Innovation Configuration Map: Clarifying Effective Mathematics Teaching Practices

Developing a culture of organizational learning and collaborative communities of practice is among the greatest challenges and goals of any instructional leader – district or building administrator, curriculum specialist, instructional coach, or teacher-leader. The use of reflective tools can guide instructional leaders as they grapple with the complexities of building and sustaining ongoing collaborative learning. This document provides a suite of such tools to help instructional leaders enact and foster systemic change by creating the kinds of district, school, and classroom environments needed to prepare students for success. Regular application of these tools helps leaders determine needs, plan actions, measure the impact of those actions and support others through organizational change.

A change, or innovation, can assume several different configurations that encompass the ideal state envisioned by its designers and different variations arising from user interpretation and experience. Innovation Configuration (IC) maps are descriptive documents that provide clarity by detailing what an innovation should look like in practice. IC maps detail the *how* and *what* of an innovation and provide a way to understand the possible progression of behaviors. These maps are useful not only throughout the change process, but also once an innovation is fully implemented and leaders strive to maximize outcomes. IC maps allow educator teams to develop a common understanding of effective behaviors, identify where additional support is needed, and encourage self-reflection and self-assessment. It is important to note that IC maps are not intended as evaluative tools. Instead, they are a means to assess and measure the various forms of innovation implementation and inform goal setting and next steps. Inherent in the productive use of IC maps is the need to openly share their purpose and intent and use results to enhance collaboration in ways that allow all voices to contribute.

The following IC maps, organized around four of the eight National Council of Teachers of Mathematics' effective math teaching practices,– *Implement tasks that promote reasoning and problem solving, Use and connect mathematical representations, Elicit and use evidence of student thinking,* and *Pose purposeful questions* – give instructional leaders purposeful opportunities to pause, reflect, and compare current practice to organizational values and expectations.

Instructional leaders can use these tools in ongoing continuous improvement efforts to –

- Initiate or focus the conversation about instructional leadership.
- Examine the current state of instructional leadership in a district or school.
- Design or strengthen existing district or school structures for collaboration and learning.
- Support job-embedded professional leadership growth and development.
- Guide decision-making about how to leverage instructional leadership to improve teaching and learning.

You can further your understanding of the research-based teaching practices covered in the IC maps by reading the National Council of Teachers of Mathematics' book, Principles to Actions: Ensuring Mathematics Success for All and continue your learning on the purpose and use of IC maps by watching this video.

5. Pose purposeful questions. (Discern student knowledge; Adapt lessons to students' levels of understanding; Ensure students are making mathematical connections.)				
Level 1	**Level 2**	**Level 3**	**Level 4**	**Level 5**
Teachers: • Purposefully pose multiple types[8] of questions to advance student understanding without funneling thinking. • Plan multiple question types in advance in consideration of possible student responses. • Formulate and ask questions in response to students' statements and actions during the lesson. • Ask questions that require students to clarify their ideas and make the mathematics visible in order to deepen students' mathematical understanding.[9] • Allow sufficient wait time so that more students can formulate and offer responses.	Teachers: • Ask different types of questions to advance student thinking. • Plan some questions in advance in consideration of possible student responses. • Ask questions in response to students' statements during the lesson. • Ask questions that require students to clarify their ideas and make the mathematics visible. • Provide wait time for students to formulate and offer responses.	Teachers: • Ask different types of questions with predetermined endpoints. • Plan questions in advance in order to funnel student thinking towards predetermined endpoints. • Ask questions in response to students' statements, funneling student thinking towards predetermined endpoints. • Ask questions that require students to clarify their ideas and make mathematics visible. • Provide shortened wait time for students to formulate and offer responses.	Teachers: • Ask questions to gather information, probe thinking, and direct students toward one particular answer. • Plan questions that funnel student thinking toward one particular answer. • Ask questions that funnel student thinking toward one particular answer. • Ask questions that require students to clarify their ideas. • Provide minimal wait time for students to formulate and offer responses.	Teachers: • Ask questions to gather information. • Ask and answer questions so that student thinking is funneled toward a predetermined answer. • Ask rhetorical questions or make statements that clarify students' thinking. • Give only a few students opportunities to respond.

[8] Question types include: Gathering information (students recall facts, definitions, or procedures), Probing thinking (students explain, elaborate, clarify thinking), Making the mathematics visible (students discuss mathematics structures and make connections with mathematics), and Encouraging reflection and justification (students reveal deeper understanding of their reasoning and actions).

[9] Students' mathematical understanding should be aligned to learning goals.

Innovation Configuration Map: Clarifying Learning

5. Pose purposeful questions (Make thinking and learning visible; Provide well-thought out responses; Justify reasoning; Contribute to class discussions[6])				
Level 1	**Level 2**	**Level 3**	**Level 4**	**Level 5**
Students: • Use precise mathematical language to explain, clarify, and elaborate on their thinking. • Present responses to student and teacher questions clearly and completely, without rushing to respond too quickly. • Reflect on and justify reasoning without prompting, rather than simply providing answers. • Listen to, comment on, and question the contributions of classmates while engaged in class discussions.	Students: • Use mathematical language to explain, clarify and elaborate on their thinking. • Present responses to questions clearly and completely. • Justify their reasoning, rather than simply providing answers. • Listen to and comment on the contributions of others while engaged in class discussions.	Students: • Explain and clarify their thinking. • Present responses to questions. • Explain their reasoning. • Listen to and comment on the contributions of one or two others during discussion.	Students: • Explain their thinking without elaboration. • Provide superficial responses to questions. • Share their reasoning. • Actively listen to others during class discussion.	Students: • Share their thinking with little or no explanation. • Rush to provide superficial responses to questions. • Listen to others during class discussion.

[6] Class discussion configurations should include whole class, small groups, and pairs.