

Instructional

The *Practice* of ~~School~~ Improvement: Improvement, (Infra)structure, & Instruction

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Overview & Questions

- What are the entailments of focusing our research and development work on the *practice* of instructional improvement?
- How might we re-conceptualize relations between The design of organizational infrastructure has to be central in any effort to understand the practice of improvement.
- What are the entailments of anchoring school improvement research in *instruction*?

Engaging the *Practice* of ^{Instructional}~~School~~ Improvement

What are the entailments of focusing on the *practice* of instructional improvement?

Popular Framings of Practice

- Getting to practice – the *how* of instructional improvement.
- Some common assumptions (implicit and explicit) in framing practice in education research:
 - Practice = individual behavior or action
 - Practice resides solely in the here and now interactions
 - Practice is distinct from social structure causing people to ...

An Alternative Framing of Practice

- “We intend the term “practice” to refer to the coordinated activities of individuals and groups in doing their “real work” as it is informed by a particular organizational or group context. In this sense, we wish to distinguish practice from both behavior and action. Doing of any sort we call “behavior,” while “action” we see as behavior imbued with meaning. By “practice,” then, we refer to action informed by meaning drawn from a particular group context. (**Cook & Brown, 1999, pp. 386-387**, italics in original)
- Key ideas
 - interactions embedded in,
 - interpretable through, and
 - constitutive of, a shared system of meaning

Framing the Practice of Instructional Improvement

School Staff & Stakeholders



Instructional Improvement
Practice

Situations

Tools, Routines, Structures

School Staff & Stakeholders



Framing Practice as Social, Situated, & Distributed Activity

- Getting to *interactions* among school staff and stakeholders.
- Exploring interactions in combination with meanings and relations.
- Practice is constituted (defined) in *habituated* or *routine* patterns of interactions, meanings, and relations.
- Practice both defines *and* is defined by social (infra)structure:
 - social (organizational, institutional) structure is the medium for practice
 - social structure *reproduced* and at times *transformed* in practice
 - by framing and focusing interactions social structure shapes practice from the inside
 - the study of micro interactions necessitates attention to the macro

Entailments for R&D on Instructional Improvement Practice

- *A real time and an historical time* understanding of practice
- Attention to social (infra) structure in research and development work on the practice of instructional improvement
- Multi-level analytical approaches that attend to micro, meso, & macro levels simultaneously
- Adopting a developmental approach and focusing on both *change and maintenance* efforts
- Embracing the bidirectionality of relations among the macro, meso, and micro

Interactions and Infrastructure: Organizational Routines & Formal Positions

Framing the Practice of Instructional Improvement

School Staff & Stakeholders

Instructional
Improvement Practice

Situations

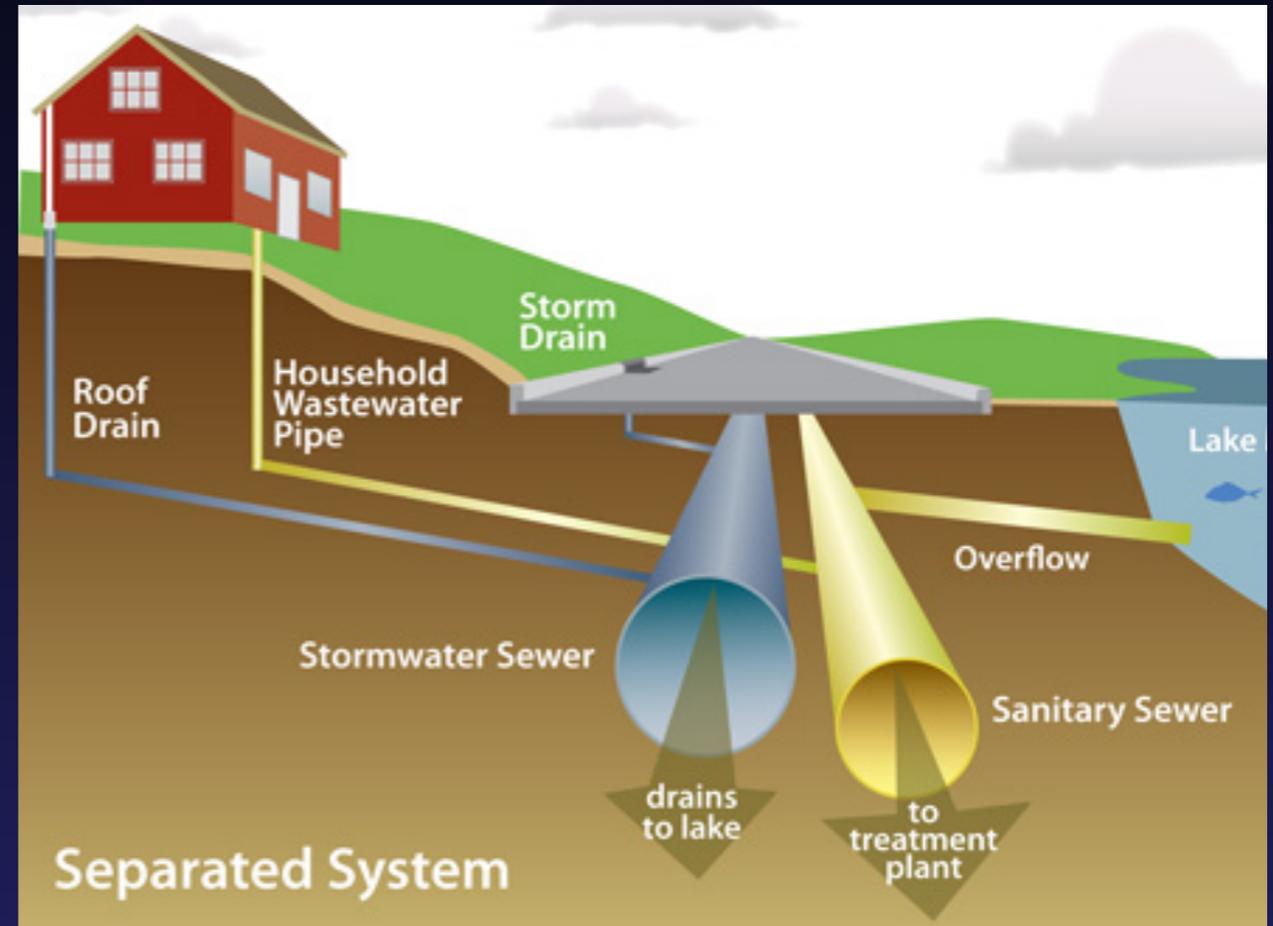
Tools, Routines, Structures

School Staff & Stakeholders





Infrastructure



Student and School Staff Characteristics

Student and School Staff Characteristics in 30 Elementary Schools in 2006–2007

	Minimum	Maximum	<i>M</i>	<i>SD</i>
Student				
Enrollment	354	870	540	132
African American	0%	90%	58%	29%
White	0%	70%	24%	24%
English language learners	0%	10%	1%	3%
Free or reduced lunch	10%	90%	59%	24%
School staff				
Full-time	89%	100%	96%	3%
Female	80%	98%	93%	5%
White	32%	93%	71%	17%
New after 2005	14%	62%	36%	13%
Years of teaching experience	9	19	13	3
Professional development in mathematics	1.58	3.60	2.01	0.38
Professional development in English language arts	1.73	2.84	2.20	0.28

Model: Predicting Tie Formation

Level 2a (*j*: provider effect)

$$\alpha_j = \gamma_0^{(\alpha)} + \gamma_1^{(\alpha)} \text{new teachers}_j + \gamma_2^{(\alpha)} \text{multiple - grade teachers}_j + \gamma_3^{(\alpha)} \text{formally designated leaders}_j + u_{0j}$$

Level 2b (*i*: receiver effect):

$$\beta_i = \gamma_0^{(\beta)} + \gamma_1^{(\beta)} \text{career stage}_i + \gamma_2^{(\beta)} \text{professional development}_i + v_{0i}$$

Formal Organizational Structure and Teaching Advice & Information Interactions

- Teachers more likely to seek advice from others of same gender and race
- Prior tie strongly associated with having a current tie
- Formal leaders more likely to provide advice or information
- Teachers in the same grade more likely to receive or provide advice or information
- Teachers more likely to seek advice about a subject from teachers who reported more PD in that subject

Spillane, J. P., Kim, C. M., & Frank, K. A. (2012). Instructional advice and information seeking behavior in elementary schools: Exploring tie formation as a building block in social capital development. *American Educational Research Journal*, 49(6), 1112-1145.

CONCEPTS NORMS SCRIPTS POLICIES SCRIPTS TOOLS WORK FRAMES
PROCEDURES STRUCTURE WORK
CONCEPTS POSITIONS
ORGANIZATIONAL
FRAMES ROUTINES RULES
TOOLS NORMS REGULATIONS FRAMES
STRUCTURE PROGRAMS WORK SCRIPTS PROCEDURES POSITIONS
PROGRAMS RULES PROCEDURES ORGANIZATIONAL ROUTINES RULES POSITIONS

Organizational Routines

- **Organizational Routines** are “repetitive, recognizable patterns of interdependent actions carried out by multiple actors.” (*Feldman & Pentland, 2003*)



Why Organizational Routines?

- Pragmatic reasons:
 - Popular mechanism in instructional reform efforts
 - Key external reform lever (e.g., Comprehensive School Reform Models)
- Conceptual reasons
 - Focus attention on patterned interactions
 - Provide frame for examining relationship between structure, agency, and practice
 - Involve cognitive, normative, and regulative dimensions

Organizational Routines: Two Aspects

- **Ostensive Aspect:** ideal form – general idea or script of the routine
- **Performative Aspect:** routine in practice in particular places, at particular times

Feldman, M. S., & Pentland, B. T. (2003). Reconceptualizing organizational routines as a source of flexibility and change. *Administrative Science Quarterly*, 48(1), 94-118.

Study Sites

School	Student Enrollment	Low Income	Black	White	Hispanic	Asian	Limited English
Adams	1,021	97%	100%	0%	0%	0%	0%
Baxter	1,127	66%	7%	47%	22%	24%	38%
Kosten	1,569	73%	8%	40%	19%	34%	48%
Kelly	261	90%	100%	0%	0%	0%	0%

Data Collection

School	Interviews	Observations of Organizational Routines
Adams	93	39
Baxter	48	25
Kosten	62	56
Kelly	16	11

Data Analysis: Multiple Phases

- *Phase 1:* in-depth school cases
- *Phase 2:* closed coding of interviews using HyperRESEARCH (e.g., organizational routines, roles and responsibilities, policy)
- *Phase 3:* closed coding of field-notes & meeting transcripts using NVivo (e.g., technical core, policy)
- *Phase 4:* open and closed coding of 22 meeting transcripts from Adams School (e.g., policy, professionalism, social tactics). (Kappa ranged from 0.70 to 0.95)

Coding Manual Example: Phase 4

Code	Description	Example
<i>Asserting In-Group Membership</i>	<i>Include any examples of people finding ways to join with actors or groups in order to reorder preferences and develop new collective identities from ‘inside.’</i>	<i>“...You know something? <u>When I was in the classroom, and I’m not far removed because I can go back to the classroom any day and I don’t have a</u></i>

Assertion One

1a. School leaders worked at recoupling their school's formal organizational structure with government policy and with *some* dimensions of the technical core by (re)designing organizational routines.

1b. School leaders designed these routines, in both form and function, to promote *standardization, accountability, & monitoring of instruction.*

A Closer Look: The Case of Adams School

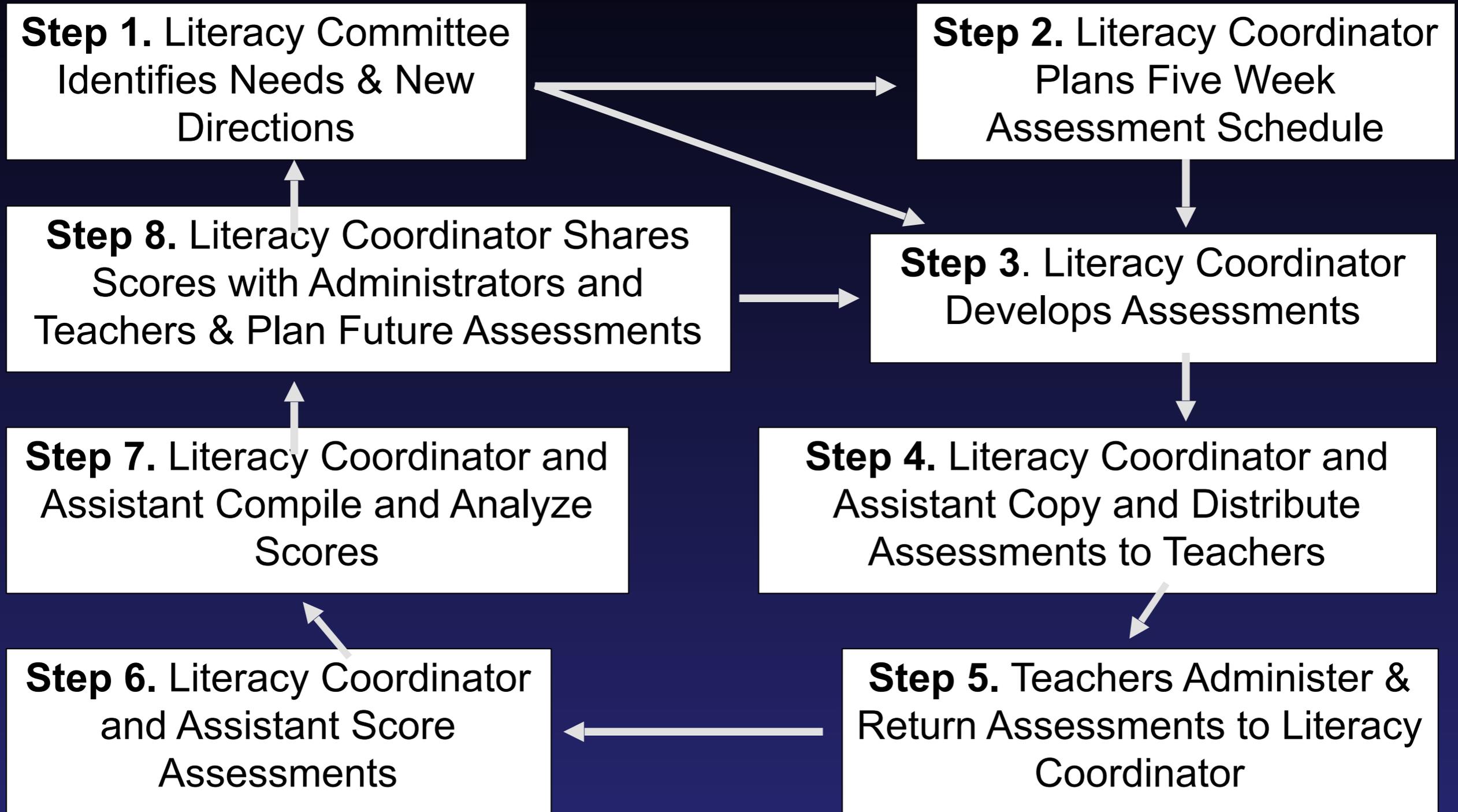
Leadership Positions and Formal Organizational Routines at Adams 1988-2003

	1988-1996	1996-1999	1999-2001	August 2001	December 2001	2002-2003
Principal	Dr. Williams			Ms. Richards		
Assistant Principal K-3	Ms. Andrews					
Assistant Principal 4-6	Ms. Richards			Ms. Wilmington		
Literacy Coordinator	Ms. Tracy (returned to Adams in 1990)			Ms. Walsh	Ms. Kelly	
Literacy Assistant		Ms. Smith (became assistant in 1996)				
Literacy Teacher Leaders	Ms. Baize Ms. James					
		Ms. Kelly (hired 1996) Ms. Walsh (hired 1997)				
New instructional routines introduced	Grade Level Mtgs; Faculty Mtgs; School Improvement Planning	Five Week Assessment Breakfast Club Teacher Leader Literacy Committee				

The Five Week Assessment

- “We were just kind of casually saying that for the majority of teachers they all work very hard, but some of them get very low results when it comes to these achievement tests ... So this [Five Week Assessment] was a way to find out ‘Are they learning?’” (Literacy Coordinator, 10/23/00)
- “The [standardized] tests ... didn’t give us much information about what we could do to improve our scores because we received the results well after we could do anything about it. We thought that a more frequent assessment ... would tell us where the children were” (Literacy Coordinator, 5/15/00)
- The Five Week Assessment enabled teachers to see “assessment as a tool for letting them know what they need to work on in the classroom. That was the goal.” (Principal Williams)

Five Week Assessment: Ostensive Aspect



The Five Week Assessment

“We’re still doing the Five Week Assessment, once that assessment is completed and graded and has been graphed and given back to the teachers, then we come back together with the teachers, with the grade levels and talk about the progress that was made. This last, well the 15th week results were not as well as we expected. ... So we had a meeting with every grade level and we just talked about the results of the test” (Principal Robinson, 2002)

Assertion Two

2a. School leaders created organizational routines *with* which and *within* which they worked at recoupling policy and instruction.

2b. Policy featured both indirectly and directly in the *performance* of organizational routines as:

- School staff performed locally designed routines that more or less mirrored external policy in form and function.
- Staff negotiated with policy in making key decisions about instruction.
- School staff negotiated the meanings of policy for their work.

Organizational Routine by Topic, by Grade

	Adams	Baxter	Kosten	Kelly
Policy	72%	67%	80%	73%
Technical Core	100	88	93	82
Technical Core & Policy	72	67	73	73
Language Arts	62	62	24	46
Math	36	10	17	36
Science	17	10	7	9

Organizational Routines as Local *Proxies* for Policy: The Five Week Assessment

First I would like to say congratulations to grade levels—all grade levels made some improvements from the Five Week Assessments to the Ten Week Assessment which is a reflection of your time and commitment to getting students to learn ... Third through fifth [grade students need to work on their] abilities to write descriptive words ... Probably lacking in vocabulary, ability to pick out details from the story. [Grade Level Meeting]

They [students] did a good job identifying the problem and solution of the story ... Which leads me to middle school. Problem and solution didn't always match ... this is truly a concern ... Little trouble determining the important information in the story. Questions most missed were vocabulary questions ... I have a packet with lessons on teaching vocabulary. I'll pass it around and if you want me to make you a copy, put your name on the green sticky note [Literacy Committee Meeting, Field Notes, 11/06/00]

Five Week Assessment: Performative Aspect

It [the Five Week Assessment] is first of all so Miss Richards, Miss Andrews and Miss Wilmington can see how the school is doing in general. That's one of the purposes. And we get an idea of how we're gonna do on our [state] standardized test. But the main point of the assessments are for teachers; that's what they're really for. They're for you, so you can see what is happening in your classroom and you can see where the students seem to be struggling and you can think about what you need to do and discuss what you need to do to help them. [Grade Level Meeting, 11/01/02]

“This is our own local assessment... It's for our purposes and we're not trying to meet any state mandate here, alright? Ultimately we have to, but this [assessment], this is for *us* to use to improve.” [Grade Level Meeting, 11/01/02]

Teachers and the Five Week Assessment

But what happens with that Five Week Assessment, it helps me to find out exactly what skills in what area I need to work a little harder; focus on a little more. And a lot of times we'll take that and we will go over it [in class], the whole assessment—the reading and the writing. It gives me a lot of feedback on exactly where the students are the weakest. And it'll be as a whole, as a whole 5th grade sometimes. So I don't feel bad that it's just me . . . it may be that specific skill [was a challenge] for the school as a whole. And then we target in on that. And then there's improvement. So those assessments are wonderful . . . and essential to the students' progress.

[Adams Teacher, 2002]

I use that [Five Week Assessment data] a lot when parents came in – I would have parents come and say, “I don't understand why he's got a D in reading because he can read.” And so I'd pull out those papers and say, “This will help you understand. This is the story with questions and these are his results.” And I said, “He's reading the words, but he's not understanding them.” And all of a sudden they understand there's a difference with reading words and understanding what you read and it's in black and white. [Adams Teacher, 2001]

Organizational Routines: Performative Aspect

Ms. Sally then switched the topic of discussion to a uniformed spelling program for the grade. She raised the point that it was important for the grade "to be following a sequence for instruction for phonics." Ms. Jill also wants to bring in one of her own favorite books into the curriculum which she claims has a "consistent format which is the most important because the students are missing a range of words. ... Ms. Dalia then raised the point that she would be concerned that the grade would not be following the standards of the Illinois State in reference to the [Jill's] book. [Grade Level Meeting at Baxter, 10/28/99]

Ms. Jones [mathematics teacher leader] remarks, "I don't too much worry about this one [kind of] question. But now if it's four or five questions [about the same content on the state test] I target in on that and I make sure my kids know that..." [Annual Kick-off Faculty Meeting at Adams, 8/31/01]

Organizational Routines: Performative Aspect

Next, Principal Johnson told the teachers that Ms. Ryan was going to go over how to read the ITBS analysis sheets from the 98-99 school year. ... She told the room that she handed out the Building Level Skills Analysis (BLSA) sheet to all the teachers and another sheet of Student Level Analysis (SLA) to the individual teachers. [After Ms. Ryan had finished] Ms. Ryan sat down and Dr. Johnson stood up again. Reiterating what Ms. Ryan had just said, Dr. Johnson stressed the importance to the teachers of "evaluating these analyses". "We do the curriculum before the test... Children have to have exposure to questions before the test... You [teachers] must refer to these [waving the analysis she had in her hand]." ... Dr. Johnson said, "Our children do well in the computation part but not as well in reasoning and higher-ordered thinking."

[Field notes, Professional Development Meeting at Kelly]

Repairing Organizational Routines

“When we first started our Five Week Assessment Program, it was a good idea. But what we didn’t (do) was (plan) follow-up conferences with the teachers. So the teachers would give the test, get the results and put them down. And ... there was no interaction after that. The first year ... there was no difference (in test scores). As we looked at what we did, we finally came to the conclusion– what was missing was we didn’t find time for the teachers to talk about the results of the Five Week Assessment” [Principal Interview, 03/01/00]

Coupling/Decoupling/Recoupling

Organizations are made up of interdependent components that are more or less responsive to, and more or less distinctive from, each other (Bidwell, 1965; Meyer & Rowan, 1977; Weick, 1976; Orton & Weick, 1990)

Coupling as a process rather than a static feature of [school] organizations (Orton & Weick, 1990; Hallett & Ventresca, 2006)

Examining micro processes or practice (Dimaggio, 1988; Powell & Colyvas, 2007; Spillane, Halverson, & Diamond, 2004)

Summary

- School leaders transformed their formal organizational structure by (re)designing organizational routines that embedded 'logics' - standardization, accountability ...
- In practice, these routine were not purely symbolic, as they addressed decisions about substantive technical matters, selectively coupling the technical core with administrative practice and policy.

Implications for Practice

- System and organizational [infra]structure
 - designing infrastructures to support instruction and its improvement
 - preparing school leaders as designers
- School administrative practice and the resources that enable it
 - Getting at the the micro processes of administration – school administrative practice –while not losing sight of the macro
- Beyond the school principal to other formal leaders (full- and part-time)

Leading Teaching and Learning by Designing Organizational Routines

- **Adams School:** Breakfast Club, Grade level meetings, Teacher Talk, Teacher Leaders, Five-Week Assessment, Literacy Committee, and Mathematics Committee.
- **Baxter School:** Cycle Meetings, Leadership Team Meetings, Literacy Committee, Math/Science Committee.
- **Kosten School:** Report Card Review, Grade Book Review, Lesson Plan Review, Faculty Meetings, Grade Level Meetings.
- **Kelly School:** Skill Chart Review, PD day.

Organizational Routines at Adams School

	Functions	Tools	People
Five Week Assessment	<ul style="list-style-type: none"> -Formative evaluation -Teacher Accountability -Monitor Instruction -Teacher Development 	<ul style="list-style-type: none"> -Standardized Tests -Standards -Student Assessments 	<ul style="list-style-type: none"> -Language Arts Coordinator -Assistant Principal -Principal -Teachers
Breakfast Club	<ul style="list-style-type: none"> -Teacher Development -Build Professional Community 	<ul style="list-style-type: none"> -Research Articles 	<ul style="list-style-type: none"> -Teachers -Language Arts Coordinator -Principal
School Improvement Planning (SIP)	<ul style="list-style-type: none"> -Identify Instructional Priorities & Resources 	<ul style="list-style-type: none"> -Previous Year SIP -District Guidelines -Test Score Data 	<ul style="list-style-type: none"> -Principal -Administration -Teachers (approved LSC)
Classroom Observations	<ul style="list-style-type: none"> -Teacher Development -Monitor Instruction -Accountability 	<ul style="list-style-type: none"> -School Protocol, -District Protocol 	<ul style="list-style-type: none"> -Principal -Assistant Principal
Real Men Read	<ul style="list-style-type: none"> -Student Motivation and Support 	<ul style="list-style-type: none"> -Books 	<ul style="list-style-type: none"> -Language Arts Co-ord. -Assistant Principal -Principal -Community Members

Changing Organizational Routines, Changing Interactions

“You close your door. You do what you want. You don’t know what everybody else is doing and it’s fine. Nobody is interested. Nobody’s checking on you or even interested in what you are doing . . . but it changed since then. We work much closer together . . . First of all, we probably were forced to do some exchange of ideas in—when it first started. Then people found it’s very helpful and nobody keeping anything as a secret so we share freely. And it helps.” (Teacher Interview)

Everybody did absolutely their own thing as far as literacy. Some people used the Basal series . . . we had different Basal series going in the building. A lot of people were going to a literature-based instruction. Nobody ever talked to each other. It was just—everybody went into their own room, closed the door and did their own thing. So we’ve tried to develop some common vocabulary and common ways of doing things.” (Teacher Interview)

School Demographics

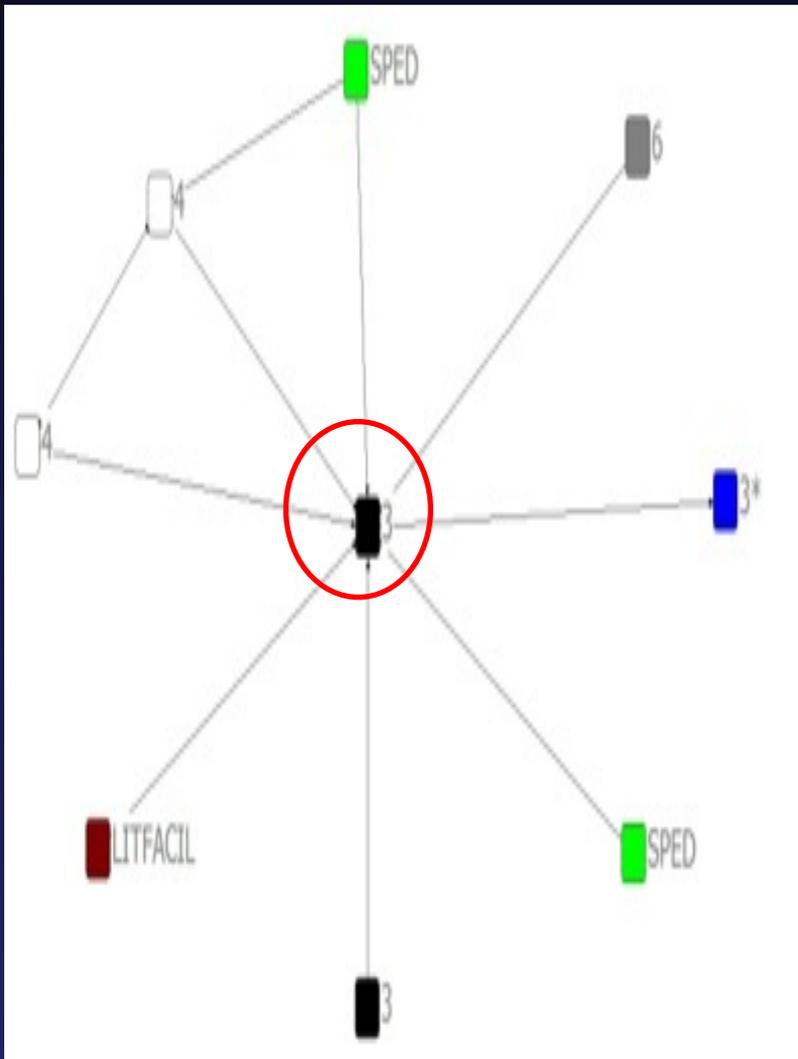
Table 1. Elementary School Demographics, Auburn Park School District, 2010–2011

School	Students Enrolled	Percent White	Percent African American	Percent Latina/o	Percent English Learner	Percent Free/Reduced-Price Lunch
Coach :						
Full-time coach:						
Chamberlain ²	487	89	3	4	0	5
Bryant ²	446	78	5	12	0	37
Half-time coach:						
Ashton ²	450	74	5	15	9	34
Fundamental Math:						
Chavez ²	341	70	12	13	9	56
Torres	484	76	7	9	7	35
King	441	84	9	3	5	21
Cisneros	338	89	4	2	0	17
Stevenson	282	71	10	11	8	38
Easton	254	86	2	4	0	10
Neither:						
Kingsley ²	530	92	2	2	0	5
Ashe	437	87	3	5	0	5
Northvale	324	85	3	6	0	15

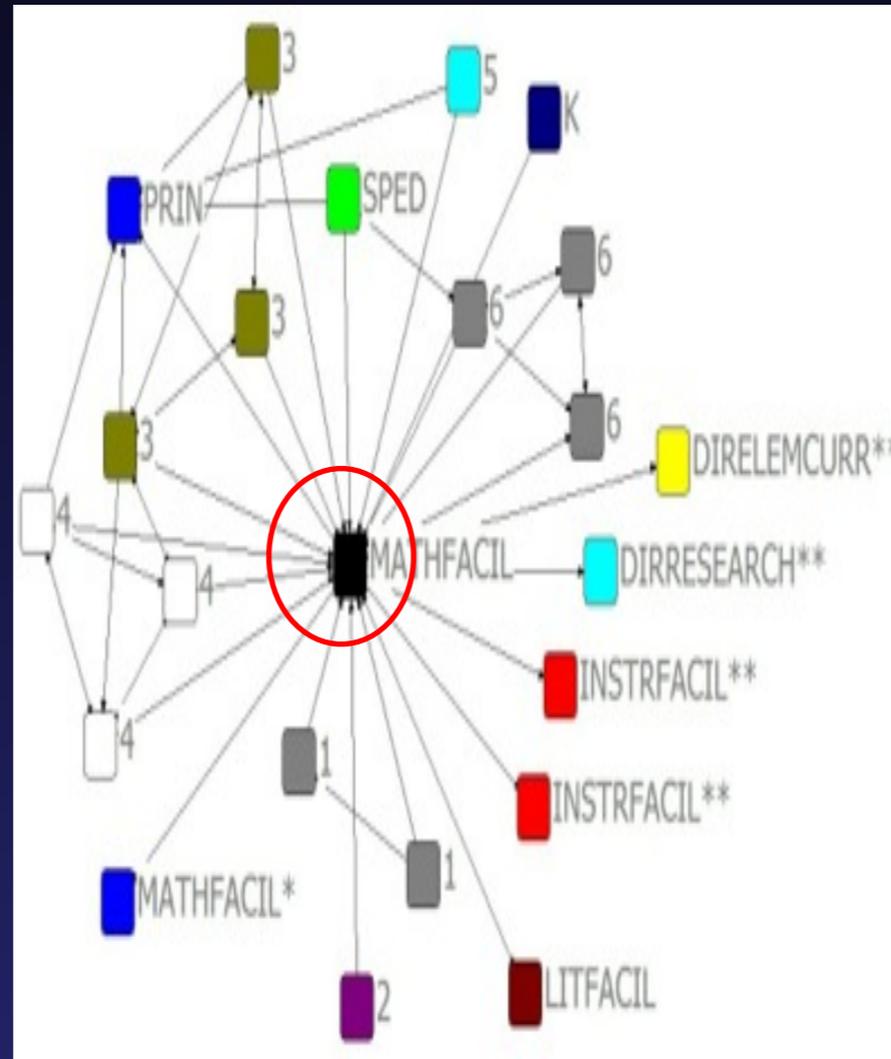
Note.—Data are not yet available for 2011–2012. Source: Nebraska Department of Education (2011).

² Interview site.

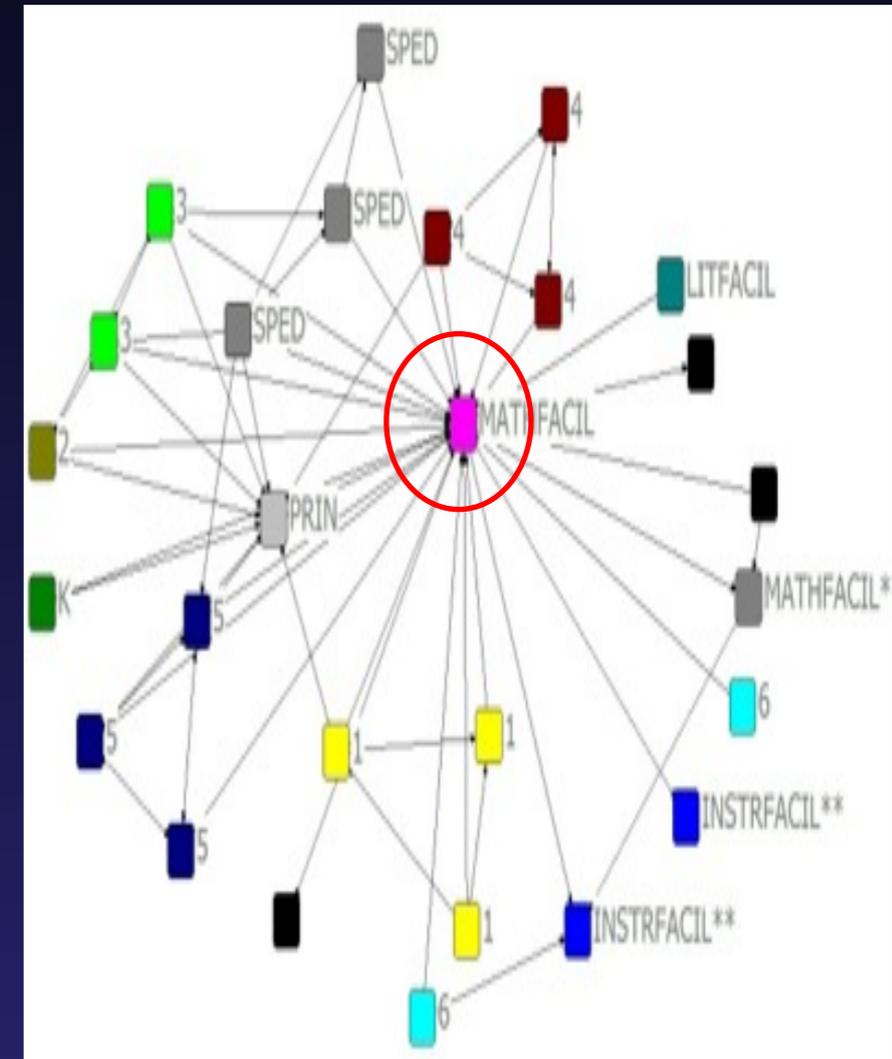
Math Coach Transforms Interactions *about Mathematics Teaching* (Bryant Elementary)



2009-10



2010-11



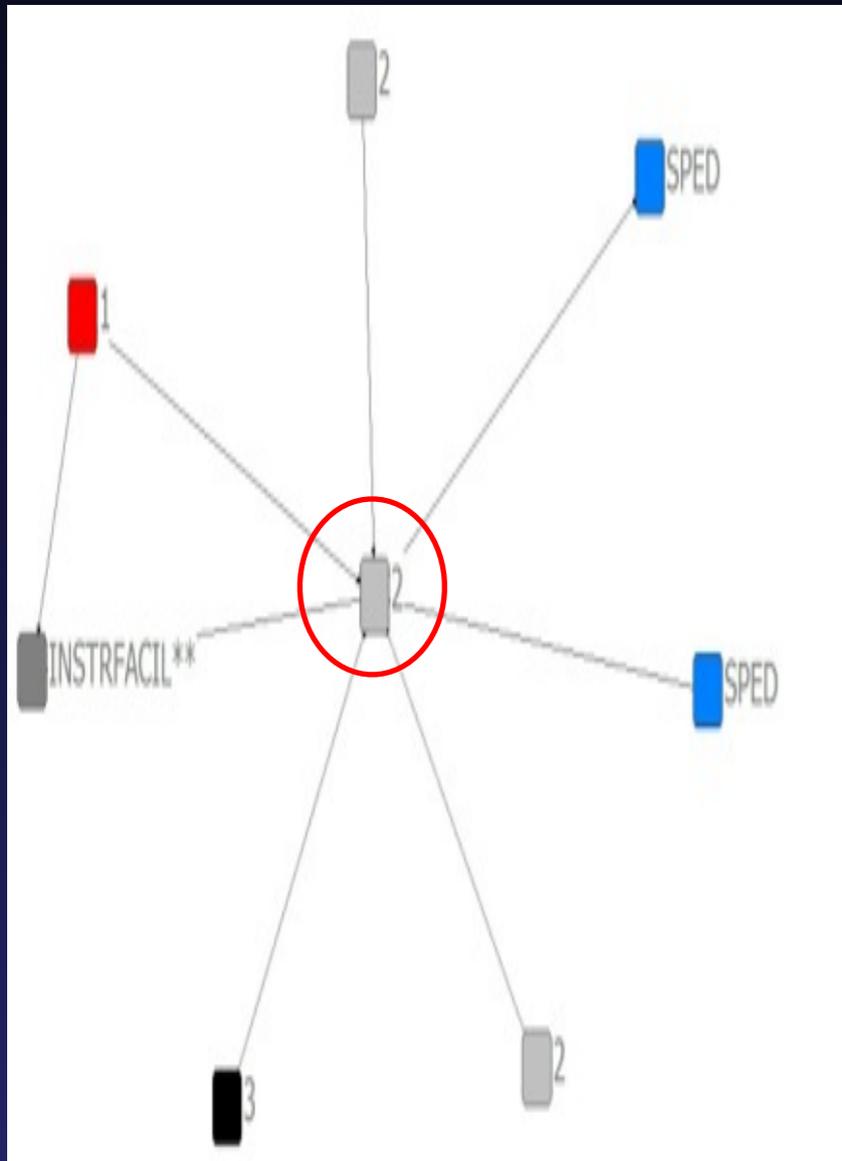
2011-12

Formal Position Promotes Advice Seeking

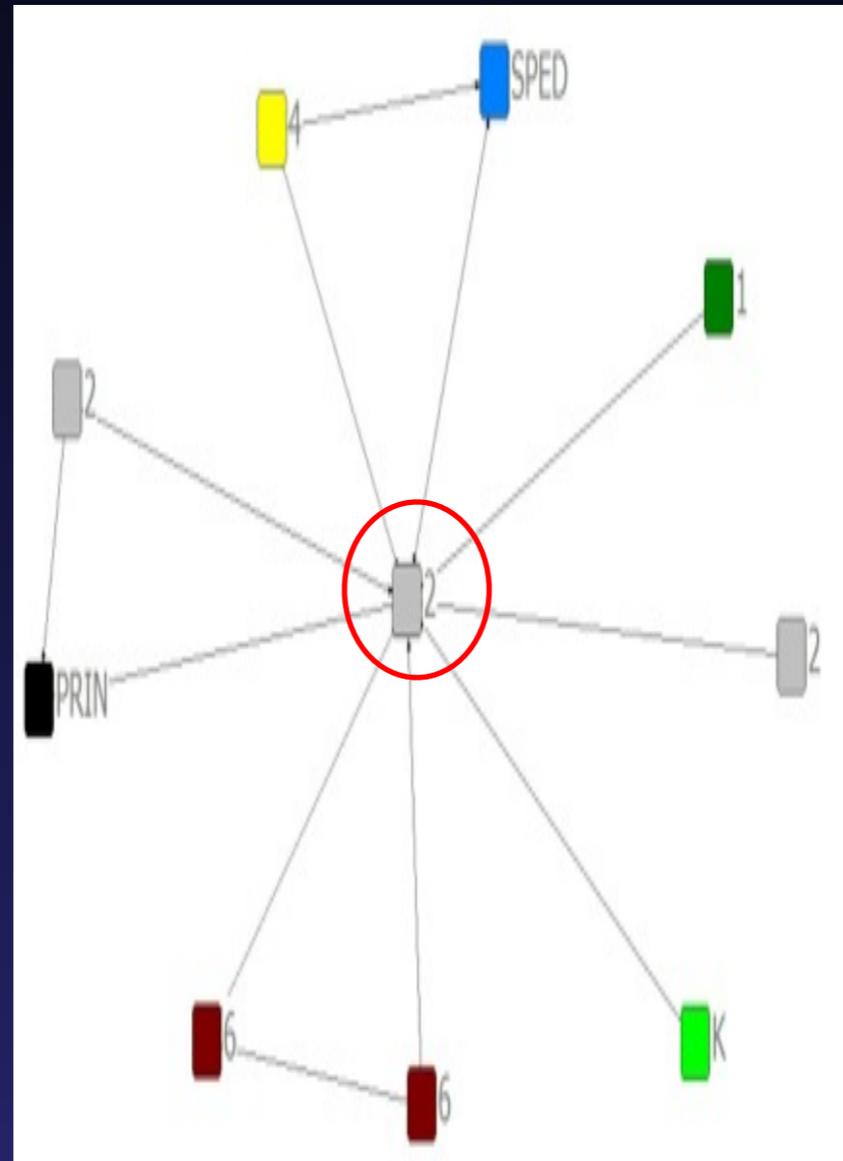
“[Emily] really wasn’t our facilitator [last year], though she was my co-worker, just a third grade teacher. I knew she had a wealth of knowledge, I just wasn’t in [her classroom] when she was teaching math. But, now that she’s moved into this math facilitator position, that’s different... She’s been trained in it. And, she’s gone to school for it and she’s a great coach. She knows a lot about math and I trust her that she has a lot of, a wealth of knowledge... She’s the go-to person.”

Angie, Special Education

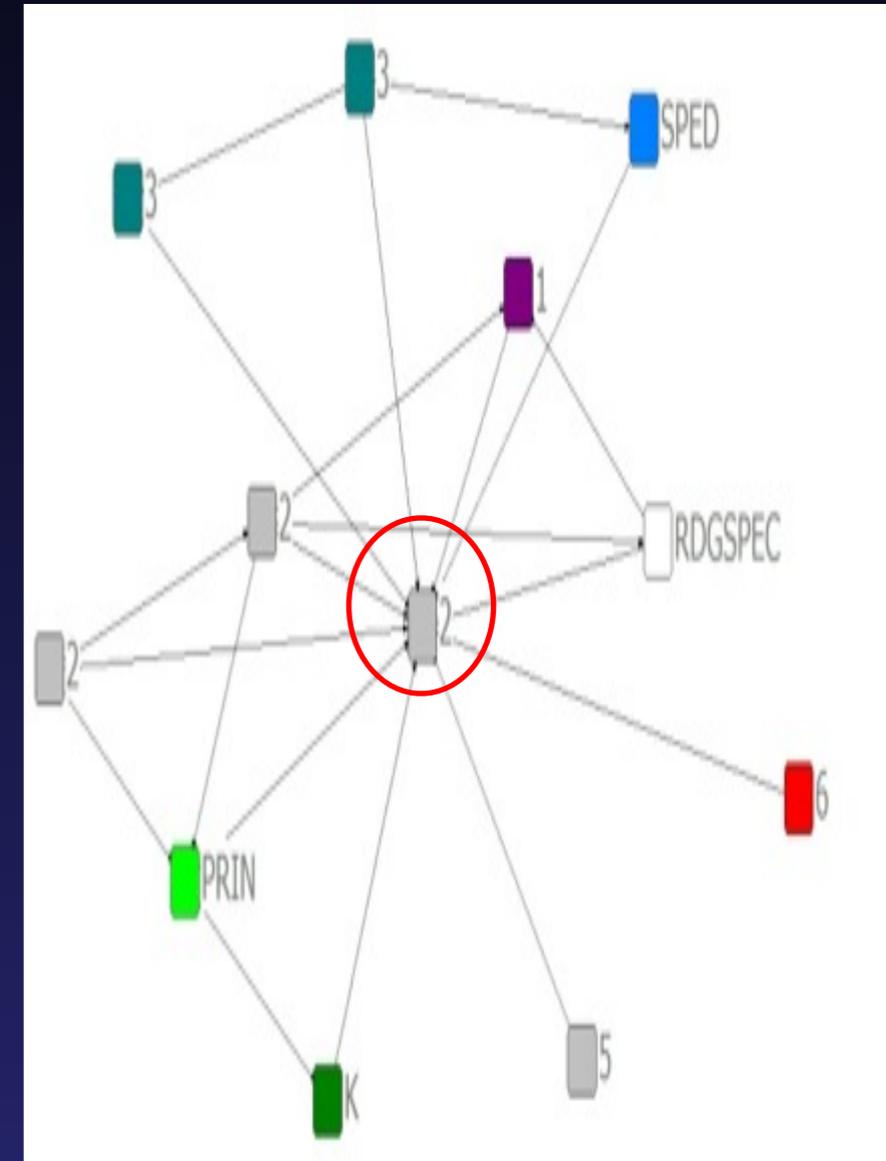
Professional Development & Teacher Leaders for Mathematics (John)



2009-10



2010-11



2011-12

Teacher Leadership and Training as a Marker of Expertise

Karen (1st grade)

“Because he’s a second grade teacher....He’s kind of become the math person to see because he’s taken this extra training that nobody else in the building has done, and I know that he’s interested in math so, he’s just one that I’ve gone to that I know focuses very heavily on, I like his beliefs and the way that he has his room set up and the way that he carries himself.”

Infrastructure Redesign Promoted Advice and Information Seeking in Mathematics

Average In-Degree for Teacher Leaders and Other Teachers, Auburn Park School District

	2009-10	2010-11	2011-12
Toolbox Members (6)	1.60	2.80	2.67
Fundamental Math Participants (9)	4.33	6.00*	6.00
Math Coaches (3)	6.33	16.33**	18.00
Other Teachers (256)	1.54	1.60	1.36

Infrastructure Redesign Promoted Brokering in Mathematics

Average Betweenness for Teacher Leaders and Other Teachers, Auburn Park School District

	2009-10	2010-11	2011-12
Toolbox Members (6)	5.00	75.80*	48.86
Fundamental Math Participants (9)	32.44	144.33*	115.42
Math Coaches (3)	38.67	248.67**	222.97
Other Teachers (256)	10.85	24.81*	11.90

Teacher Leadership as a Coupling Mechanism

Change in Teachers' Beliefs about and Reported Practices in Mathematics

	2009-10	2010-11	2011-12
Beliefs about Mathematics Instruction Mean (SD)	3.35 (0.5)	3.46*** (0.5)	3.51*** (0.5)
Reasoning and Problem-Solving Practices Mean (SD)	2.39 (0.4)	2.52*** (0.4)	2.64*** (0.5)

Notes: Means are based on teachers from 12 schools with over 70% response rates who responded in every year of the survey. Significant differences are for comparisons to 2009-10.

*** $p < .001$; ** $p < .01$, * $p < .05$; + $p < .10$

Tentative Summary: Organizational Routines & Social Interactions

- ‘Socio-technical system’ ... inter mental models (Hutchins, 1995) in material and abstract tools
- Organizational routines and tools embody representations of what it means to learn, teach, and improve teaching.
- Organizational routines embody norms about the practice of improvement.
- Organizational routines have both affordances and constraints enabling some sorts of interactions about somethings, constraining other sorts of interactions about other things.
- Organizational routines more or less embody macro institutional logics and these logics frame and focus micro interactions among school staff and stakeholders.

Anchoring School Improvement Research in *Instruction*

What are the **entailments** of anchoring school improvement research in *instruction*?

Anchoring Leadership

Students'
Opportunities To Learn



Teaching



What gets taught?

How is it taught?

Instructional Improvement
Practice



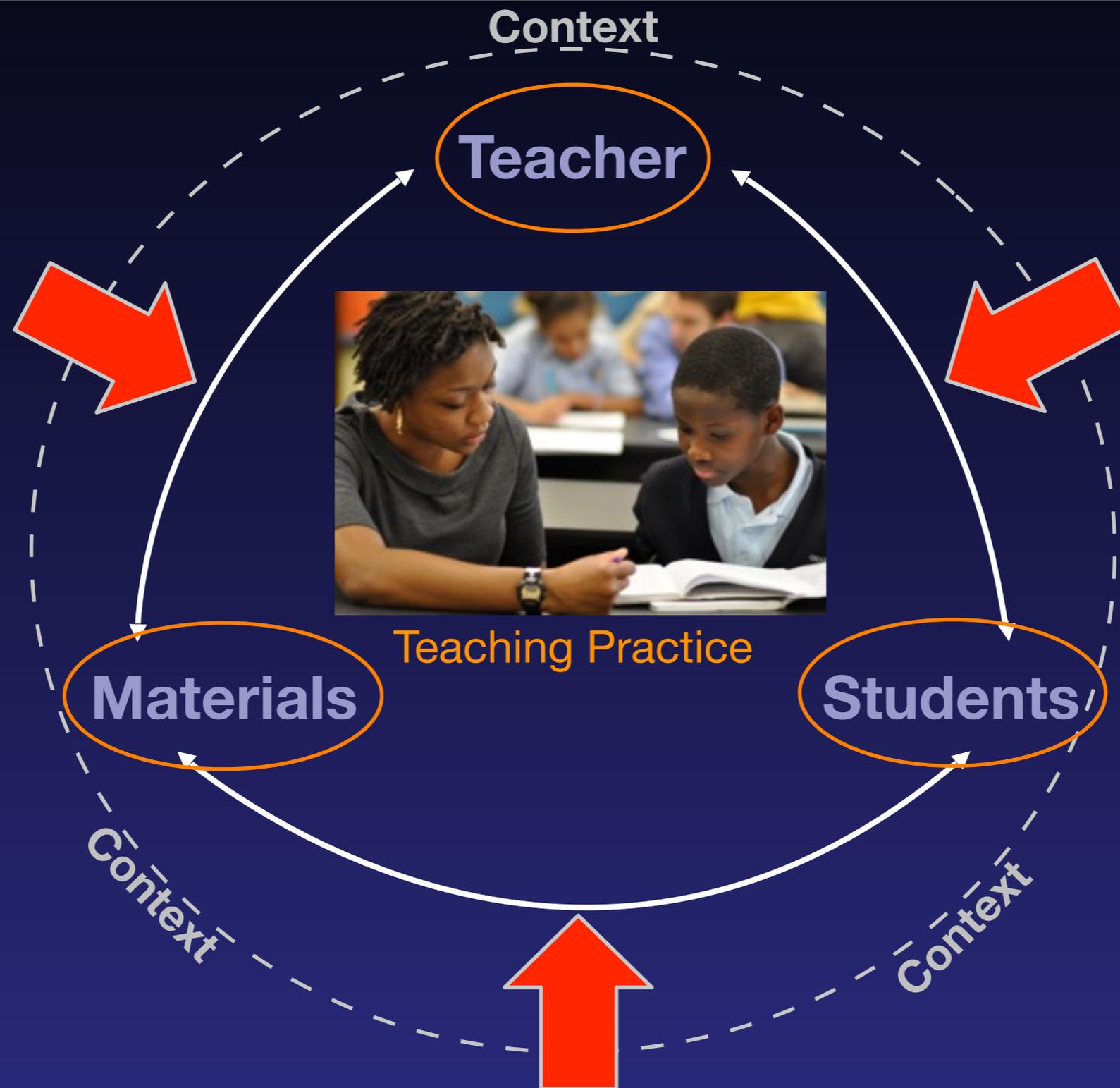
Teaching Practice is ...

- Socially Constructed or Defined - craft or technical routine?
- A Social or Collective practice
- (School) Subject Specific – the subject matters
- Simultaneously works on diverse and potentially conflicting goals of schooling — social mobility, social efficiency, & democratic goals.

Teaching as a Social Practice



Teaching and Leadership



School Demographics

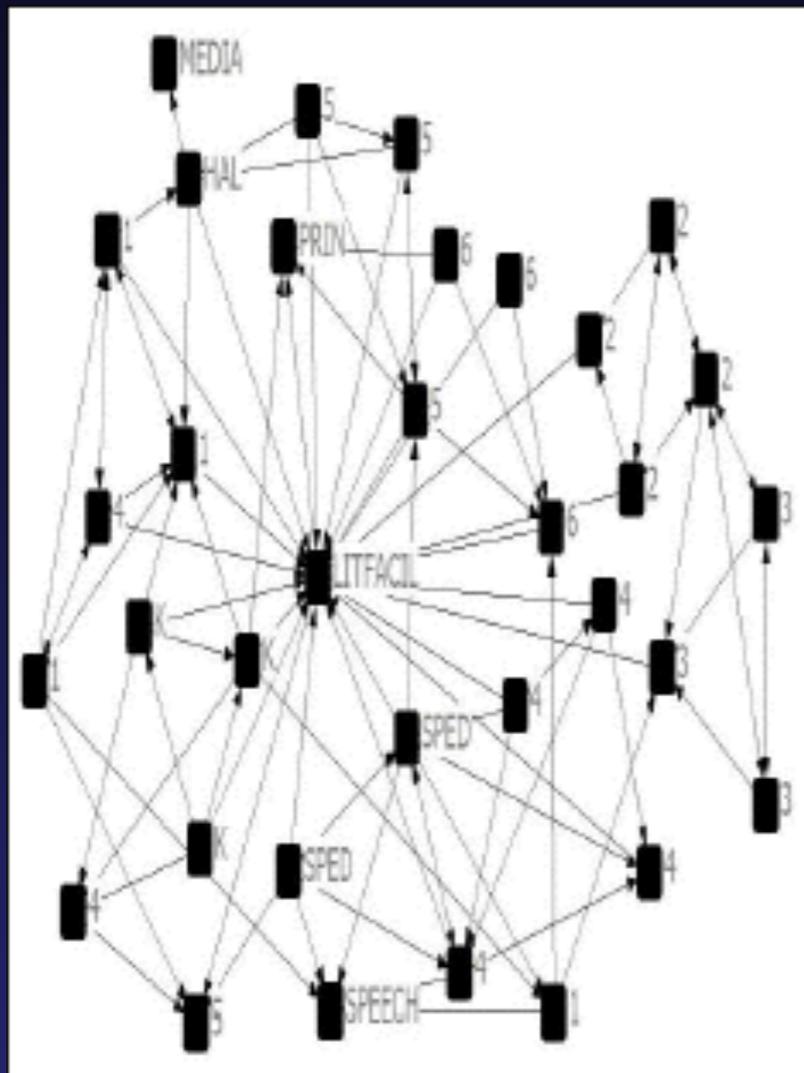
Table 1. Elementary school demographics, Auburn Park School District, 2012.

School	Students enrolled	White (%)	African American (%)	Latino (%)	English learner (%)	Free/reduced lunch (%)	Staff in network
<i>Kingsley</i>	564	89	2	4	—	7	32
<i>Chamberlain</i>	528	91	3	3	—	5	30
<i>Ashton</i>	484	74	5	12	7	40	31
<i>Ashe</i>	464	88	2	5	—	7	27
<i>Warner</i>	446	84	7	2	4	18	27
<i>Abbott</i>	441	93	1	4	—	23	24
<i>Bryant</i>	436	81	6	8	—	39	34
<i>Riley</i>	403	89	4	3	—	28	26
<i>Northvale</i>	395	86	4	5	—	14	22
<i>Torres</i>	393	76	9	8	9	44	29
<i>Cisneros</i>	353	88	3	4	—	16	22
<i>Chavez</i>	343	71	11	11	8	58	28
<i>Stevenson</i>	277	69	10	10	9	48	22
<i>Easton</i>	259	83	3	5	—	10	17

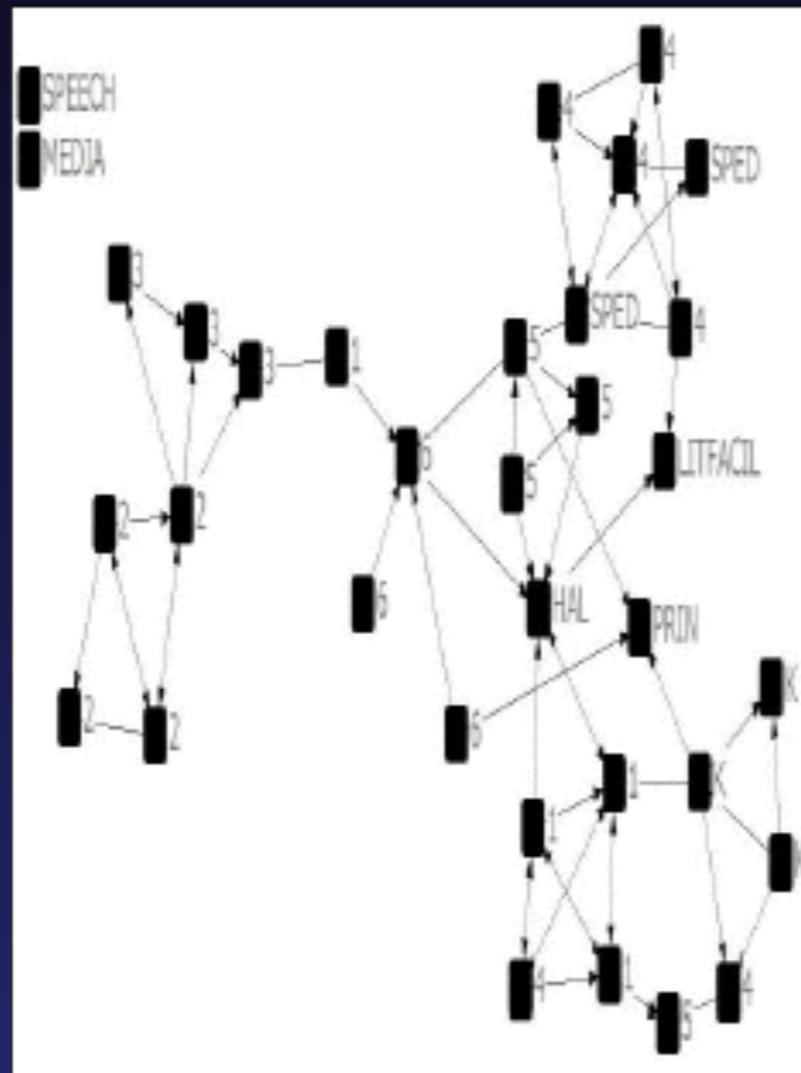
Notes. A missing value indicates that data were masked to protect student identity, as fewer than 10 students were reported in the subgroup. Schools in italics were interview sites.

The Subject Matters

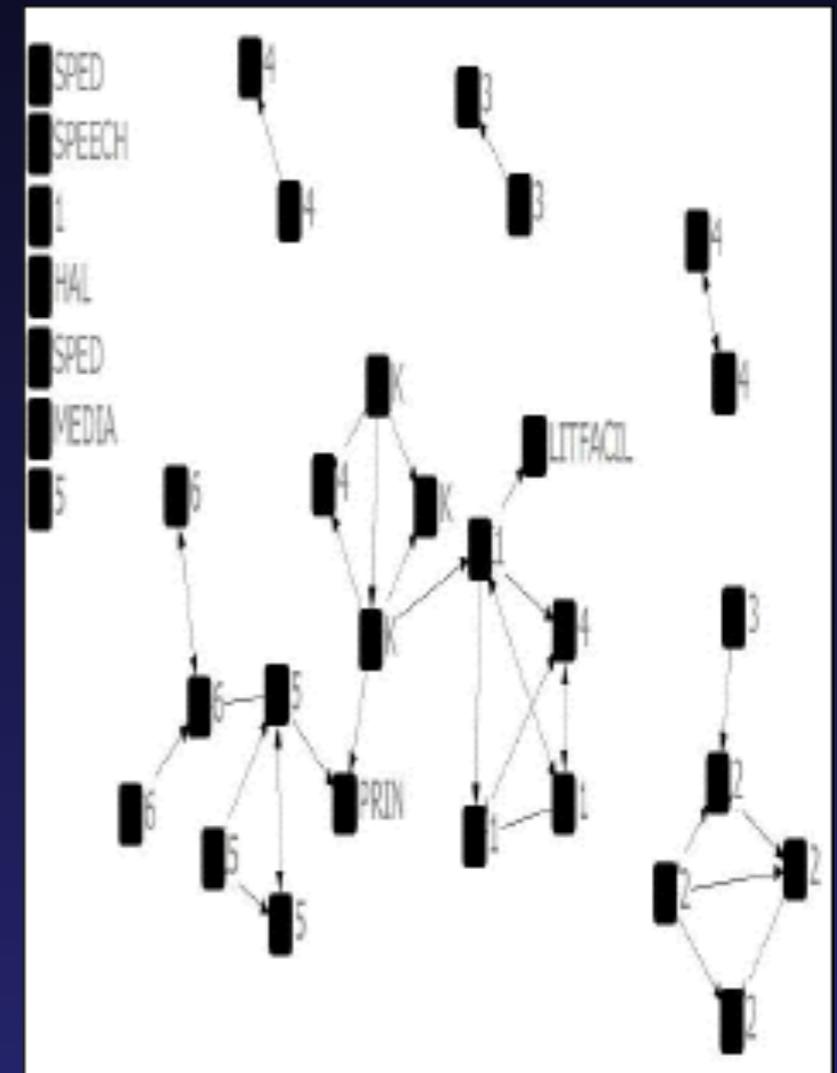
Kingsley Elementary School (No Mathematics Facilitator)
Social Network Diagram by subject, 2012



Literacy



Mathematics



Science

Spillane, J. P., & Hopkins, M. (in press). Organizing for instruction in education systems and school organizations: How the subject matters. *Journal of Curriculum Studies*.

The Subject Matters

Table 2. Average centrality measures in subject matter networks, 2012.

	Literacy	Mathematics	Science	Change from math to literacy (%)	Change from science to math (%)
In-degree	2.93	2.02	1.19	+45.0	+69.7
Out-degree	3.63	2.41	1.40	+50.6	+72.1
Betweenness	38.08	21.94	2.52	+73.6	+770.6

The Subject Matters

Table 3. Mean (and Standard Deviation) comparisons for centrality measures, 2012, Based on one-way analysis of variances, with permutation-based standard errors and tests ($n = 371$).

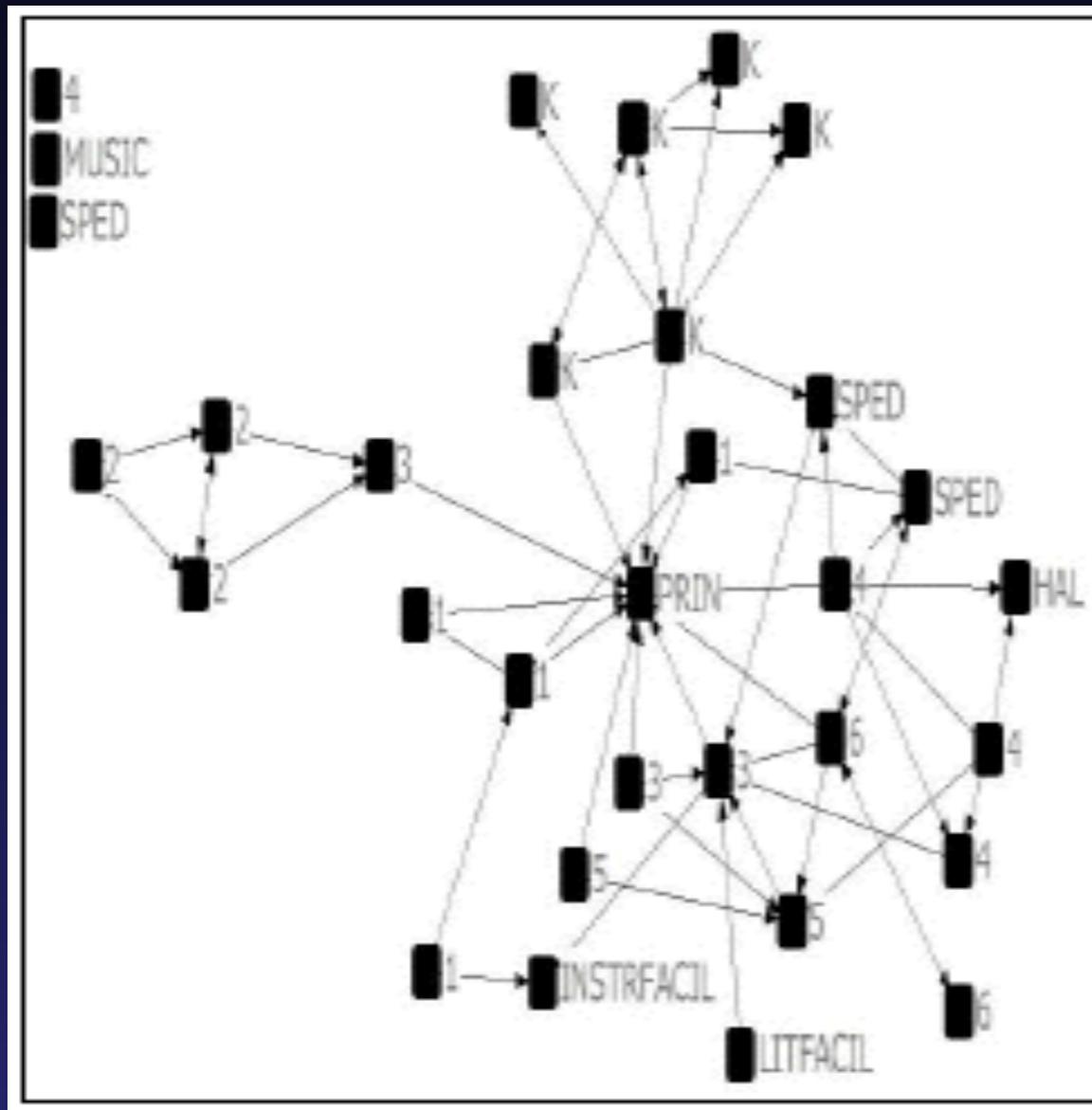
	<i>n</i>	Literacy			Mathematics			Science		
		In-deg.	Out-deg.	Between	In-deg.	Out-deg.	Between	In-deg.	Out-deg.	Between
Principals	14	5.7 (3.3)	4.9(3.6)	137.4(65.8)	4.1(3.3)	3.6(2.9)	53.7(52.1)	1.7(1.8)	1.8(2.3)	10.0(18.6)
Literacy Facilitators	14	16.1 (4.7)	5.9(3.2)	214.9(177.2)	0.7(0.8)	1.1(1.1)	2.7(10.0)	1.1(0.9)	1.0(1.8)	0.0(0.0)
Reading Specialists	6	5.8(3.2)	6.3(4.0)	140.9(93.7)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)
Math Facilitators	2	1.5(0.7)	1.5(0.7)	3.8(5.4)	19.5(0.7)	8.5(4.9)	285.0(249.0)	0.5(0.7)	0.0(0.0)	1.57(5.9)
Teacher Leaders	96	2.8(1.7)	3.1(1.9)	31.3(44.9)	2.6(2.6)	2.4(1.8)	28.5(62.6)	1.5(1.2)	1.3(1.5)	3.3(8.1)
Teachers	239	2.0(1.4)	3.6(2.4)	22.4(39.4)	1.6(1.2)	2.4(1.9)	16.9(37.5)	1.1(0.9)	1.5(1.5)	1.9(5.4)
<i>F</i>		164.3	5.9	38.5	50.6	8.4	15.5	7.4	1.7	4.0
d.f.		5	5	5	5	5	5	5	5	5
<i>p</i>		0.0002	0.0002	0.0002	0.0002	0.0004	0.0006	0.0002	0.1248	0.0224

Note. Random replications are applied because our observations are not independent. Tests of significance are based on 5000 permutations.

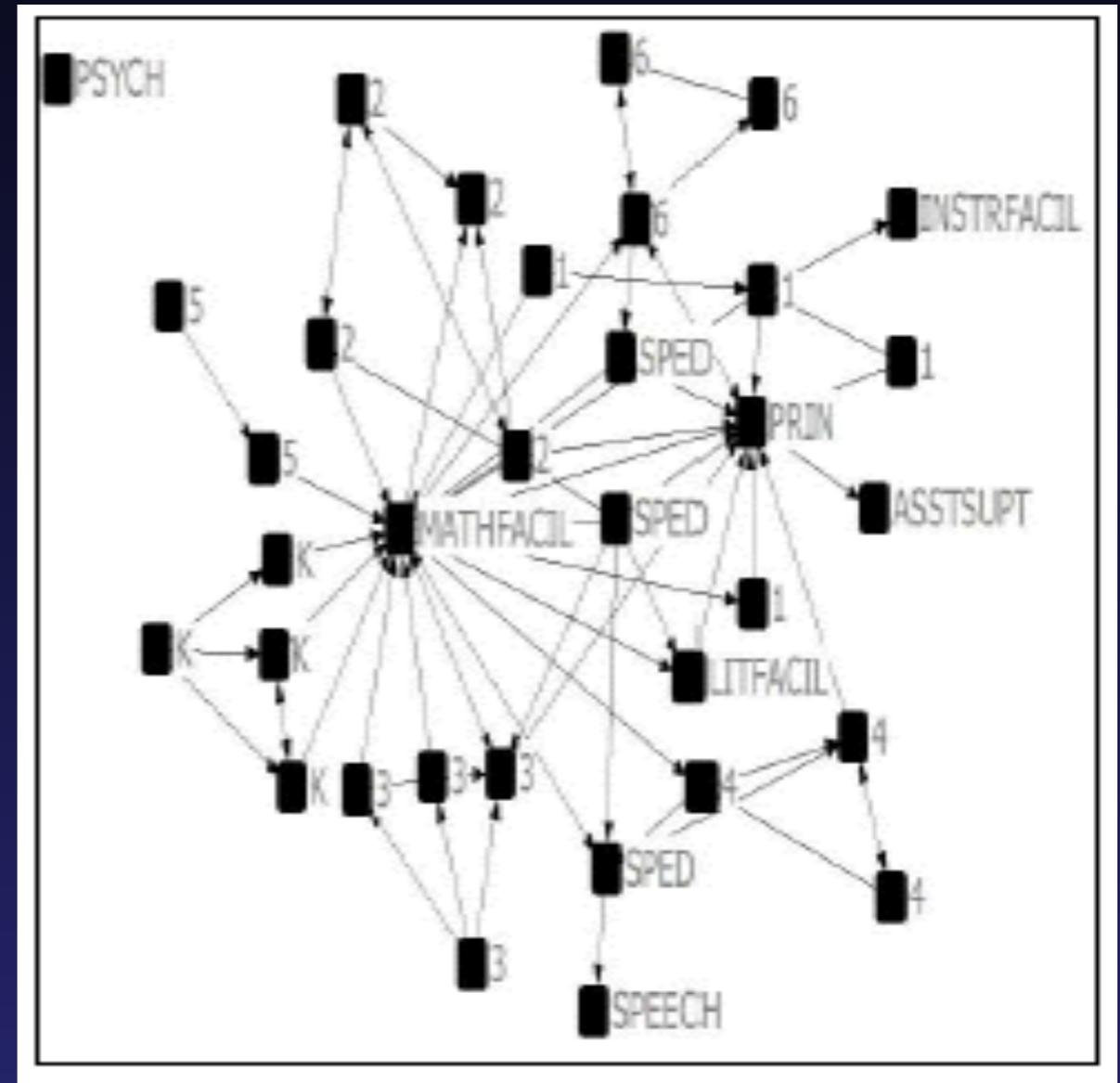
ORGANIZATIONAL INFRASTRUCTURE: FORMAL POSITION & ORGANIZATIONAL ROUTINE

“Our literacy facilitator, she was there [at the PLC meeting] every week. Usually [the meeting] included just our teaching team, literacy facilitator, and a special education teacher who was there most of the time too.” (Kingsley Principal)

Mathematics



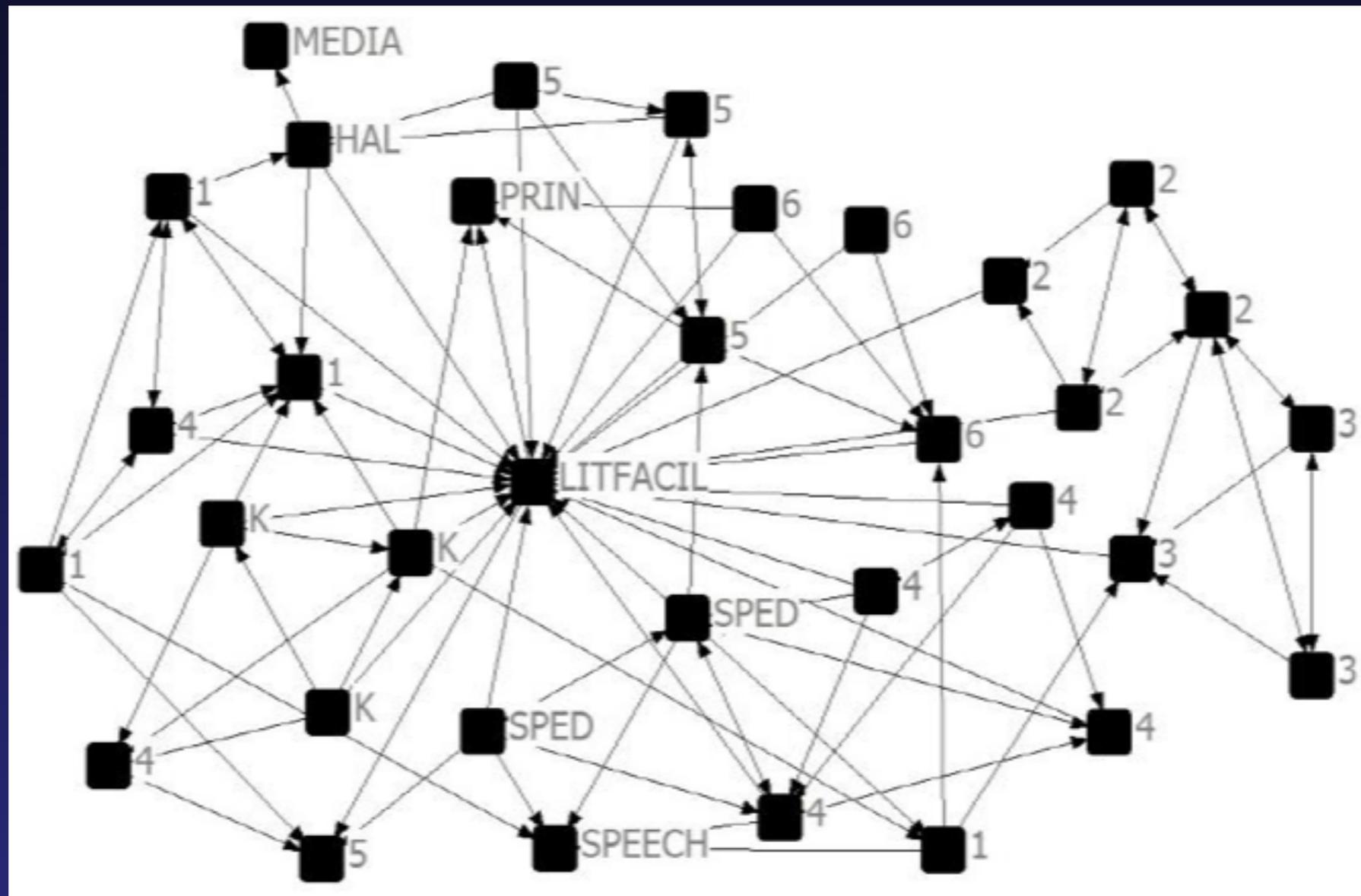
2010



2012

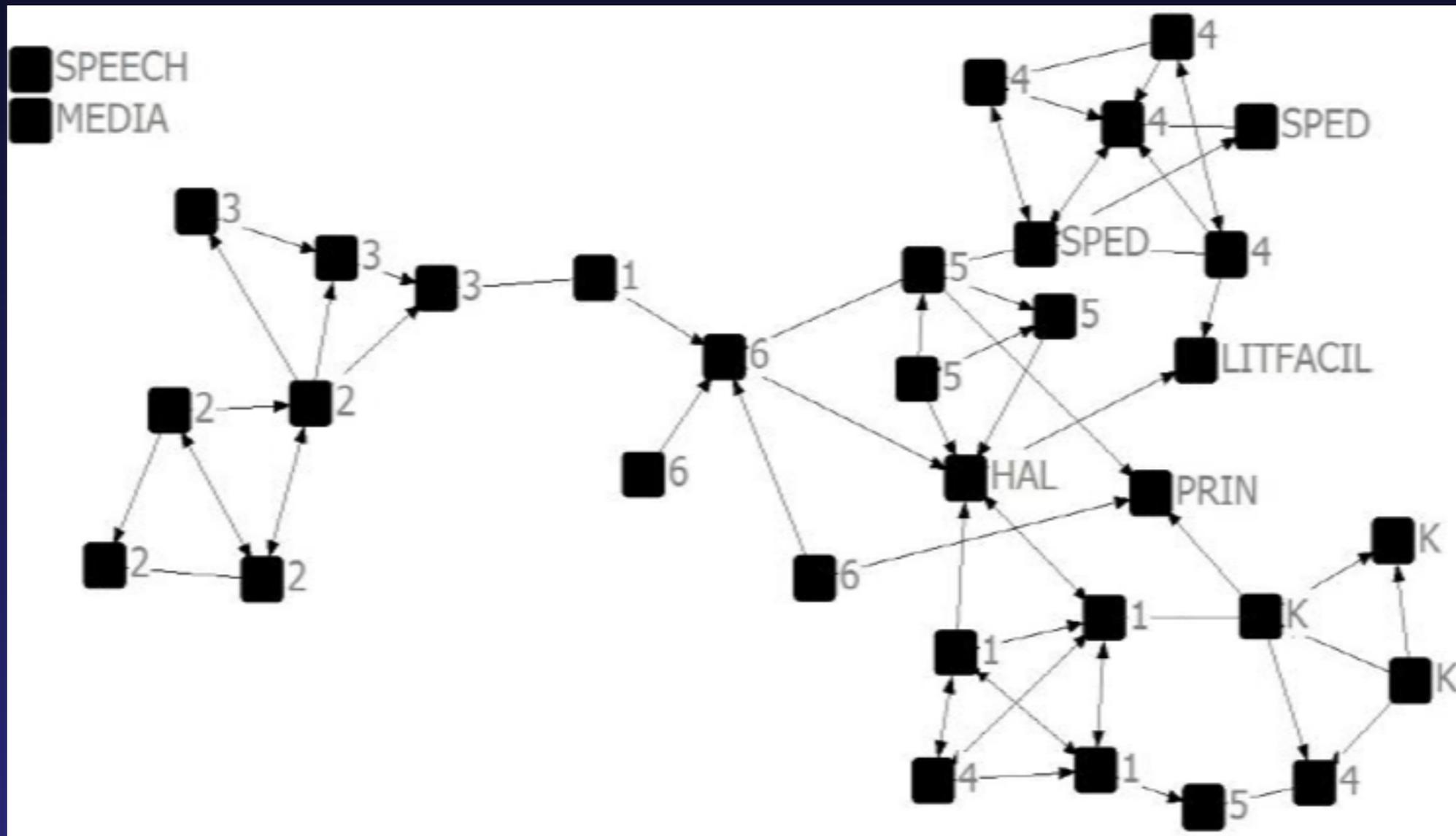
The Subject Matters - Language Arts

Kingsley Elementary School: Instructional Interactions about Literacy



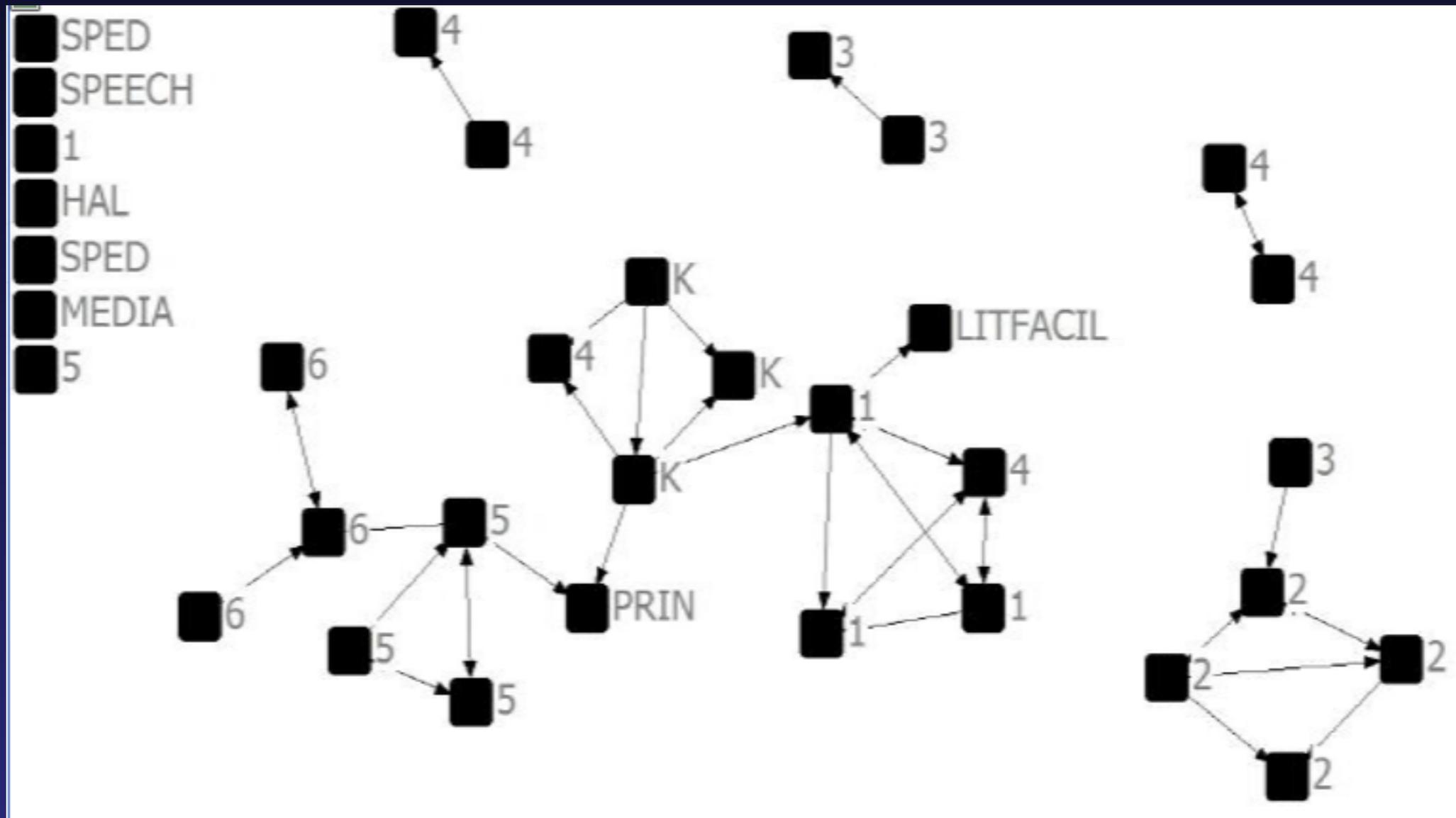
The Subject Matters - Mathematics

Kingsley Elementary School: Instructional Interactions about Mathematics



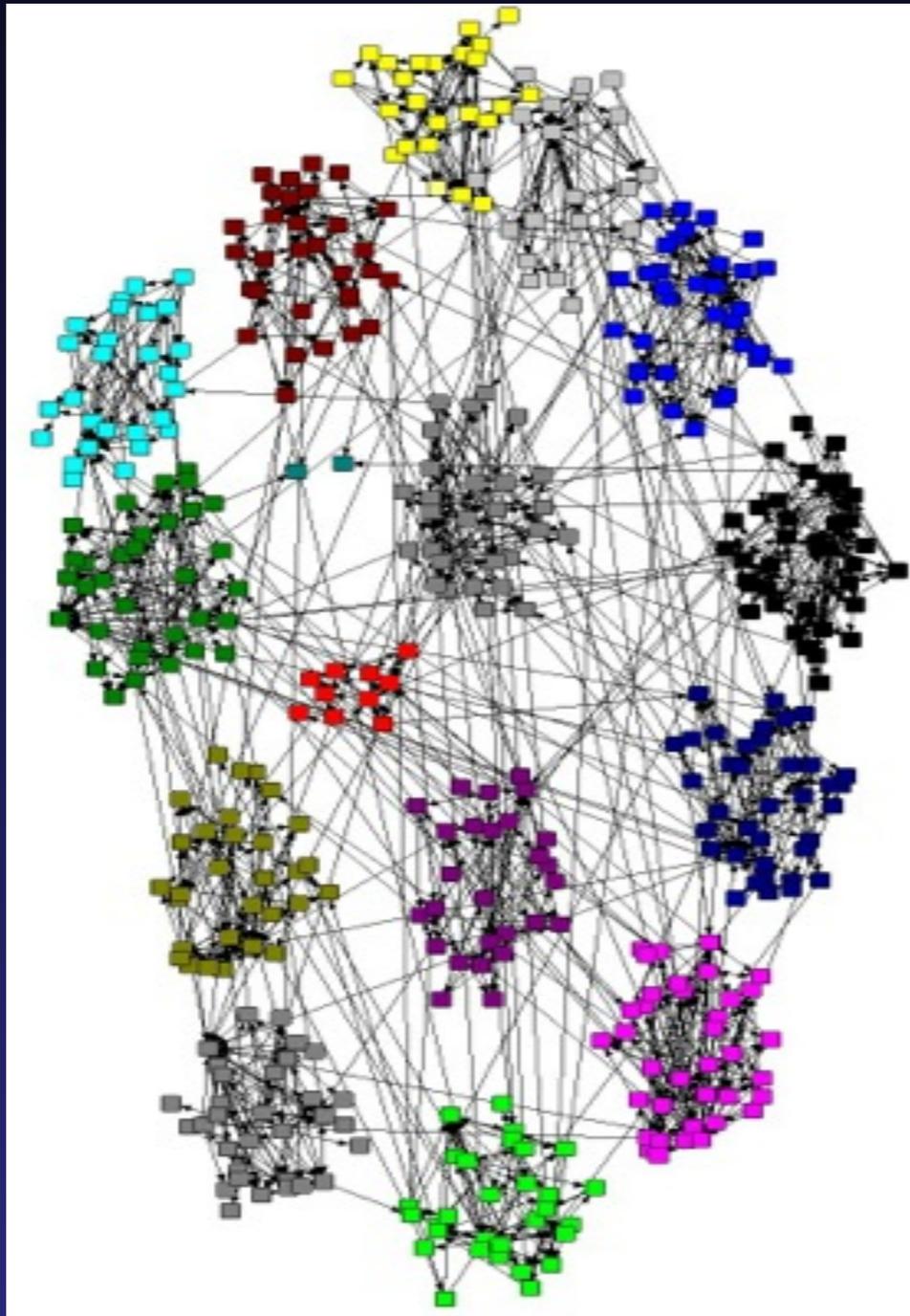
The Subject Matters - Science

Kingsley Elementary School: Instructional Interactions About Science

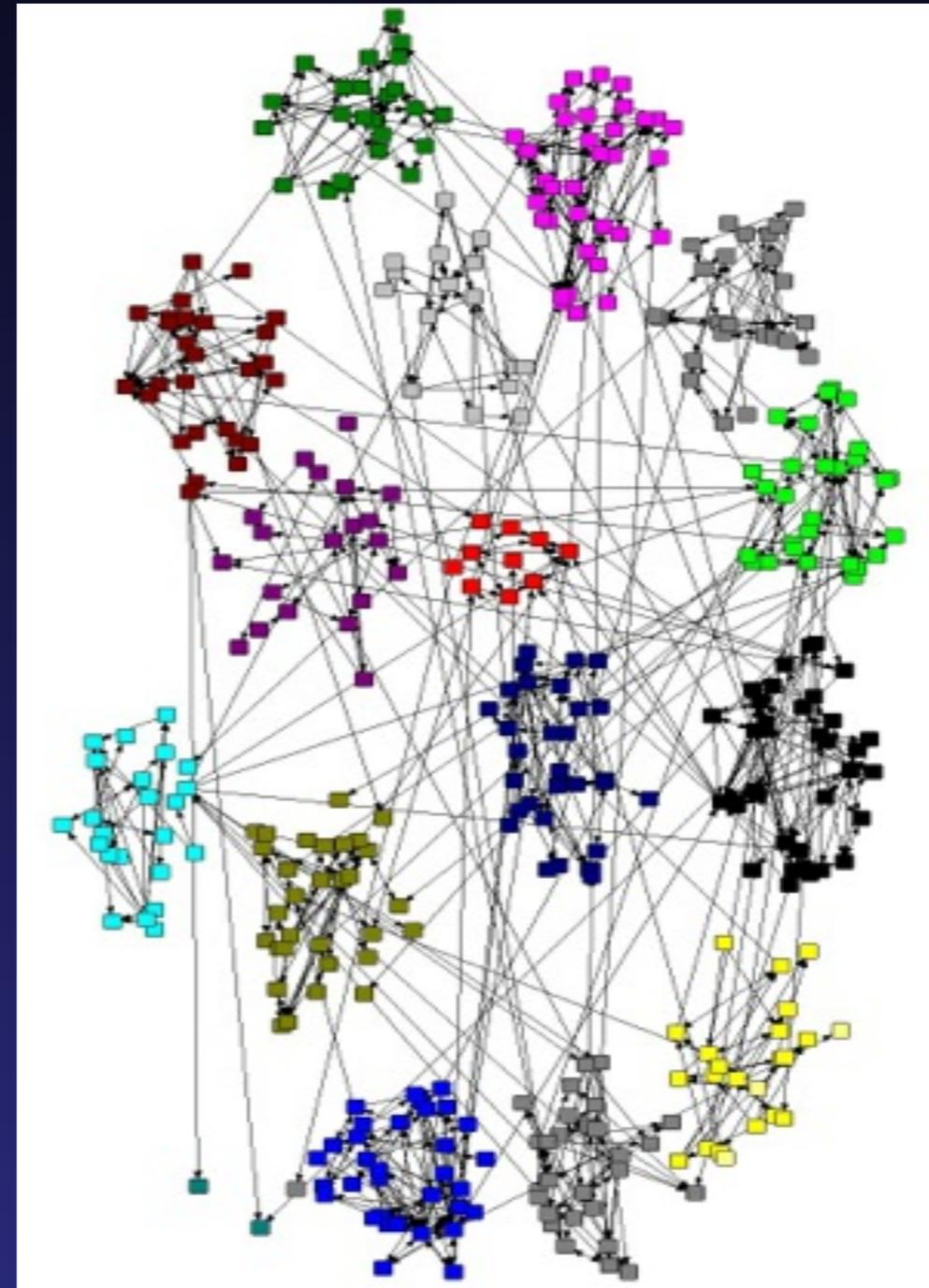


A System View: Instructional Advice and Information Interactions

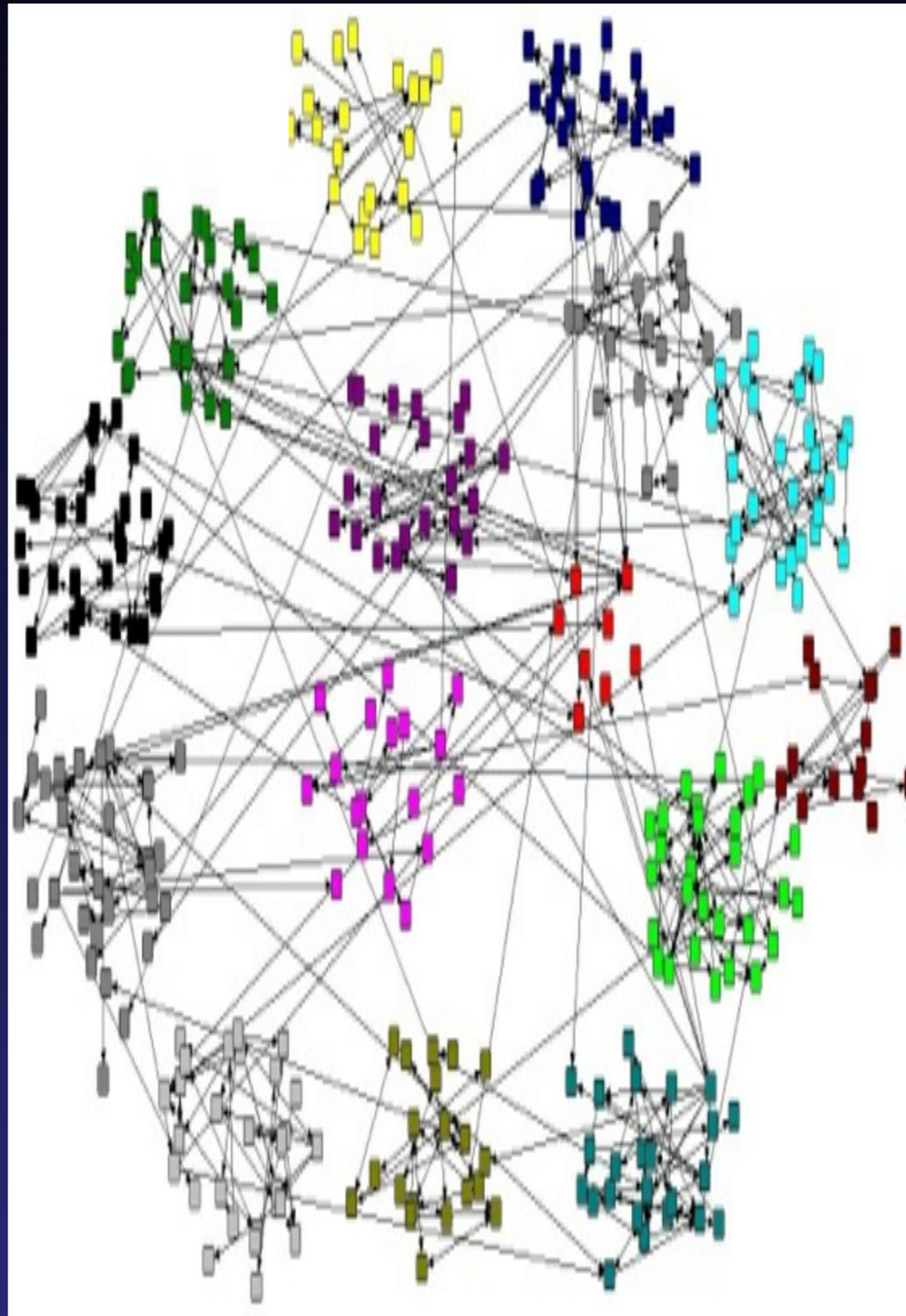
English Language Arts



Mathematics



School and School Systems: Science



Conclusion: Moving Forward

- Putting the practice of instructional improvement central in our research and development work on school improvement.
- Grappling with the methodological entailments of framing the practice of improvement as a social, distributed, and situated activity.
- Treating instruction as an explanatory factor in school improvement research and development work and considering the entailments of same.

More At:

<http://www.distributedleadership.org>

<http://distributedleadership.org/DLS/Presentations.html>