction, Coaching, and Administrator

Well thought out plan

Somewhat of an idea on a plan

No plan, or, not very well thought out plan

Well thought out plan (ss.)

Somewhat of an idea on a plan (ss.)

No plan, or, not very well thought out plan

COACHING ACTIONS

Student Self-Planning Action Plan Data

Percentage of ss. (%)

Plot Area

Well Thought out

Somewhat

No Plan

Feb. 1st

Feb. 25th
Finding 2: Planning for action

Teacher Leader - Instruction

**SEMESTER 1**

- HOOK to introduce Concept Category
- IBE of new Concept Category
- NOTES of new Concept Category
- ACTIVE PRACTICE of new Concept Category
- QUICK CHECK
- ACTION PLAN for successful mastery of Concept Category
- TEST

**SEMESTER 2**

- HOOK to introduce Concept Category
- IBE is not a task; instead, it can be a routine/non-routine question that allows students to ask questions and process given information, think about what they still need and plan their approach.
- ACTIVE PRACTICE of new Concept Category
- QUICK CHECK & Error Analysis
- ACTION PLAN CHOICE for successful mastery of Concept Category:
  - written defense (visuals, definitions, examples, connections)
  - concept map (at least 10 words/visuals/symbols)
  - active practice (at least 16 problems)
  - flashcards (at least 16 words)
- Students reflect on their performance on the QUICK CHECK and participate in active Error Analysis. They will also make decisions to deepen their understanding of the concept category. They can choose different types of study choices as well as different levels of practice problems.

*Encourage students to begin their actions earlier than later. Minimum number helped students have a guideline for what to submit.*
Finding 3: Motivation to defend and improve practice

Site Administrators

My Goal: Co-teach at least one unit in a class with the coach at the start of the year to be truly immersed in the program and moves.

Continue to optimize coaching schedule and PLC/PD schedule to support coaches and PTs.

Teacher Leader - Coaching

Coaching Goal Metacognitive Reflection

Strengths:

Currently, I have a really good relationship with my partner coach. We both enjoy conversations about different strategies and how we can use them in our classroom. Over the past few months and even over the past few weeks, my partner teacher has really increased his willingness to try out different things in his classroom and have a positive reflection as to how his students are responding. From recording our sessions, I was able to pick out those questions that this particular teacher was eager and ready to answer. I noticed that he was much more apt to answer if the questions were posed to emphasize what the students were doing and how may this have an affect on their classroom experience.

Next Steps (for next year):

Since timing was a big issue this year, I am hoping that next year, my partner teacher and I can set a more structured time to meet on a weekly basis. In addition, I would like to work on getting the teacher to expand his or her thinking to really strive for multiple peers
Implications: Data-driven decisions

• Further questions:
  • What were the solution options?
  • Why did the chosen solution work?

• Importance of collecting, analyzing, and using data for a purpose

• Data, specific to math education, should be collected throughout performance and over time to evaluate the solution (Cleary, Callan, & Zimmerman, 2012).
Implications: Internal accountability

- Relies on collective effort, transparent plans and data, and dialogue about successes and challenges

- Further questions:
  - What were the metrics for evaluation?
  - What was the importance of these collaborations?
  - How did interactions between participants lead to improved solutions?

- Without these connections, solutions and individuals appear isolated instead of part of a systematic solution for math education created by a collaborative problem solving team.
Conclusion: Defense of Practice

Definition: A process for leaders’ to articulate specific decisions about student learning and the reasons why they make them

**Partner teachers** co-present on:
- Their instructional system, their peer coaching collaboration, and their vision for their students’ success.
- Student-focused goals and student achievement and learning data that shows progress over time towards achieving success.

**Teachers** and their **site admin** co-present on:
- How they are developing leadership capacity within their departments to implement data-driven instruction, observation and feedback, and planning.
- Data that shows that everyone teaching mathematics is improving their craft.

**Site and district administrators** co-present on:
- How the district professional learning system supports all math teachers in data-driven instruction, observation and feedback, planning, and professional development.
- Data that shows progress in developing a student and staff culture that ensures a positive, strong community.

Through this process, math instructional leaders develop their self-regulation skills (Zimmerman & Campillo, 2003).
Thank you!

Katie Laskasky
Clinical Faculty
Loyola Marymount University
Katie.laskasky@lmu.edu

Tatiana Mirzaian
Clinical Faculty
Loyola Marymount University
Tatiana.mirzaian@lmu.edu

Katharine Clemmer
MLC Director, Clinical Faculty
Loyola Marymount University
Kclemmer@lmu.edu

Christine Soldner
MLC Assistant Director
Loyola Marymount University
Christine.soldner@lmu.edu

www.mathleadershipcorps.org
@mathleadershipcorps @MathLeadershipC
MLC Partnership

- **Year 1:** Establish a math instruction system expectations that build students as mathematical thinkers, problems solvers and self-regulated learners

- **Year 2:** Build system capacity with admin/teacher buy-in and support of math instruction implementation

- **Year 3:** Build system capacity for internal accountability where system holds itself accountable for developing student learning in mathematics

- **Year 4:** System operates and self-sustains, solving own problems

- **Throughout:** Defenses of Practice to articulate continuous improvement, followed by analysis of next steps