# Planning for Change: Issues of Implementation and Scale

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# Beginning with Images of Practice

- Capitalizing on students' interests and experiences

- Identifying and building on what students know

- Providing students with experiences to engage them in the practices of science and sustain their interest

# Capitalizing on Interest and Experience



http://scijourner.org

# Capitalizing on Interest and Experience

| Key Dilemma | How the Project Design Helps Teachers Manage the Dilemma |
|---|---|
| Students pick topics that the teacher knows little about. | Materials provide guidance for students and teachers as to how to research particular topics. |
| Students pick topics that aren't tied to the science standards. | Work is guided by a science literacy rubric that emphasizes skills at the intersection of science and ELA standards. Also, teachers aren't expected to give up their regular curriculum. |
| Teachers are unfamiliar with the professional practice of science journalism. | Project employs a science journalist who engages students in critical stages of the editing project. |

# Identifying and Building on What Students Know

*Elicitation Questions help teachers find out what students know at the beginning of investigations.*
Why do scientists develop models?
Why might scientists need a model of Earth's interior?

*Reflect and Revise Questions identify students' understanding of core ideas.*
How can water cause rocks to weather?
What's the best evidence for what Earth's interior looks like?





**Contingent Pedagogies**

# Identifying and Building on What Students Know

*Talk moves help teachers build on what students know and engage students in the scientific practice of argumentation.*

"Say more about that."

"What's your evidence for…?"

"So I think you're saying….Do I have that right?"





**Contingent Pedagogies**

# Identifying and Building on What Students Know

| Key Dilemma | How the Project Design Helps Teachers Manage the Dilemma |
|---|---|
| Challenge of developing good questions to identify what students know | Elicitation and Reflect and Review Questions |
| Few supports for wait time | Think-Pair-Share strategies |
| Only a few students can answer any given question posed | Clickers |
| Classroom talk by students is limited | Norms and Talk Moves |
| "What Next" problem | Contingent Activities |

# Engaging Students in Science Practices

# Engaging in Science Practices

| Key Dilemma | How the Project Design Helps Teachers Manage the Dilemma |
|---|---|
| Keeping investigations focused on core ideas | Driving Questions and Project Board |
| Supporting students in engaging in scientific practices, especially of developing and using models and constructing explanations | Providing regular opportunities for students to construct, compare, and revise models<br>Templates for constructing explanations |
| Making connections across different ideas (Crosscutting concepts) | Ideas develop over time, across the three middle school years as part of a coherent sequence (more of a spiral, not unit model) |

# How Can You Plan for Implementation?

"…[I]mplementation may not be as unpredictable as we've been led to believe. Although adjustments are likely to occur at multiple places and repeatedly over time, the implementation process has junctures that can be identified and defined in ways that may increase the predictability of how programs are likely to be used."

(Weinbaum & Supovitz, 2010, p. 69)

# Junctures in Planning Implementation

| Juncture | Questions to Address |
|---|---|
| Identifying curriculum materials and programs that reflect evidence-based practices | Where can I find information about materials and programs? What's the evidence that the materials or program can work in settings like mine? |
| Allocating resources for materials and professional development | How much does it cost to implement? What will teachers and educators need to learn to implement the program well? Who has the authority to allocate resources for implementation? |

# Junctures in Planning Implementation

| Juncture | Questions to Address |
|---|---|
| Designing or adapting professional development | What should the professional development look like? Who can serve as a resource to their colleagues after initial workshops? |
| Building ownership | What is a compelling argument for why teachers should try out the materials or implement the program? |
| Evaluation design and implementation | What evidence do we need to measure the value or worth of the materials or program? |

# Later in the Day

- You will engage in a "prologue to planning."
- The template does not look like a traditional planning document.
- The template invites you to consider:
  - The location of expertise relevant to implementation of evidence-based practices.
  - A broad strategy for organizing for change.

# Big Ideas for Afternoon (Handout)

1. People sharing resources and expertise facilitates implementation.

2. Expertise is needed for each side of the "instructional triangle."

3. Diffusion happens through networks.

4. Implementing new practices is like organizing a campaign in a social movement.

# Thank you.

Bill Penuel

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# Prologue to Planning

**Big Idea #1:**

People sharing resources and expertise facilitates implementation.
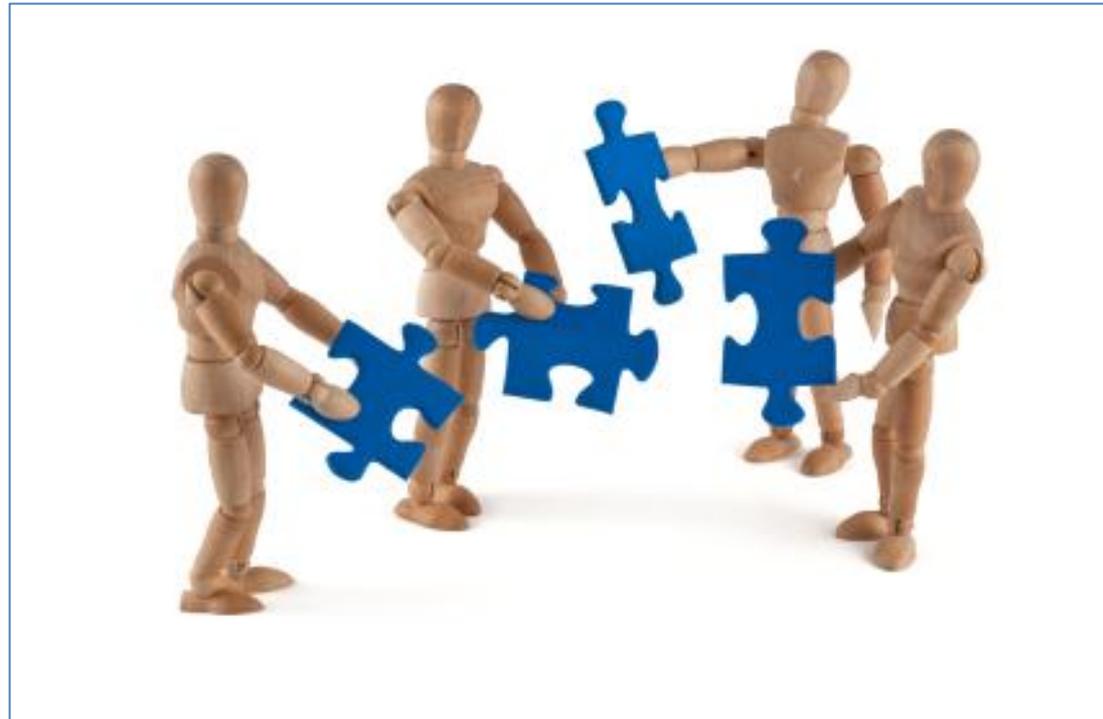
# Prologue to Planning

**Big Idea #2:**

Expertise is needed for each side of the "instructional triangle."
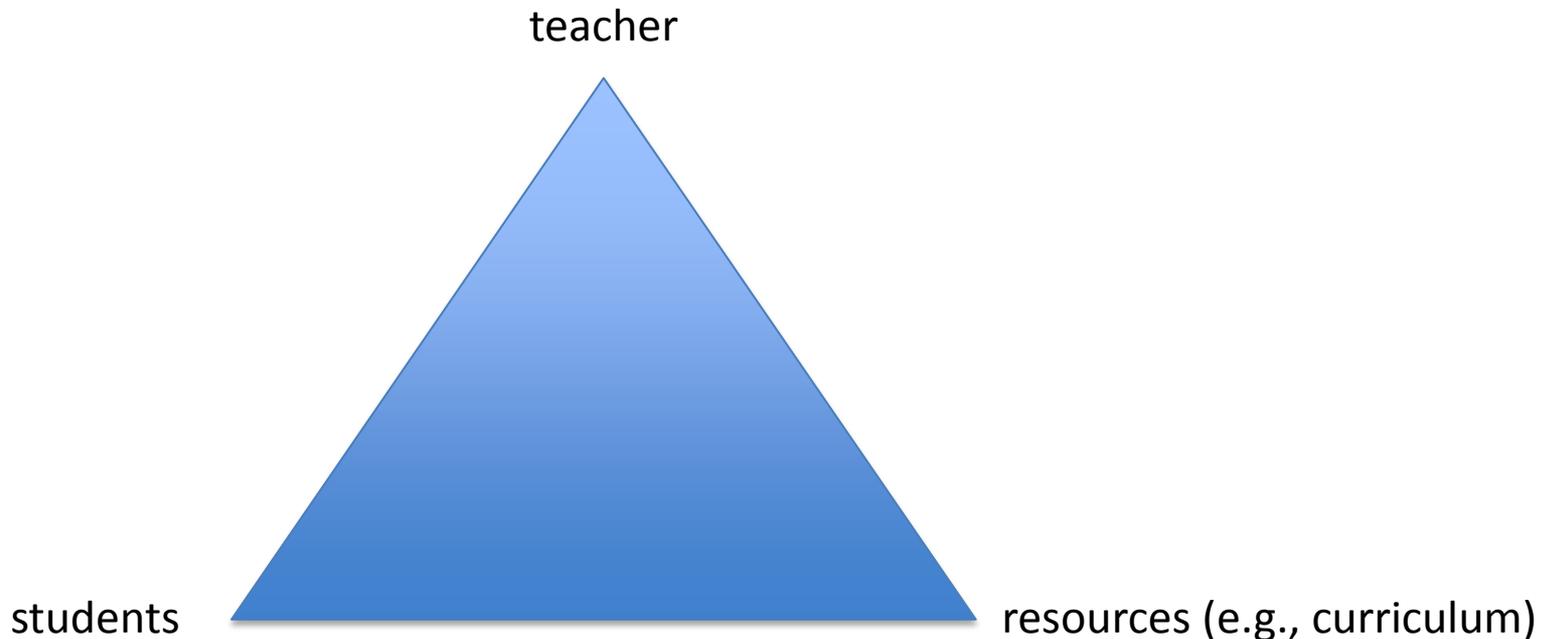
teacher

students

resources (e.g., curriculum)
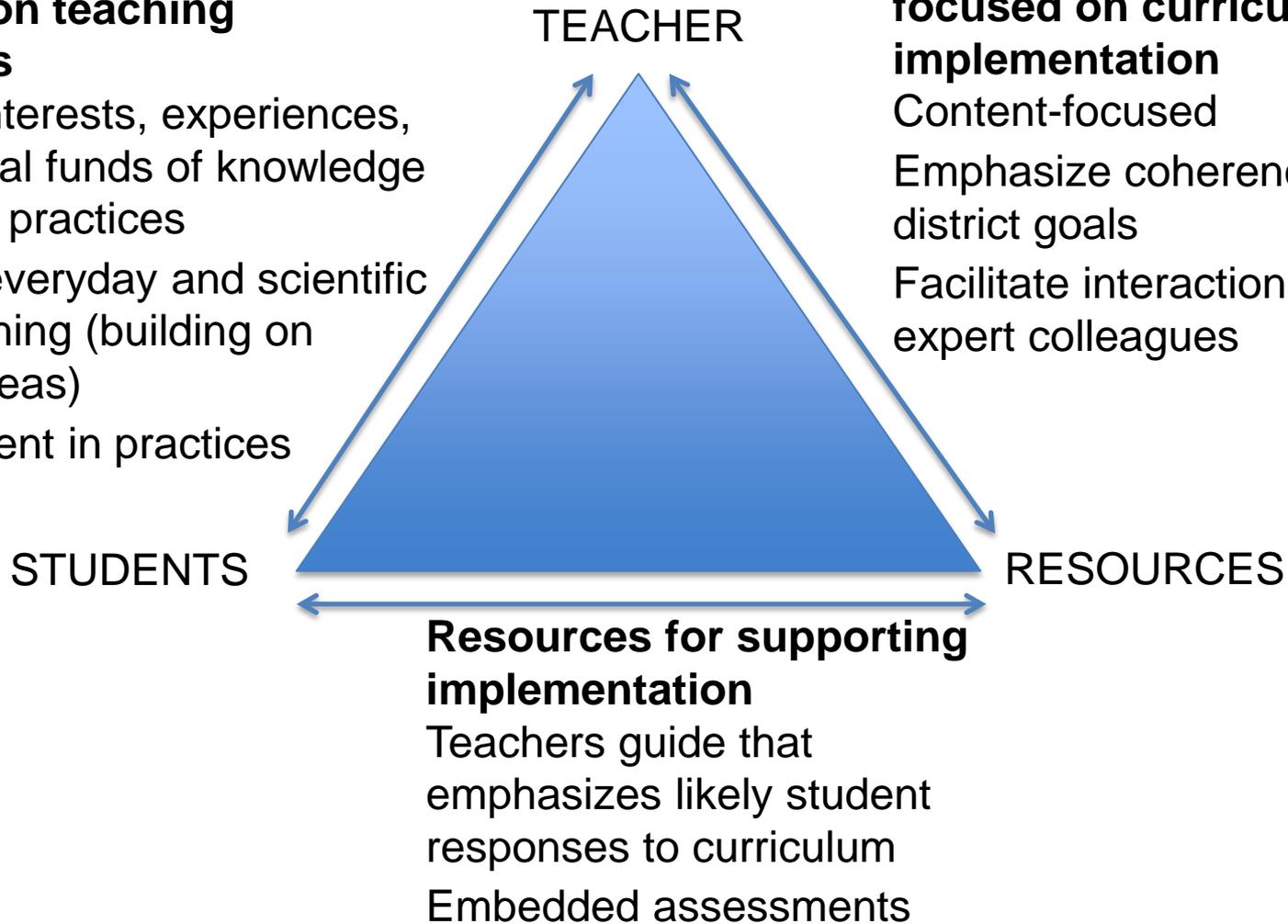
# Prologue to Planning

**Big Idea #3: Diffusion happens through networks.**
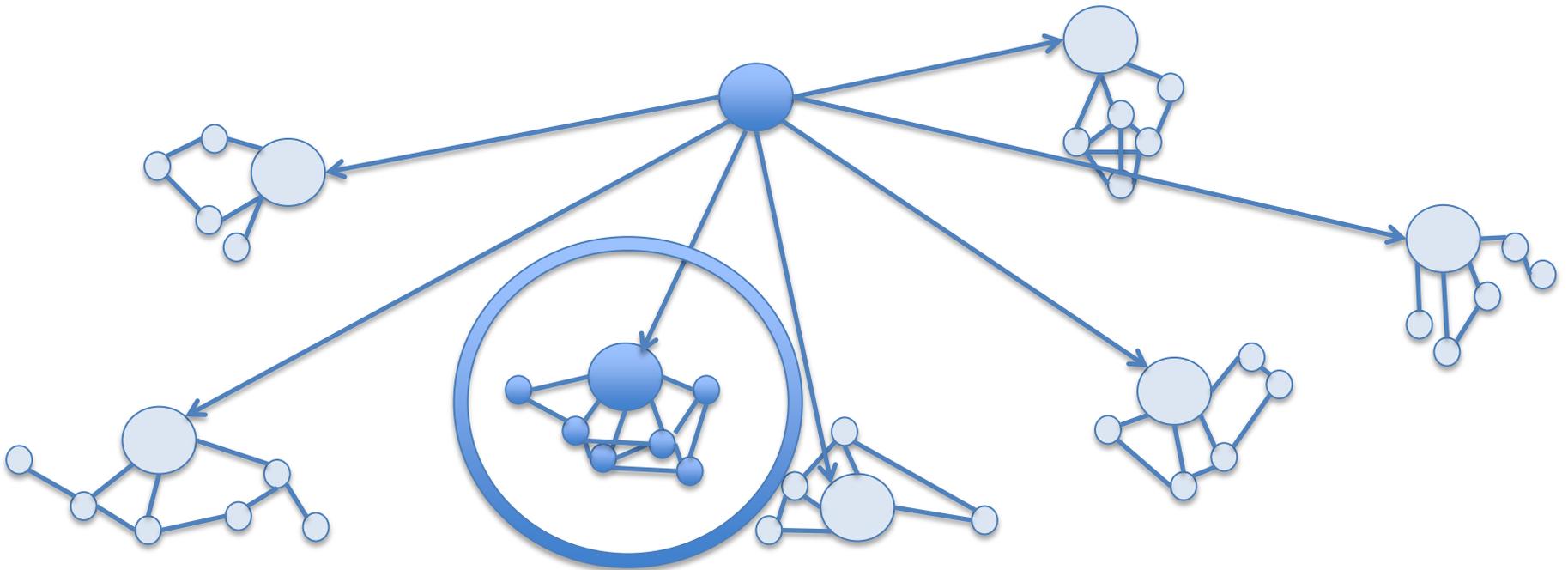
# Hierarchy, Network, or Both?



State
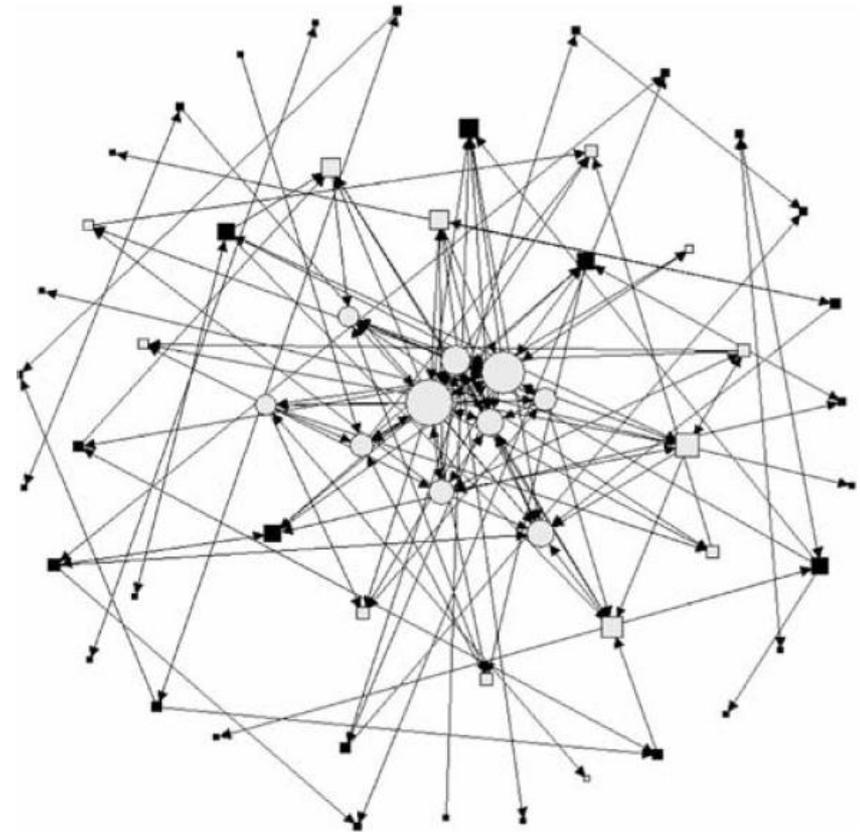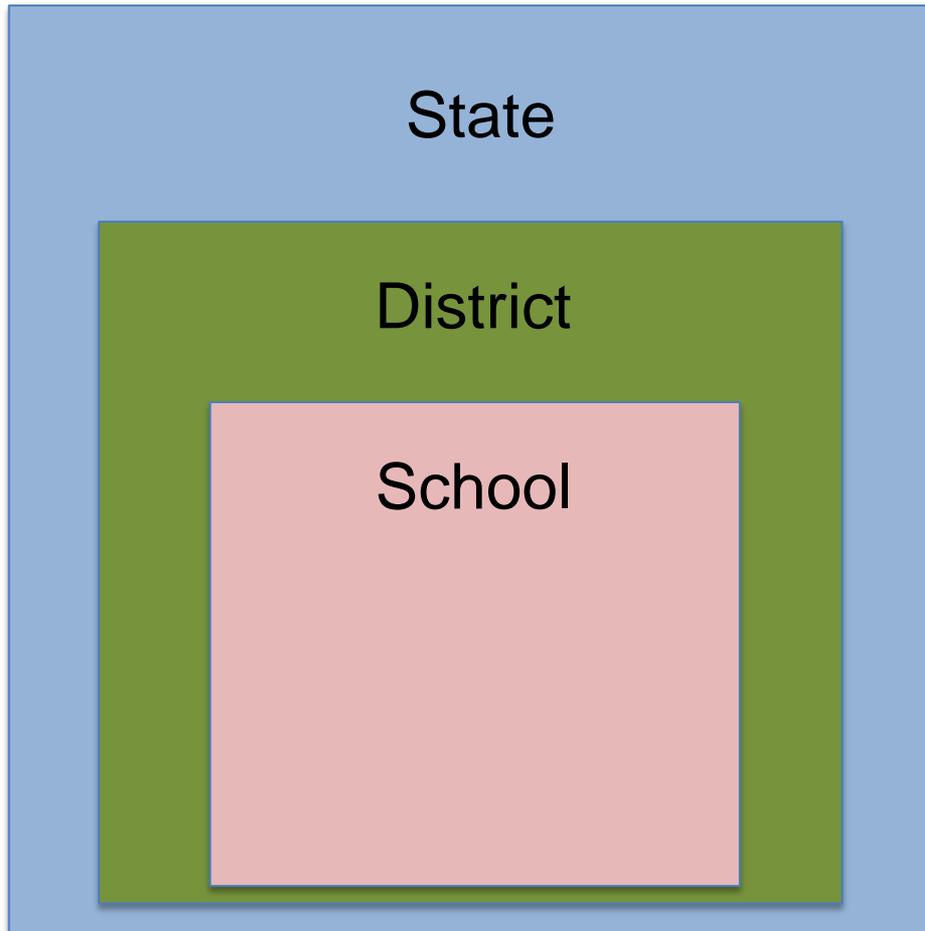
District

School



Social network diagram from: Daly & Finnigan (2009)

# Nodes and Ties
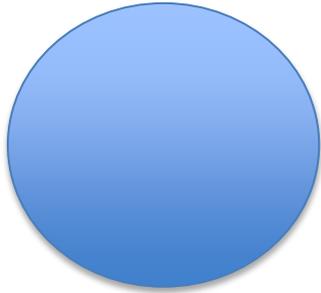
**Organizational Nodes**
State Departments of Education
STEM networks
Schools and Colleges of Education
District curriculum offices
Independent PD providers
Textbook and materials providers

**Individual Nodes**
State directors
District curriculum supervisors
Principals
Teacher leaders/coaches
Teachers

# Nodes and Ties



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**Types of Ties**
Dissemination of information
Teaching (e.g., professional development workshops)
Ongoing guidance (e.g., coaching)
Joint Work

**Characteristics of Ties**
Strength/Closeness
Differences in Knowledge

# Networks and School Change

- Big Idea 3.1: Every node (organization or person) needs access to an expert.

- Big Idea 3.2: Every node doesn't need to be connected to every other node. Otherwise, there are too many cooks in the kitchen.

## The 'New' Science of Networks and The Challenge of School Change

*To promote effective teacher collaboration, school leaders must examine all the social networks already in place and must ensure that expertise and other social resources are available at multiple levels in the school community.*

By William R. Penuel and Margaret Riel

WHAT DO finding a job, finding others who share an interest in quilting, getting medical advice, and improving teaching and learning have in common? All of these actions require individuals to draw on information or expertise through their ties to others in social networks. The study of people's social ties, the resources they obtain from them, and the communication tools — such as the Internet — that facilitate the flow of expertise and resources makes up an evolving science of networks that can help us better understand how to support and promote school change.

The science of networks is not new in itself, but its application to the functioning of schools is. Sociologists have used mathematical methods for analyzing social networks since the 1960s and 1970s to study how people use social ties to find information, resources, and even other people to help them accomplish their goals.[1] Some of the earliest diagrams made of social networks concerned relationships among students.[2] More recently, researchers have begun to use social network analysis to analyze school leadership, teacher communities, and the diffusion of innovations in schools. And it turns out that — as in other domains — networks matter for school change.

A social network refers to a set of people and the relationships among them. Sometimes these relationships are concentrated in small subgroups, and the larger network can be described in terms of the connections between subgroups.[3] So we can describe a school as a network that is composed of a set of subgroups, such as grade-level or subject-area teachers, students arranged by different grade levels, and smaller cliques of students within those grade levels. A network analysis then helps us understand how expertise, information, and resources flow from person to person and from subgroup to subgroup in the social structure.

In teacher networks — the focus of this article and of our own research — the kinds of information and resources that circulate include ideas about teaching, learning, and assessment; talk about how to coordinate different school activities; stories of students and their successes and difficulties; strategies for managing

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# Prologue to Planning

**Big Idea #4:**

Implementing new practices is like organizing a campaign in a social movement.

**Implement NOW!**