

Network nodes and subgroups are positioned relative to each other based on the strength of their ties (proximity equals stronger ties). Also, subgroups are assigned a radius score, indicating their centrality to the overall network. Radius scores and centrality are inversely proportional; the lower the radius score, the more central a subgroup is to the network. Measures of centrality are important because they indicate which actors (or group of actors) handle more of a given network’s traffic. In this study, the traffic is “collegial learning.” Thus, subgroups that are more central to the network serve as conduits for more “collegial learning” traffic than those subgroups that are less central to the network. In Table 4.3, notice that subgroups Kirby-A, Kirby-B, and Kirby-D have the three highest radius scores (5030, 5441, and 7176, respectively).

Table 4.3
Radii of Kirby High School Learning Network (Wave 1) Subgroups, 2014-15

Subgroup	A	B	C	D	E	F	G	H	I
Radius	5030	5441	62	7176	240	535	4795	2356	122

In Figure 4.1, Kirby-A and Kirby-B are represented by the red and blue network nodes and the white subgroup circles on the far left of the figure. Kirby-D is represented by the grey network nodes and the white subgroup circle on the far right of the figure. Conversely, Kirby-I (with a radius of 122) is at the center of the figure. Subgroups Kirby-A, Kirby-B, and Kirby-D all handle less network traffic than Kirby-I.

Reform self-efficacy. Teachers’ reform self-efficacy (RSE) was measured by asking participants to respond to the following on a zero (“no confidence”) to 10 (“complete confidence”) scale: “Indicate the degree of confidence you have in your implementation of the PLC initiative.” Table 4.4 shows the average RSE and item participation rates for participants in each of the schools.

Table 4.4
Average Reform Self-Efficacy (and Item Participation Rate) of Learning Network (Wave 1) Schools, 2014-15

Allred High School	5.5 (0.72)
Buscema High School	5.8 (0.78)
Kirby High School	4.9 (0.65)
Lim High School	6.0 (0.82)

RSE ranged from 4.9 to 6.0, and item participation rates ranged from 0.65 to 0.82. When broken down into subgroups (Table 4.5), RSE ranged from 2.0 to 7.6, and item participation rates ranged from 0.40 to 1.00.

Table 4.5
Average Reform Self-Efficacy (and Item Participation Rate) of Learning Network (Wave 1) Subgroups, 2014-15

Subgroup	Allred High School	Buscema High School	Kirby High School	Lim High School
A	4.2 (1.00)	6.5 (0.40)	5.7 (0.67)	6.0 (1.00)
B	-	6.0 (1.00)	5.0 (0.71)	6.4 (0.73)
C	5.0 (0.63)	7.4 (0.92)	5.4 (0.65)	5.7 (0.70)
D	2.0 (0.75)	4.7 (0.88)	5.6 (0.71)	7.6 (1.00)
E	6.0 (0.83)	5.3 (1.00)	6.4 (0.64)	3.0 (0.67)
F	6.3 (0.75)	5.0 (0.86)	4.9 (0.58)	6.9 (0.91)
G	5.8 (0.80)	6.6 (0.70)	3.5 (0.80)	6.1 (1.00)
H	6.4 (0.72)	5.6 (0.89)	3.5 (0.73)	4.2 (0.86)
I	4.8 (0.75)	-	4.8 (0.69)	7.2 (0.71)
J	4.3 (0.43)	-	-	4.7 (0.75)
K	6.8 (0.80)	-	-	6.2 (0.86)
L	5.8 (0.80)	-	-	5.0 (0.75)
M	-	-	-	5.9 (0.82)
N	-	-	-	6.4 (0.90)

Qualitative sampling. Learning network subgroup radius scores, RSE, and RSE item participation rates were used to construct a maximal variation subgroup typology (Table 4.6) from which a qualitative, purposive sample was selected.

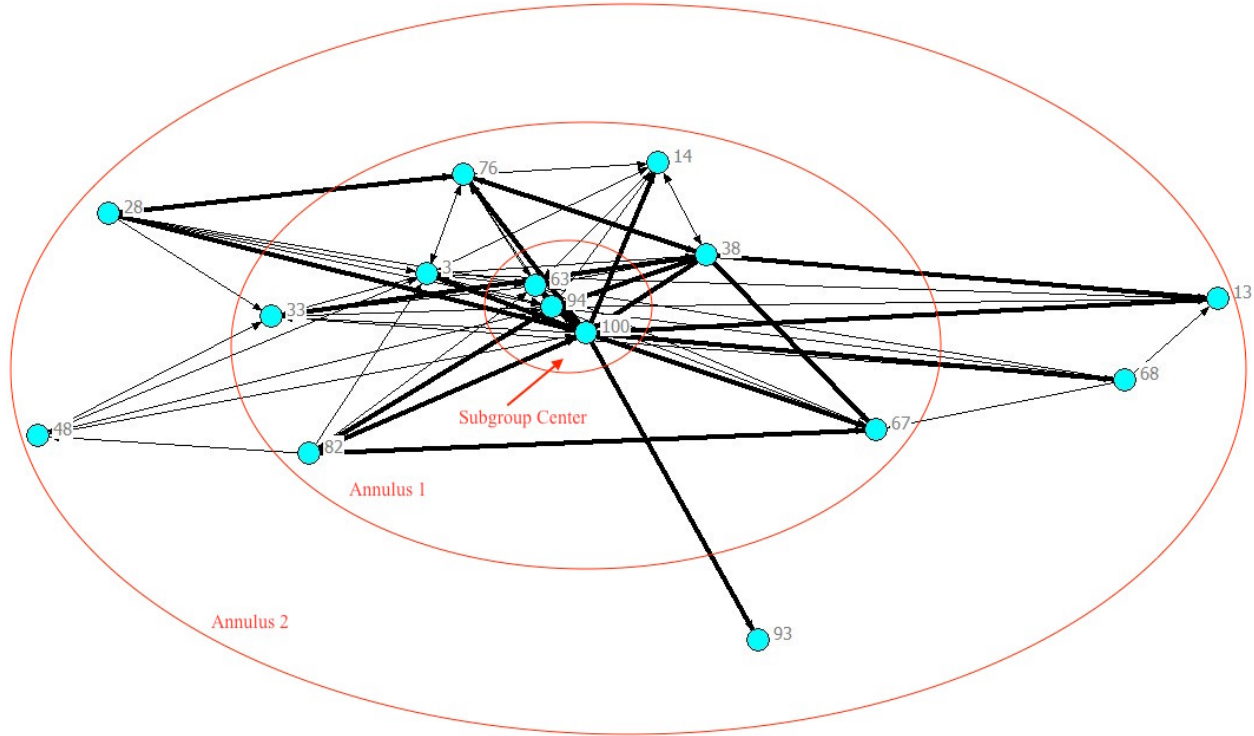
Table 4.6
Subgroups in Learning Network (Wave 1) Subgroup Typology

<p><u>Type #1 (Core-High)</u> Radius category: core RSE category: high RSE item participation rate ≥ 0.70</p> <p>Eight subgroups (Allred-H, Buscema-B, Buscema-C, Buscema-G, Lim-A, Lim-B, Lim-F, Lim-G)</p>	<p><u>Type #2 (Core-Low)</u> Radius category: core RSE category: low RSE item participation rate ≥ 0.70</p> <p>One subgroup (Kirby-H)</p>
<p><u>Type #3 (Periphery-High)</u> Radius category: periphery RSE category: high RSE item participation rate ≥ 0.70</p> <p>Seven subgroups (Allred-E, Allred-F, Allred-K, Lim-D, Lim-I, Lim-K, Lim-N)</p>	<p><u>Type #4 (Periphery-Low)</u> Radius category: periphery RSE category: low RSE item participation rate ≥ 0.70</p> <p>Two subgroups (Allred-D, Kirby-G)</p>

The purpose of the qualitative sample was to explore a unique subgroup’s experience of their own collegial learning in the context of reform. Subgroups with a radius score of 3600 or less were identified as “core” subgroups. Those with radius scores greater than 3600 were identified as “periphery” subgroups. “Core” and “periphery” categorizations were cross-checked with learning network sociograms to ensure accuracy. Subgroups were also categorized by RSE. Subgroups with an average RSE less than or equal to four were categorized as “low” and greater than or equal to six as “high.” Three subgroups with an item participation rate less than 0.70 were discarded from the typology (Buscema-A, Kirby-E, and Lim-E).

Kirby-H (Figure 4.2) was unique among the 42 subgroups in this study due to its position as a core subgroup and its low reform self-efficacy score. The teachers in this subgroup managed to occupy a core space in their school’s collegial learning network while simultaneously claiming a lack of confidence in their ability to implement the PLC reform. This resistance in the network core served as the focal point for qualitative data collection and analysis.

Figure 4.2
Sociogram of Kirby-H Subgroup, (Wave 1), 2014-15



Interview protocol. Seven of the 11 Kirby-H survey participants (Table 4.7) were interviewed using a semi-structured protocol. Survey responses from Kirby-H participants were used to individualize the interview protocol in two ways. First, participants were asked to provide more details regarding their “top three topics of discussion” when interacting with colleagues they nominated on the learning network item. Second, participants were asked to provide a rationale for why they nominated colleagues on the learning network item and describe learning incidents with these colleagues.

Table 4.7
Kirby-H Interviewees with Pseudonym, Sociogram ID, and Centrality Classification within Kirby-H

Pseudonym	Sociogram ID	Centrality classification within Kirby-H
Ms. Danvers	14	Annulus 1
Ms. Greenwood	38	Annulus 1
Mr. Morg	3	Annulus 1
Mr. Quill	63	Subgroup Center
Ms. Raye	100	Subgroup Center
Mr. Terrax	94	Subgroup Center
Mr. Udonta	68	Annulus 2

Qualitative Findings

The qualitative results addressed RQ2 (“How did teachers in a unique subgroup understand the PLC reform?”) in subsection “Reform” and RQ3 (“How did teachers in a unique subgroup understand their own learning in terms of formality and informality?”) in subsection “Learning.” In the “Reform” subsection, I used thematic instances, valences of thematic instances, and thematic co-occurrences to determine how members of Kirby-H understood the PLC reform initiative. In the “Learning” subsection, I used three learning instance categories (and their corresponding valences or preferences) to assess how members of Kirby-H understood their own collegial learning in terms of formality and informality.

Reform texts within interview transcripts.

Thematic coding. The seven Kirby-H subgroup interviews were coded thematically by the researcher for references to the PLC initiative and social objects specific to the reform (e.g. scales). As a result, 17 themes emerged from 103 thematic instances (Table 4.8).

Table 4.8
Themes and Number of Thematic Instances from PLC Blocks of Text

professional interactions/collaboration	11	reform dujour	6	Support	3
Time	10	Efficacy	6	kitchen sink	3
programmatic organization/structure	10	content possible but not actual	6	internal communication	3
Compliance	10	external communication	5	Evaluations	3
description of PLCs/PLC reform	8	Documentation	5	validity of scales	2
Content	8	leader turnover	4	TOTAL	103

A thematic instance consisted of a passage of text within the PLC-coded blocks of text that initially prompted a theme to emerge, fit within my working understanding of a theme, or strengthened my working understanding of a theme. These instances included the actual thematic referent, but many of them also included the context necessary to make sense of the referent. For example, Ms. Danvers (annulus 1) said:

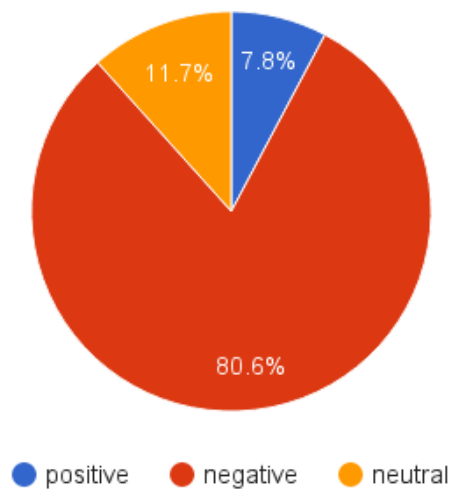
The only thing I’m getting out of the PLC is the work that I’m doing with Ms. Greenwood because we split dual enrollment this year, and so, she has some of the lower level, the ENC 1101, 1102, and I have some. So, she has two, and I have two. So, it actually worked out pretty well ‘cause I had more information on drama, and she had more information on poetry, and so, we kinda traded, and we did a lot of work together

with that. That’s the biggest thing that I got, is that kinda collaboration out of the PLC, which isn’t strictly what the PLC is supposed to do. (D-515)

This passage of PLC-coded text was tagged as a “professional interactions/collaboration” instance, but the first sentence is not directly related to this theme; it is instead providing the necessary context (“split[ting] dual enrollment this year”) for the core of the theme located at the end of the instance (“we kinda traded, and we did a lot of work together with that”).

Valence coding. As shown in Figure 4.3, each instance of a theme was also coded, as described in Chapter 3, for its valence (or affect): positive, neutral, or negative.

Figure 4.3
Valence of Thematic Instances from PLC Texts



The vast majority of valences were negative (80.6%), followed by neutral (11.6%) and positive (7.8%).

Negative valences were ascribed to thematic instances that exhibited a hostile or critical tone toward the PLCs or the PLC reform. For example, Ms. Raye (subgroup center) exhibited a hostile tone toward the PLC reform when she referred to the use of PLC time on “these things that we have to do that nobody really understands” as “the pretend game” (R-764). Mr. Terrax (subgroup center) criticized the PLCs by saying, “If PLCs were voluntary, no one would go ‘cause they feel that their time could be better spent doing something else” (T-27251).

Neutral instances were often statements of fact but could nevertheless have been couched within a larger text that was not neutral. Ms. Raye's description of her note taking qualifies as a neutral instance of "documentation": "I've taken attendance, I've written down topics of discussion, I've written our future topics" (R-44829). Even so, the larger text suggests a negative tone regarding both "compliance" and "external communication":

I'm a really good, I like to kinda CYA [cover your ass]. So, every time we met, I always took notes because I knew that even though they said we didn't have to take notes at the beginning of the year, they're gonna ask for it. So, I just have done it at every meeting anyways. I've taken attendance, I've written down topics of discussion, I've written our future topics. Just because I kinda know that they say one thing but it's gonna be an empty promise and they're gonna need it anyways. (R-44829)

Neutral valences were also ascribed to thematic instances that exhibited a tone that was difficult to classify as either positive or negative. For instance, in a description of the PLCs, Mr. Terrax (subgroup center) said, "So, I think that, ya know, PL-, it's fine, ya know" (T-13919).

Positive valences were ascribed to eight thematic instances related to PLCs or the PLC reform. For example, Mr. Quill's description of his behaviors qualified as positive: "I like the fact that I have the chance to interact with my colleagues, on a professional level" (Q-8350). Ms. Greenwood's description of her PLC as "really productive" (G-1849) similarly qualified as positive.

Themes and their valences. The four most prominent themes within PLC-coded passages of text were "professional interactions/collaboration" (11 instances), "time" (10 instances), "compliance" (10 instances), and "programmatic organization/structure" (10 instances). Of the 11 "professional interactions/collaboration" instances, seven were presented as two contrasting interactions. Mr. Udonta (annulus 2) said:

If, ya know, teacher talking to teacher, just shooting the breeze about their classes, I get a lot more from that than, than, "Well, let's sit down and conduct this meeting. And where are you at on your, your assessments?" (U-4944)

In this instance of "professional interactions/collaboration," Mr. Udonta contrasts an interaction consisting of "teacher talking to teacher, just shooting the breeze" that he "get[s] a lot more from than" a formal PLC meeting. Also, five of the eight total positive instances were tagged as "professional interactions/collaboration," along with two of the 12 total neutral instances.

All 30 of the “time,” “compliance,” and “programmatic organization/structure” instances were negatively valenced. Nine of the 10 “time” instances described a way that the PLC initiative took time away from other aspects of teaching. For example:

And since having taken it on, I’ve been taken out of the classroom for two days (which really impacted my first semester AP classes) for [PLC facilitator] trainings that I learned absolutely nothing at, complete and utter wastes, waste of my time. (R-764)

According to Ms. Raye (subgroup center), PLC facilitator trainings not only decreased the amount of time she had with her students, the trainings were also “complete and utter wastes, waste of my time.” In a second example below, the development of scales (a social object directly related to the PLC reform in SPSD) is described as taking up half of Mr. Morg’s time during weekend lesson planning:

I just go through and I kind of align this [scale], but it takes forever...Other people in my department are, ya know, they’re totally against it, and I get why because it takes too much time. Like, I’m a single dude, right, and I sit here and I work, I don’t know, I work until, like, six-thirty, seven every night. And all day Sunday, it’s school-related as well, and I would say 50 percent of that time has been making these, like, goal-related scale things and, ya know, enhancing my lessons with that. Like, I get the opposition. (M-2773)

Mr. Morg (annulus 1) noted that the time needed to develop scales generated “opposition” from other members of his department.

The 10 negatively valenced instances of “compliance” included descriptions of broken promises, piggyback programs, and interference with practices that teachers understood to be closer to the core of high-quality teaching and collegial learning. Ms. Raye (subgroup center) hoped that the new school year would be different than the previous school year in terms of compliance.

And I find that last year, last year’s PLC was a lot of just jumping through hoops. And we were told that’s not what it was going to be, that we could structure it. And then we got towards the end of the year, and it was like, “No, you have to have this product, and these notes, and this, and this, and this.” (R-764)

Later in the interview, Ms. Raye (subgroup center) noted that the continuation of the compliance structures were part of an effort to piggyback the accrual of continuing education hours (or points) into the PLC meetings.

‘Cause the same thing happened last year. “You don’t have to take notes. You don’t have to do a product.” May comes. “Where are your, where are your documentations of your meetings for the whole year and where are your products?” And if you didn’t have it, you didn’t get your points. (R-44829)

Teachers also said that the compliance structures simply interfered with what they understood to be high-quality teaching and collegial learning. Mr. Terrax (subgroup center) said:

...the time I could have spent figuring out that kid and how can I teach it better to them and going online and looking at stuff, I feel like the district would want me sitting in a PLT and discussing it, “What are you doing?”, and that kind of stuff. (T-16734)

Similarly, Ms. Raye (subgroup center) noted, “Like, I don’t like the fact that we’re being forced to utilize this strategy that might not match the needs of your students or how you structure your class, ya know what I mean?” (R-17112).

“Programmatic organization/structure” instances primarily focused on the differences between teachers within the same PLC. For example, Ms. Raye (subgroup center) echoed the same sentiment three times in one thematic instance: “None of us teach any of the same classes...None of us teach the same thing...None of us teach any of the same stuff.” (R-764).

Mr. Morg (annulus 1) said:

Ya know, maybe sometimes, definitely in our, ya know, our PLC gatherings, we, I was in, like, the oddball group, the, ya know, the group, the loners that don’t have any, ya know, connections, as far as curriculum goes, we’re just sharing random ideas. (M-13022)

Ms. Danvers (annulus 1) noted the divisions within her PLC due to the lack of common courses among the teachers in her PLC:

I mean, there is nothing common except, ya know, the Common Core standard, but any kind of implementation of it is gonna be so much different. So, I mean, we could work on scales together, but that would be it. I mean, we couldn’t do anything other, kind of common planning, so we split out so it’s like two, two, and two. So, occasionally they come back, but it just, it seems so splintered. (D-515)

Ms. Greenwood (annulus 1) described, in detail, the challenges associated with her “Upper Level English/Language Arts” PLC:

...the group that I’m in is the individuals who teach CCR part of the day, that senior college and career readiness class, and it’s junior English, junior English honors, and then it’s dual enrollment, it’s AP Lit, and it’s AP Lang...it’s really difficult for us to meet...it makes it difficult to really plan commonly even though we have common planning and that’s what were supposed to be working for with our scales and with, ya know, determining lessons and meeting these standards and unpacking that standard, so whatever...it’s a fragmented group. (G-1849)

The fragmentation Ms. Greenwood (annulus 1) and Ms. Danvers (annulus 1) described was a result of the composition of their PLC, and as a result of this fragmentation, the work of the PLC was hindered.

There was also a comparative element to the “programmatic organization/structure” instances. Mr. Morg (annulus 1) suggested that other content areas and other grade levels might be better suited to the PLC reform:

I think more, like, social studies is hard because it’s so broad with everything that’s being covered, but, like, if you were to look at, like, a mathematical PLC, I’m sure they, ya know, like, all of the Algebra people are grouped together, and then higher math grouped together as well. And it’s all pretty consistent, similar as far as what you can do and stuff that’s useable in the future, as well, ya know. I think it was more designed for, like, elementary teachers, which kinda makes sense, ya know, just talking to a few of them, all of them, like, working tougher in unison and actually being really, really productive, that shows that it’s working to some degree. (M-13952)

Ms. Raye (subgroup center) echoed these sentiments:

I think if you’re, like, a math teacher or a science teacher and you have very clear-cut standards and you have, I mean, math is math. And you are working specifically within a content with other people that teach your content with extremely clear guidelines, knowing exactly what they’re gonna be tested on and so on, it works better. (R-41091)

For these teachers, PLCs were not a good fit for social studies teachers. Also, math and elementary teachers were specifically singled out as being more likely to find benefit in the PLC reform.

“Description of PLCs/PLC reform” was not one of the top four thematic instances, but it was nevertheless tagged eight times and included all three valences. Mr. Terrax’s comment—“So, I think that, ya know, PL-, its fine, ya know” (T-13919)—was the lone neutral thematic instance of “description of PLCs/PLC reform.” In terms of positive valences, Ms. Raye (subgroup center) said, “And I have been to some fantastic trainings” (R-37366), and Ms. Greenwood (annulus 1) said, “And [the PLC] is, at times, really productive” (G-1849). Negative valences included an audible groan by Mr. Udonta (annulus 2) when the PLC reform was mentioned (U-4944), a reference by Ms. Raye (subgroup center) to the PLC reform as “the exact same thing repackaged” (R-37366), Mr. Terrax’s description of the PLCs as “very data-driven” (T-16734), and Ms. Greenwood’s assessment of the PLCs as “a complete waste of time” (G-1849). The descriptions were often hedged or an attempt was made to balance one comment with another. Mr. Terrax (subgroup center) hedged his description of the PLCs as “data-driven” by adding, “that’s fine, but...I don’t know” (T-16734). Ms. Raye (subgroup center) tried to balance out her assessment of the PLC reform as “the exact same thing repackaged” by saying:

And it just doesn’t...I don’t know. I’m trying not to be so jaded. I’m really not always a totally negative person. It’s just, it’s, it’s, it’s, it’s, it’s been tough, this has been a tough year to come in every day and do this and do this well when this is just everywhere, ya know. (R-37366)

Mr. Udonta (annulus 2) followed up his audible groan in response to a query about the PLCs with, “That, that, I think they’re helpful...to a certain extent, I, ya know. Ya know, I don’t wanna be totally negative on them” (U-4944). Ms. Greenwood’s comment was most notable for its concise, counterpoised description of the PLCs: “And [the PLC] is, at times, really productive, and at times, a complete waste of time” (G-1849).

Thematic co-occurrences. Thematic instances were cross-referenced with one another through a thematic co-occurrence matrix (Figure 4.4).

Figure 4.4
 Thematic Co-occurrence from PLC-coded Blocks of Text

	Professional interactions/collaboration	Time	Programmatic organization/structure	Compliance	Description	Content	“Reform dujour”	Efficacy	Content possible but not actual	External communication	Documentation	Leader turnover	Support	“Kitchen sink”	Internal communication	Evaluations	Validity of scales
Professional interactions/collaboration	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Time	2	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Programmatic organization/structure	4	3	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Compliance	4	7	2	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Description	2	1	3	2	X	X	X	X	X	X	X	X	X	X	X	X	X
Content	4	3	5	4	1	X	X	X	X	X	X	X	X	X	X	X	X
“Reform dujour”	1	4	2	3	1	1	X	X	X	X	X	X	X	X	X	X	X
Efficacy	2	4	1	5	2	2	2	X	X	X	X	X	X	X	X	X	X
Content possible but not actual	4	2	3	3	2	2	2	0	X	X	X	X	X	X	X	X	X
External communication	2	3	3	4	0	3	1	1	2	X	X	X	X	X	X	X	X
Documentation	3	2	3	4	1	4	1	1	2	4	X	X	X	X	X	X	X
Leader turnover	2	3	4	2	0	4	1	1	1	2	2	X	X	X	X	X	X
Support	1	0	2	0	1	0	0	0	1	1	1	0	X	X	X	X	X
“Kitchen sink”	2	3	2	1	0	2	0	1	1	0	0	2	0	X	X	X	X
Internal communication	2	1	2	3	0	3	1	0	2	3	3	2	0	0	X	X	X
Evaluations	1	0	2	0	1	1	1	1	2	0	0	1	1	1	0	X	X
Validity of scales	0	2	0	2	0	0	2	2	0	0	0	0	0	0	0	0	X

“Time” and “compliance” co-occurred more than any other thematic combination (7), followed by “content” and “programmatic organization/structure” (5) and “compliance” and “efficacy” (5).

The co-occurrence of “time” and “compliance” within PLC-coded blocks of text occurred seven times, and all thematic instances of “time” and “compliance” within these seven co-occurrences were negatively valenced (Q-15847, T-16734, T-27251, R-764, R-17112, R-44829, M-2773). 70% of the 10 instances of “time” co-occurred with “compliance,” and 70% the 10 instances of “compliance” co-occurred with “time.” Mr. Terrax (subgroup center) said:

And that’s, that’s, that’s where I see the PLTs going, its very data-driven and that’s fine, but...I don’t know. It doesn’t, I feel like it really doesn’t apply and help me because the

time I could have spent figuring out that kid and how can I teach it better to them and going online and looking at stuff, I feel like the district would want me sitting in a PLT and discussing it, “What are you doing?”, and that kind of stuff. And I feel like I could find a quicker answer and start adapting my lessons way quicker on my own than I can sitting in a PLT, ya know what I mean. (T-16734)

“Time” in this PLC-coded block of text is “the time I could have spent figuring out that kid and how can I teach it better to them and going online and looking at stuff.” “Compliance” in this PLC-coded block of text is, “the district would want me sitting in a PLT and discussing it, ‘What are you doing?’, and that kind of stuff.” Mr. Terrax (subgroup center) explained how “time” and “compliance” are related to one another when he says, “And I feel like I could find a quicker answer and start adapting my lessons way quicker on my own than I can sitting in a PLT, ya know what I mean.” In other words, the need to comply with the strictures of the PLC reform cause a decrease in the amount of time teachers could devote to other practice-related tasks.

The co-occurrence of “content” and “programmatic organization/structure” within PLC-coded blocks of text occurred five times. Four of the five thematic instances of “content” within these five co-occurrences were neutral (R-764, R-44829, M-13022, D-16793); one was negatively valenced (D-515). All thematic instances of “programmatic organization/structure” within these five co-occurrences were negatively valenced. 62.5% of the eight instances of “content” co-occurred with “programmatic organization/structure,” and 50% of the 10 instances of “programmatic organization/structure” co-occurred with “content.” One of Ms. Raye’s comments provide an example of a neutral “content” and negative “programmatic organization/structure” co-occurrence:

The problem with ours, with social studies, is we’re always kinda the red-headed step-child of education to begin with. None of us teach any of the same classes. There are only two teachers in my entire department that teach the same thing all day, and that’s one for U.S. History and one for World History. So, the way it’s structured, the group that I’m in charge of is upper-level social studies. None of us teach the same thing. We don’t have any of the same students. I teach Government and U.S. History. The other ones teach Economics. One teaches Psychology all day (Mr. Morg teaches Psychology all day). None of us teach any of the same stuff. So, what we end up doing is just, kinda, trying to share some strategies, maybe, that go across the board. (R-764)

Ms. Raye (subgroup center) attributes the content of her PLC (“some strategies, maybe, that go across the board”) to the programmatic organization/structure of the PLC reform (“None of us teach any of the same stuff”). Because the teachers in her PLC did not teach the same courses, the content of the PLCs was not specific. Instead, the PLC’s members shared generalized strategies with one another. Mr. Morg (annulus 1) reinforced Ms. Raye’s claim about their common PLC:

Ya know, maybe sometimes, definitely in our...PLC gatherings, we, I was in, like, the oddball group...the loners that don’t have any connections, as far as curriculum goes, we’re just sharing random ideas, just trying to apply, we did something in our PLC, applying, or what is it, political cartoon analysis, and then I tried to break it down into psychology and, like, show...a little cartoon newspaper clipping from, like, the Peanuts, or something, something having to do with a psychological property, and having the kids, maybe, learn what perspective this could be based on, what’s happening in this comic strip or cartoon. (M-13022)

For Mr. Morg (annulus 1), the content of the PLC (“political cartoon analysis”) resulted from the programmatic organization/structure of the PLC reform (“the oddball group, the, ya know, the group, the loners that don’t have any, ya know, connections, as far as curriculum goes”). Thus, even in the best light, the programmatic organization/structure of the PLC reform fostered a multidisciplinary approach to PLC content, one that was often unstructured and lacks coherence.

The co-occurrence of “compliance” and “efficacy” within PLC-coded blocks of text occurred five times. All thematic instances of “compliance” within these five co-occurrences were negatively valenced (M-2773, U-4944, T-16734, R-17112, T-27251). Four of the five thematic instances of “efficacy” within these five co-occurrences were negative (M-2773, T-16734, R-17112, T-27251); one was neutral (U-4944). 70% of the 10 instances of “compliance” co-occurred with “efficacy,” and 83.3% of the six instances of “efficacy” co-occurred with “compliance.” Mr. Morg’s comment provided an example of a negative “compliance” and negative “efficacy” co-occurrence:

And I get it, I get why it’s necessary to have kids think, ya know, about before or, ya know, before and after and rate their learning. But as far as adding something to the educational experience, I don’t think they think that it adds anything...So, I get why we need to do it, I just don’t know if it’s really effective right now. (M-2773)

In this example, Mr. Morg (annulus 1) was discussing the use of scales in the classroom as a means of student metacognition through self-assessment. Scales were important social objects within the PLC reform, but as noted here, their efficacy was called into question while simultaneously noting their mandatory nature. The congruence of both a mandatory reform practice and its perceived lack of impact highlights the negative valence of both.

Summary. Kirby-H's understanding of the PLC reform was intensely negative. They perceived the reform to be a misuse of their time, often geared toward generating trivial compliance. Their reaction to the content of the PLC reform often lacked this virulent negativity, but this potential positive in the reform was mitigated by a lack of programmatic organization and structure. For Kirby-H, the professional interactions and collaboration opportunities were the best part of the reform, but this bright spot was crowded out by other, more negatively valenced, parts of the reform.

Learning incident texts within interview transcripts. The seven Kirby-H subgroup interviews were coded conceptually by the researcher for collegial learning incidents. Cooley et al.'s (2003) four dimensions of in/formality in learning (setting, process, content, purpose) served as the guiding framework during this phase of coding, and a fifth dimension, reflection, was added to enhance the robustness of Colley et al.'s construct. Process was present in 81 (92.0%) of the 88 learning incidents, followed by content (71, 80.7%) and setting (60, 68.2%). Reflection (38, 43.2%) and purpose (24, 27.3%) were the dimensions least present in the 88 learning incidents.

Operationalization. A learning instance consisted of a passage of text within the transcribed interviews that exhibited one of the five dimensions of learning or a combination thereof. Some learning incidents included only one of the five dimensions but nevertheless provided a description of collegial learning. When asked, "What would be the average interaction that I would see between you and another teacher where you would learn something?", Mr. Quill (subgroup center) said, "Well, unfortunately, most of the conversation gets done off campus...Happy hour meeting, dinner, ya know, somebody has a little get-together at a house, at their house or whatever" (Q-15593). Setting was the only dimension referenced by Mr. Quill in this learning incident ("off campus...Happy hour meeting, dinner, ya know, somebody has a little get-together at a house, at their house or whatever"), and even though content, process, purpose, or reflection was not mentioned, it nevertheless qualified as a learning

incident. Other learning incidents included all five dimensions of in/formality in learning. For example, Mr. Morg (annulus 1) described a five-dimension learning incident that occurred with other *Advanced Placement* (AP) Psychology teachers in the district:

I met up with him two weeks ago at Starbucks, and then actually the AP Psych teacher at Jusko [another high school in the district] and one of the AP Psych teachers-oh I'm sorry, one of the AP Psych teachers from Jusko and one from Buscema. And we just had this, ya know, idea explosion. We updated, like, our disorders and how we needed to teach those because for the AP test, they've adopted the new DSM, the Diagnostic Statistical Manual of Disorders. And that's gonna appear on there, so we're just thinking of ideas to teach those effectively and the change in terminology. But I get so much more out of, like, those guys because they're specific to my content. (M-9702)

The setting was "Starbucks," and the purpose was "for the AP test." The process was "We updated, like, our disorders and how we needed to teach those because for the AP test, they've adopted the new DSM, the Diagnostic Statistical Manual of Disorders." The content was "ideas to teach those effectively and the change in terminology." Reflection was "And we just had this, ya know, idea explosion," and "I get so much more out of, like, those guys because they're specific to my content."

Holistic categorization. Using the five dimensions, these 88 learning incidents were then holistically categorized as either "description of formal learning" (21), "description of informal learning" (46), "comparison/contrast of formal and informal learning" (19) or "other" (2).

Two related learning incidents (D-13896, R-29189) highlight the benefits of holistic categorization and serve as an exemplar of "description of formal learning" (23.9%). Ms. Danvers (annulus 1) and Ms. Raye (subgroup center) both discussed "lunch-n-learns" (setting) as a learning incident. Ms. Raye explicitly described the lunch-n-learns as "pretty informal." Ms. Danvers said that these were "little short, like, ya know, 20, 25 minutes, go learn a little something whatever." In terms of process, Ms. Raye said lunch-n-learns were a place "where you got trainings from other teachers on things that we're really good at." Similarly, Ms. Danvers noted that lunch-n-learns were places to learn "something new or different to take a look at every now and again. Say, 'OK, yeah, I'll use that,' or 'No, that's not gonna work for me.'" Ms. Raye mentioned a wide array of content available during lunch-n-learns ("previewing, on pack-, unpacking questions," "best practice," "Socratic seminar," and "critical

thinking”), and Ms. Danvers said the content involved “little things...to tweak or look at in the classroom.” Ms. Raye reflected on this learning incident by noting that,

it was a little bit more comfortable because you’re not listening to an administrator or somebody from district. It was a colleague, and it was a colleague who does something well and was being recognized for doing something well and was approached, “You do this well. Can you show this to the rest of the school?” (R-29189)

Despite Ms. Raye saying the learning incident was “pretty informal,” the setting was a formal structure with informal elements. Learning that results as an unintended byproduct of a setting is one of the markers of informality, but the learning described above is not incidental to the setting. As a result, the incident as a whole was categorized as “description of formal learning.” The use of an aggregated measure of all five dimensions along a formal/informal scale might have otherwise led to this learning incident being categorized as “description of informal learning” due to Ms. Raye’s explicit description of the setting and process as “pretty informal.”

Descriptions of informal learning were well over half (52.3%) of the coded learning incidents and included a wide range of dimensions of in/formality in learning. Teachers reported settings that were “after school” (T-10812, R-28593, G-4372, G-7731) and within PLC group meetings (D-4697, Q-9715). Processes often involved self-directed learning (D-13213, T-330, T-11295, T-17705), pilfering instructional strategies and lesson plans (M-10646,), trading or sharing instructional strategies and lesson plans (D-4697, D-9531, T-23356, R-9303, R-28593), or asking questions of colleagues (Q-7653, Q-17774, T-11893). Content was similarly wide-ranging and included curriculum (M-12727), lesson plans (M-10646), activities (D-9739, T-330), strategies (G-7731, Q-5117, T-23356), observations (Q-17774), and classroom management (U-4249). Purposes and reflections appeared less than the other three dimensions, but when they did appear in the text, they helped clarify the categorization of the learning incident as a description of informal learning or the valence of the learning incident (described below). Purposes included “the chance for people to vent” (Q-16489), being “a sounding board” (G-8432), claiming that an innovation common among younger teachers is “something I’m [not] familiar with or, not necessarily comfortable with” (Q-7653), “spending more time looking into how to teach better” (T-330), “hanging out Friday after school” (T-10812), and “tak[ing] what [another teacher] says into consideration” (T-11893). Reflections included descriptions of types of learning (“unfortunate,” Q-16489; “idea explosion,” M-9702), frequencies of types of learning (“That’s

usually the way it happens,” M-12727; “I can get a lot of advice that way,” T-11295), descriptions of other teachers’ work (“so thought out and thoughtful too and engaging,” M-10646; “she had worked with these infographics, which were incredible...that is really cool,” D-10040), comments on a working relationship with a colleague (“that’s been the saving grace, I think, of my life after school,” G-4372), and comments on teacher learning reform (“none of them are going to save education,” Q-5117).

Comparisons and contrasts between formal and informal learning constituted 21.6% of the learning incidents. Mr. Udonta’s discussion of learning within a PLC group meeting provided a helpful example of the “comparison/contrast of formal and informal learning” category.

Colin and I talk Economics. If...we go into it and we [pounds fist], ya know, “Hey Colin, let’s, where you at?” “Where am I at? What have you been teaching ‘em?” “How you giving ‘em material?”...that’s one thing, but PLTs, I mean, they’re focus isn’t on...the Marzanno, how Marzanno’s affecting this, and what paperwork do we have to get in, when does it have to be in, that’s a pain...teacher talking to teacher, just shooting the breeze about their classes, I get a lot more from that than, than, “Well, let’s sit down and conduct this meeting. And where are you at on your, your assessments?” (U-5752)

In this learning incident, the setting is “PLTs.” One set of processes are “Colin and I talk Economics,” and “teacher talking to teacher, just shooting the breeze about their classes.” This is contrasted with a different process: “Well, let’s sit down and conduct this meeting. And where are you at on your, your assessments?” A contrast is also highlighted in terms of content. The overarching content is “Economics,” one set of content is “Hey Colin, let’s, where you at? ya know. ‘Where am I at? What have you been teaching ‘em?’ ya know. ‘How you giving ‘em material?’” This stands in contrast to other content: “Marzanno, how Marzanno’s affecting this, and what paperwork do we have to get in, when does it have to be in.”

Learning incidents categorized as “other” (2.3%) had one or more dimensions of in/formality in learning present in the text, but there was not enough evidence to render a holistic judgement about its level of formality or informality. In one example, Mr. Morg (annulus 1) was given a hypothetical scenario in which, “‘You have to learn in one particular way. You can learn from whoever you want, but there’s only one way in which you can learn.’ What’s that one way gonna be?” In his response, he described two types of processes and provided a brief reflection:

“Probably one-on-one, ya know, talking to them and, like, a hands-on kinda thing. ‘Cause if, I could definitely read it and get it, but if I see it and practice, ya know, it’s usually sinks in a little bit better” (M-11947). While this might initially appear to be a comparison/contrast between formal and informal learning, the process counter-example ("I could definitely read it and get it") was not necessarily formal, and the other three processes ("one-on-one, ya know, talking to them; a hands-on kinda thing; see it and practice") were not necessarily informal. “One-on-one” is not formal unless the process involves a coach. “Hands-on” and “see it and practice” could be either formal or informal, depending on other dimensions. In short, the difference between these two kinds of processes is social/active versus individual/passive, not formal versus informal.

Valences of descriptions. Learning incidents in both descriptive categories were also assigned a valence: positive, neutral, or negative. Valence was determined through textual and contextual markers of efficacy and emotional affect. Each valence category is explicated below with two examples. Overall, descriptions of formal learning were predominantly negative, and descriptions of informal learning were overwhelmingly positive (Table 4.9).

Table 4.9
Descriptions of Learning Incidents, by Valence

	Description of Formal Learning Incidents (N = 21)	Description of Informal Learning Incidents (N = 46)
Positive	4 (19.0%)	42 (91.3%)
Negative	14 (66.7%)	2 (4.3%)
Neutral	3 (14.3%)	2 (4.3%)

Positively valenced learning incidents comprised four (19.0%) of the 21 descriptions of formal learning and 42 (91.3%) of the 46 descriptions of informal learning (Table 4.9). Mr. Morg’s description of a learning incident that occurred with other *Advanced Placement* (AP) Psychology teachers in the district (M-9702, categorized as “description of informal learning,” see above for text) was positively valenced due to his reflection on the learning incident: “And we just had this, ya know, idea explosion,” and “I get so much more out of, like, those guys because they’re specific to my content.” Similarly, Ms. Danvers (annulus 1) described a lunch-n-learn, which was categorized as “description of formal learning”:

I do like the lunch-n-learns that they do. The little short, like, ya know, 20, 25 minutes, go learn a little something whatever. They haven’t done them in a couple of years, but

I've found that, it, just having little things like that to tweak or look at in the classroom. And I can't even remember what they did in the past. But just, just something new or different to take a look at every now and again. Say, "OK, yeah, I'll use that," or "No, that's not gonna work for me." (D-13896)

This learning incident was positively valenced due to its positive textual marker ("I do like the lunch-n-learns") and its positive emotional affect through an expression of professional autonomy ("Say, 'OK, yeah, I'll use that,' or 'No, that's not gonna work for me'").

Neutral valenced learning incidents comprised three (14.3%) of the 21 descriptions of formal learning and two (4.3%) of the 46 descriptions of informal learning (Table 4.9). In R-44829 (below), Ms. Raye (subgroup center) described her PLC group's work:

For the whole first semester, I met with myself, Todd, Brian Mowery, and Josh. And that's our group. Not one of us teaches the single same subject, so there's no continuity there. And we kinda got started on looking at, like, a skill. So, we decided before we went on Christmas break that we would focus on primary sources and we would come up with some, something that, some type of graphic organizer or something that could be used in any primary source across the board. (R-44829)

This description of formal learning did not indicate a positive or negative valence with regard to either efficacy or emotional affect. The context of the learning incident indicated that this was a positive learning incident in an otherwise negative experience of formal learning, but the setting (which, in this case, would be the circumstances) keep this learning incident from a positive valence. Due to a lack of strong positive or strong negative markers and weak markers that effectively cancelled each other out, this description of formal learning was valenced neutral. In a description of self-directed informal learning by Ms. Danvers (annulus 1), the valence of the learning incident is neither positive nor negative:

I'm an academic learner, so I go look up information. I do a lot of research and look up information on my own...So, and then trying things out. I mean, I just try things out and see how they work, and just shift and get rid of and change or do whatever. (D-13213)

There is no strong evidence for emotional affect in this text, but a case could be made for efficacy ("I just try things out and see how they work, and just shift and get rid of and change or do whatever"). Even so, there is no clear positive or negative marker of efficacy, nothing to indicate that "try[ing] things out" either worked or did not work.

Negatively valenced learning incidents comprised 14 (66.7%) of the 21 descriptions of formal learning and two (4.3%) of the 46 descriptions of informal learning (Table 4.9). In this “description of formal learning,” Ms. Greenwood (annulus 1) explained how a faculty meeting turned into a learning incident:

GREENWOOD: And I know there are some brilliant things going on over in, in World Languages with that scale and how it’s actually used and implemented that I would love to see, but I don’t get to meet with them.

INTERVIEWER: How do you know that?

GREENWOOD: Because it was in a faculty meeting, and I know a couple of the teachers over there who I respect a lot for what they do.

INTERVIEWER: So, someone got up at a faculty meeting and talked about how they used it in World Languages?

GREENWOOD: Yeah, yeah. Mr. Tivan [assistant principal] actually brought it up. And he goes, “Oh, you should see the scale work that social studies is do-, or that World Languages is doing.” I’m like, “Share it with the rest of us.” That to me would be meaningful, if the PL-, PLCs could actually, I think, share strategies from what they do, like, “This is what we’re really good at. We’ve really focused on scales. This is how we do it.” (G-15213)

The mention of high quality instruction by Mr. Tivan during the faculty meeting was lamented by Ms. Greenwood (annulus 1) because of a lack of time to see other teachers’ instruction in other departments and the use of PLC time not devoted to “sharing strategies” like the ones mentioned by Mr. Tivan. These laments highlight the negative valence of this learning incident both in terms of efficacy and emotional affect. In Q-15593 (categorized as “description of informal learning,” see above for text), Mr. Quill’s use of “unfortunately” in reference to learning that “gets done off campus” at a “Happy hour meeting, dinner, ya know, somebody has a little get-together at a house, at their house or whatever” is negatively valenced due to its contextual marker of efficacy.

Preferences of comparison/contrast of formal and informal learning. Learning incidents that included a comparison or contrast between formal and informal learning were assigned a preference category (formal, informal, neither). Preference was determined if the interviewee stated a preference for one kind of learning over another, used words or phrases that

implied a preference for one kind of learning over another, stated that one type of learning occurred more frequently than another, or implied that one type of learning occurred more frequently than another. Overall, comparisons and contrasts of formal and informal learning exhibited a strong preference for informal learning, and there were no comparison/contrast learning incidents that exhibited a preference for formal learning (Table 4.10).

Table 4.10
Comparison/Contrast of Formal and Informal Learning Incidents, by Preference

	Comparison/Contrast of Formal and Informal Learning Incidents (N = 19)
Formal	0 (0%)
Informal	16 (84.2%)
Neither	3 (15.8%)

While there were no comparison/contrast learning incidents that exhibited a preference for formal learning, informal preferences comprised 16 (84.2%) of the 19 comparison/contrast learning incidents. Three (15.8%) of the 19 comparison/contrast learning incidents did not exhibit a preference for either formal or informal learning. One of Mr. Udonta’s learning incidents (U-5334) posed an interesting challenge to this coding scheme and, in the end, served to strengthen it by incorporating a frequency element to the concept of “preference” as described above. He was asked, “So, if I was to observe you or shadow you for a day, two, three days, what would those interactions [with colleagues you nominated on the social network item] look like? Like, where would they be, what would you be talking about, ya know, the circumstances of the interactions with these people in terms of learning to do your job or learning to do your job better.” In response, he stated three different settings in quick succession: “PL-, our PLTs, our meetings, after school (maybe). Not so much lunch ‘cause I usually eat here. Typically, after school, collaboration.” One was informal and appeared to be the most frequent (“Typically, after school, collaboration”), a second was formal and was hedged (“PLTs, our meetings, after school (maybe)”), and a third was dismissed (“No so much lunch ‘cause I usually eat here”). As a result, this was categorized as a preference for informal learning due to the high frequency (“Typically”) of the informal setting and the less frequent (“maybe”) formal setting. A more common example of preference for informal learning appeared in learning incident R-14332.

Ms. Raye (subgroup center) contrasted the process of going through formal channels (“Media”) with the process of going through informal channels (“within my own department”) for “help with something” or when “my computer’s not working.” She indicated a preference for informal channels (“I can find most of what I need within my own department” and “I don’t go to the Media...I go to Mr. Morg”).

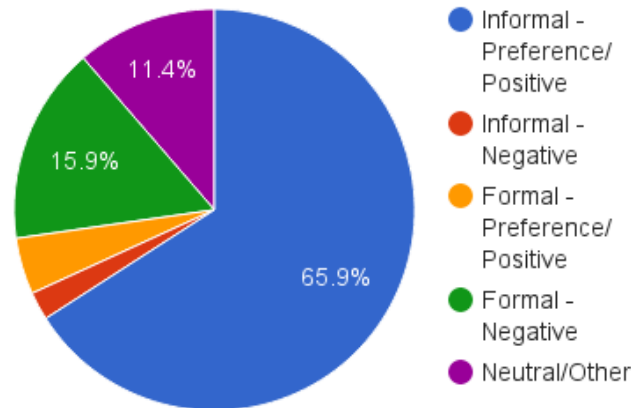
Preference for neither formal nor informal learning was exhibited when Mr. Terrax (subgroup center) was asked to describe situations in which “you’re learning about lesson planning”:

Different methods of teaching material. So, “How am I going to teach this subject coming up?” Not necessary filling out a lesson plan but, if I’m going to teach a specific subject, ho-, what different method can I use to teach it instead of lecturing or what-, ya know, whatever. Ya know, a lot of times I’ll try to teach through an essay, ya know. I’ll assign the kids an essay topic and then try to teach it through that, ya know what I mean. But that, ya know, I like that kinda stuff, where it’s not just, ya know, your normal, like, “I’m gonna talk about this and you guys take notes,” ya know. So, that’s kinda what I mean by lesson planning. Just different methods of teaching. (T-19428)

Here, the formal process (“filling out a lesson plan”) was not preferred by Mr. Terrax, but informal learning was not clearly preferred either. The preference appeared to be for pedagogic novelty and/or more engaging strategies (for example, to “teach through an essay” instead of lecturing).

Reconstituted categorization of learning incidents. Description valences and comparison/contrast preferences were reconstituted into five categories: “Informal - Preference/Positive,” “Informal - Negative,” “Formal - Preference/Positive,” “Formal - Negative,” and “Neutral/Other” (Figure 4.5).

Figure 4.5
Learning Incidents (N = 88)



A preference for informal learning or positive descriptions of informal learning constituted 58 (65.9%) of the 88 learning incidents, followed by 14 (15.9%) negative descriptions of formal learning and 10 (11.4%) neutral preference and “other” learning incidents. Preference for formal learning or positive descriptions of formal learning (4, 4.5%) and negative descriptions of informal learning (2, 2.3%) were the least populated learning incident categories.

Summary. Kirby-H overwhelmingly described informal learning incidents in positive terms or preferred informal learning when compared with formal learning. When informal learning was described by members of Kirby-H, it was overwhelmingly positive, and when formal learning was described, it was generally negative. When compared in a single learning instance, there was not a single preference for formal learning. Kirby-H understood their own learning as being, at its most frequent and best, informal. Formal learning, especially as it was instantiated in PLC reform, lacked the efficacy and authenticity of informal learning opportunities.

Chapter 5: Discussion, Implications, and Conclusions

Teacher practice has been at the center of education reform for the last 30 years. These reforms, and their associated formal professional development programs, have typically focused on changing teachers' instructional practices. Until very recently, these reforms have rarely, if ever, taken account of teachers' well-established, informal learning networks as a positive resource. These networks, these "patterns or regularities in relationships among interacting units" (Wasserman & Faust, 1994, p. 3) were often seen as either obstacles to be overcome or in conflict with reform itself. Learning more about the structure and nature of these collegial learning networks within the context of a teacher learning reform might provide insight into the improvement of teachers' instructional practices.

The purpose of this mixed methods study was to analyze teachers' collegial learning through a delineation of four schools' social structures and then to explain those structures through the meaning that teachers made of a PLC reform, their own learning, and the relationship between the two. Chapter 1 provided a brief introduction to this study. Chapter 2 mapped out this study's analytic framework, highlighting the role of collegial learning, Professional Learning Communities as an instantiation of collegial learning, social structures as an intermediate outcome of PLC reform, how social structures are measured and documented in this study, and unresolved questions that led to the one overarching research question and three subquestions. Chapter 3 explained why an explanatory sequential mixed methods design was necessary and detailed the study's context and setting; research design; and data sources, collection, and analysis. In Chapter 4, the analyses of the quantitative and qualitative data yielded three major findings: 1) common PLC membership was significantly correlated with the formation of new learning network ties, 2) a unique subgroup (Kirby-H) had an intensely negative view of the PLC reform, and 3) Kirby-H overwhelmingly described informal learning incidents in positive terms or preferred informal learning over formal learning.

In this chapter, I discuss, from a mixed methods perspective, these three major findings and integrate them into a coherent discussion on teacher learning and education reform. Also in

this chapter, I discuss minor findings and highlight limitations within my study, including issues of survey timing, qualitative sampling criteria, and network item wording. Finally, I highlight implications of this study for future research and practice.

Integration: Discussion of Findings

Integration in mixed methods research demands an accounting of how different categories of data within the study speak to one another and to the research questions. In this study, the quantitative data revealed that teachers in the four high schools studied were much more likely to make new collegial learning connections with those inside their PLC versus those outside their PLC (Finding #1). This finding is consistent with the literature on the effects of reforms aimed at creating collaborative groups among teachers but appears to contradict the qualitative evidence highlighting Kirby-H’s negativity regarding the PLC reform (Finding #2). One explanation for this apparent contradiction is that the sample under consideration was different for each finding. The broad, quantitative sample included hundreds of participants from four high schools within one district while the qualitative sample was from one school (and mostly, one department) that exhibited low reform self-efficacy. This explanation is reasonable, but I argue below that these two findings are actually complementary and that Kirby-H’s positivity regarding and preference for informal learning (Finding #3) helps explain the relationship between Finding #1 and Finding #2 (Table 5.1).

Table 5.1
Sequential Explanatory Joint Display

Finding #1 (Quantitative)	Finding #2 (Relevant Qualitative Responses)	Mixed Methods Interpretation
The odds of forming a new collegial learning tie were 12.12 times greater within PLC groups than between them.	<p><i>Qualitative Excerpt 1</i> “It doesn’t, I feel like [the PLC] really doesn’t apply and help me.”</p> <p><i>Qualitative Excerpt 2</i> “If, ya know, teacher talking to teacher, just shooting the breeze about their classes, I get a lot more from that than, than, ‘Well, let’s sit down and conduct this [PLC] meeting.’”</p>	<p><i>Apparent Contradiction</i> The qualitative data suggest that Kirby-H’s PLC did not facilitate collegial learning. Therefore, the strong quantitative correlation between same PLC membership and new collegial learning ties suggest that collegial ties are composed of learning outside of formal structures (i.e. informal learning). Further, maladaptive beliefs of Kirby-H members may have complicated the success of the PLC reform.</p>

Each learning incident in the interview texts was coded as either a description of formal learning, description of informal learning, or comparison/contrast of formal and informal learning. Each description of formal learning and description of informal learning was then

holistically coded as either positively or negatively valenced, and comparison/contrast learning incidents were coded as either a preference for formal learning or preference for informal learning. In almost two-thirds (65.9%) of the 88 Kirby-H learning incidents, informal learning was either positively described or preferred when compared to formal learning. In terms of sheer quantity, informal learning was described more than two times as often as formal learning (46 descriptions of informal learning versus 21 descriptions of formal learning). Of those 46 descriptions of informal learning, over 90% were positive. Two-thirds of the 21 descriptions of informal learning were negative. In Kirby-H's 19 comparisons of formal and informal learning, informal learning was preferred in almost 85% of the learning incidents, and formal learning was not preferred in any single learning incident. These findings echo earlier studies regarding the predominance of informal learning in the workplace. Further, this study focused on a key group of teachers that both resisted reform efforts and operated within the core of a learning network in the midst of those reform efforts, suggesting that a large part of Kirby-H's contribution to the learning network was informal in nature.

In light of Finding #3, it was not a foregone conclusion that Kirby-H would have responded so negatively to the PLC reform. One can conceive of a situation in which both informal learning was predominant and preferred by Kirby-H and also that the PLC reform was viewed positively, but this was not the case. Instead, the PLC reform was the object of discussion when the topic of conversation revolved around formal learning incidents, and Kirby-H's understanding of the PLC reform was intensely negative. Kirby-H perceived the reform to be a misuse of their time, often geared toward generating trivial compliance. As noted in Chapter 4, Mr. Terrax said:

...the time I could have spent figuring out that kid and how can I teach [the content] better to them and going online and looking at stuff, I feel like the district would want me sitting in a PLT [name given to PLC groups] and discussing it...And I feel like I could find a quicker answer and start adapting my lessons way quicker on my own than I can sitting in a PLT. (T-16734)

Kirby-H's reaction to the content of the PLC reform often lacked this pervasive negativity, but this potential positive was mitigated by a lack of programmatic organization and structure. For Kirby-H, the collegial interactions and collaboration opportunities were the best part of the

reform, but this bright spot was crowded out by other parts of the reform that they negatively perceived.

Given Kirby-H's descriptions of the reform's missteps, there appeared to be, at minimum, some areas of opportunity for the district and school administration in terms of implementation fidelity, but this phenomena is not uncommon in educational settings engaged in reform (Datnow & Stringfield, 2000; Noell & Gansle, 2009; Shapley, Sheehan, Maloney, & Caranikas-Walker, 2010). Even so, Kirby-H's complaints did not entirely focus on fidelity. Much of their negativity centered on how the PLC reform directed teachers' time and energy away from practices that were, from their perspective, productive and useful. These productive and useful practices predated the PLC reform, which suggests that Kirby-H's *pro forma* compliance with, resentment of, or active resistance to the PLC reform was a response to what was being displaced in their work life by the PLC reform. Further, these productive and useful practices were, by and large, informal in nature.

The element of the findings that likely preexisted the PLC reform is the predominance and preference for informal learning. As the PLC reform was implemented, the practices that were learned by teachers informally and were considered by them to be productive and useful were displaced by SPSD's implementation of the PLC reform. This displacement (along with implementation missteps) fostered feelings of negativity among key subgroups (like Kirby-H). Despite all this, new collegial learning ties were strongly correlated with membership in the same PLC. One possible explanation for these seemingly disparate findings is that the PLCs were constructed on top of preexisting, informal learning networks and bounded by content area.

The above explanation, while supported by the evidence in this study, does not illuminate a path forward for those interested in systemic teacher learning reform. DuFour and Reeves (2015) said, somewhat tautologically, that PLC reforms work when they are "done right." In fairness, the authors identified poor district and school leadership as the direct cause of improperly implemented PLC reforms, but they nevertheless failed to account for how teachers' perceptions of a PLC reform might affect the reform itself. Further, the notion that PLC reforms should simply be "done right" falls far short of providing helpful advice to districts and schools struggling to foster collegial learning among teachers, and it also limits the scope of possible solutions.

The members of Kirby-H, particularly those in the subgroup center (Mr. Quill, Ms. Raye, Mr. Terrax), were key stakeholders in their school's learning network and presented a special challenge to school and district leaders in terms of the PLC reform. With this in mind, how might SPSD have accounted for Kirby-H in such a way as to both value their insights and experiences but also temper the subgroup members' maladaptive beliefs? Mr. Quill was a seasoned veteran near the end of his career, and approached the formal structures of professional learning with routinized indifference. For him, the PLC reform was the fifth "savior of education program" during his career. His professional learning, as it related to the PLC reform, was piecemeal and selective. Further, he claimed that there was "a simple formula," which he called "common sense education," to the complex problems of teacher practice. This formula involved "car[ing] about kids...about your subject area and what you teach." Ms. Raye, approaching a decade in the classroom, exhibited an incisive (yet demoralized) assertiveness about her work. She echoed Mr. Quill's sentiments regarding the cyclical nature of teacher learning reform, claiming that the PLC reform was "just yet one more trend coming in education" and noting (with clear frustration) that "you have a learning goal or a standard or, I'm trying to think of the, essential que-, I've, god, I, learning goal, standard, essential question, they're all the same thing." She was able to pinpoint one of the logistical challenges of the PLCs ("None of us teach the same thing. We don't have any of the same students.") and, therefore, used her informal collegial learning network to work around that challenge when necessary. Mr. Terrax embraced novelty and experimentation in his practice and valued the same in other teachers' practice as well. He embodied a confidence in his own professional skills that was only tempered by the wisdom he sought from online resources ("I feel like I don't necessarily actively seek out anybody for advice because I know how Google works") and "happenstance" professional learning with his local colleagues. He believed that professional improvement most often came through his own study and research. Consequently, Mr. Terrax approached the PLC reform as an opportunity to find new teaching resources that would "fit your personality."

Three themes emerge from the above discussion of Mr. Quill, Ms. Raye, and Mr. Terrax. First, these teachers believed that the PLC reform would eventually go away and be replaced by yet another teacher learning reform. Second, these teachers constructed simplistic and/or piecemeal solutions to problems of practice and, at minimum, passively resisted systematic change. Third, when formal systems failed to solve these teachers' problems of practice (or even

created new problems), they often relied on idiosyncratic solutions. While these three themes do not constitute an exhaustive representation of the variability among key subgroups in the midst of reform, they do represent a contribution to existing work (Horn, Chen, Garner, & Frank, 2017) on the factors that complicate the success of teacher learning reforms.

Imagining Collegial Learning and Reform

Imagine a school like the ones in this study. At this school, teachers learn how to do their jobs every day. They learn how to teach this year's particular group of students based on their daily interactions with them. They also learn that last year's lesson plans work well, or less well, with this group of students. They learn a new "bell ringer" strategy from the teacher next door by listening in while standing at her own door at the very beginning of class time. They learn about the new tardy policy from their principal during the monthly staff meeting. In all these ways, teachers learn to do their jobs, and most of these learning opportunities are informal.

A new teacher learning reform (Professional Learning Communities) is adopted by the district and is implemented over five years. The primary way that this reform affects teachers is through PLCs. PLC membership, which was decided by building-level administrators, is distributed to teachers. Teachers subsequently ruminate on, fret over, and discuss the PLC groupings. Some PLCs are perfectly matched with teachers' own learning connections. Others are not. In general, and on the whole, the PLCs include those colleagues that learn from one another because teachers' collegial learning, and the PLC grouping process, centers on common course content. Algebra teachers are in one PLC, U.S. History teachers are in one PLC, and so on. However, there are some notable exceptions. All the world language teachers (the French teacher, the two Spanish teachers, and the Latin teacher) are all grouped together. The psychology teacher is grouped with the economics and civics teachers. Also, two English/Language Arts teachers are not grouped with any of the social studies teachers, with whom they share lunch every day. In this way, the PLC groupings, on their face, are problematic if viewed through the lens of "common course content."

What is not taken into account in these PLC groupings are the informal opportunities that teachers use, every day, to learn how to do their job. The copy room conversations about teaching students how to write, the lunch time complaint sessions that turn into a "strategy grab bag" for all those involved, and the after hours meet-ups at the local watering hole that help new teachers form productive networks with veteran teachers and teachers in other

departments...these are not part of the PLC grouping process. The PLCs in this study were highly predictive of new learning ties because they used common course content as an organizing framework, but they nevertheless receive a wide range of criticism because 1) these groupings do not account for the informal learning that was already occurring outside of common course content and 2) the common course content is not always so common. To use a construction metaphor, the formal structure of PLC groupings were built on top of a shifting and dynamic landscape of informal learning ties. The formal structure was neither designed to adapt to the landscape's dynamism nor built with all the specifications of the landscape in mind.

Discussion of Other Findings

In addition to the three major findings, other findings from this study aligned with prior empirical studies related to geography, race, and leadership. The statistical significance of the geography variable supports the findings from previous research on teachers' social networks (Coburn & Russell, 2008; Spillane, Shirrell, & Sweet, 2017). As such, the importance of propinquity in networks related to professional learning and advice should not be overlooked in future studies. The statistical significance of the race variable can be attributed to the high percentage of White teachers in all four schools (87%). Further, there is evidence that the salience of racial homophily in social networks is often mitigated by other factors, such as the aforementioned propinquity and homophily based on nonracial categories (Wimmer & Lewis, 2010). Interestingly, none of individual characteristics of the "learner," the actor who provided the tie, were statistically significant predictors of new collegial learning ties. Instead, the formal leadership role of the "teacher," the actor who received a nomination, did influence the formation of new collegial learning ties, either as a PLC facilitator or non-PLC facilitator peer leader. This finding echoes previous work on the interaction between formal peer leadership and informal social structures (Penuel et al., 2010).

Limitations

This study's findings and discussion should be interpreted within the context of the following limitations: timing of the surveys, use of reform self-efficacy (RSE) as a qualitative sample parameter, and reliance on "learning" network data instead of "close colleagues" network data.

Only four months separated the distribution of Wave 1 and Wave 2 of the survey, and the model accounts for prior collegial learning. Therefore, these quantitative results may not fully

represent the longitudinal formation and dissolution of learning ties within the four schools studied. Given more time and resources, each wave would have been separated by at least six months and deployed over multiple years. The model yielded statistically significant changes in key variables, but these findings should be approached with caution because they neither capture changes between multiple years of teaching nor possible effects of the PLC reform that might have occurred outside of this timeframe.

Second, RSE was constructed as a measure of teachers' approach, affect, or beliefs about the PLC reform within the district. It was based on participants' responses to the question, "Indicate the degree of confidence you have in your implementation of the PLC reform." Responses to this item were averaged by subgroup, and this average was used to determine a subgroup's RSE score for the purpose of qualitative sampling. The use of a single item to determine a subgroup characteristic is not ideal, but given the need for relatively high response rates in network data collection and the potential for survey fatigue, I opted to use a single item, instead of a battery of questions, that focused on teachers' perception of their efficacy. Even so, this qualitative sample parameter should be more closely examined in future studies.

Finally, the network survey item intentionally veered away from phrasing that is most commonly used in similar social network analyses because I believed that the network item should be closely aligned with the focus of the study: collegial learning. I asked participants to complete two network items. One of these items posed the question "Who have you learned from?" The other item asked participants, "Who are your close colleagues?" The order in which these two items were presented to the participants was randomized. The primary purpose for including the more traditional "close colleagues" item was to serve as a backup in case the "learning" item failed to produce significant results. I also ran a quadratic assignment procedure (QAP) analysis of the results from these two items, but there was no statistically significant difference between the two. Any attempt to extend this work should attend to the differences and similarities between "learning" network survey items and "close colleagues" network survey items in order to ensure the validity of the construct under study.

Implications and Conclusions

While the above limitations should frame this work with an appropriate set of expectations, these findings are nevertheless important for three key stakeholders: scholars, administrators, and teachers.

For scholars. First, mixed methods theorists have noted a relative lack of clarity and precision regarding integration in studies that use both quantitative and qualitative data (Bryman, 2006; Fetters et al., 2013; Lewin, Glenton, & Oxman, 2009). This study has contributed to a more precise articulation of integration points in social science research through its design, methodology, and interpretation. My use of an explanatory sequential design allowed me to connect the quantitative and qualitative data through my qualitative sampling framework, build on my quantitative data through an individualization of my semi-structured interview protocol, and interpret my results through a joint display that relied on both data sets.

Second, teacher learning reform (as a concept) is in need of reevaluation. Lieberman and Pointer Mace (2008) suggested that high-quality teacher communities were “the best professional development for teachers” (p. 233). PLC reforms embody many of the characteristics of teacher communities as described by Liberman and Pointer Mace, but this study highlights some challenges to the concept of reform as teacher community. Proponents of the specific formal professional development program in question (PLC reform) posit that formal structures designed to change teachers’ social structures are a necessary component of organizational change. The cleavage between the quantitative and qualitative data in this study suggests that the path between formal reform structures and informal collegial learning is neither as straight nor as clear as the PLC reform program might suggest. Put another way, the acknowledged inputs are incomplete in PLC programs. Informal collegial learning is registered as an output of formal structures, but informal collegial learning is also an input. Failure to robustly account for this specific input is part of the reason why teacher learning reform (as a concept) is in need of reevaluation and why PLC reform initiatives suffer from infidelity at the hands of key groups of teachers (like Kirby-H). Teacher learning programs and reforms may be more valuable if filtered through the lens of practitioners’ own informal, collegial learning. One outcome of this approach to collegial learning might be the willingness to pilot formal programs or reforms from the bottom up and then abandon them if they are not taken up by practitioners.

For administrators. The findings from this study echo earlier work (Elmore & McLaughlin, 1988) and suggest that administrators must account, at the design stage of a reform, for teachers’ preexisting, informal collegial learning. The reliance on common content area as an organizing framework for ground-level reform-related groupings is insufficient and, in some instances, counterproductive to the goals of teacher learning reforms like Professional Learning

Communities. If the goal of a teacher learning reform is to build professional community through productive and deliberate collaboration, two alternatives to common content area as an organizing framework might be learning network subgroupings and self-selection.

Learning network subgroupings would rely on social network data (much like those collected and analyzed in this study) to produce a list of naturally occurring subgroups within a school's learning network. These subgroups could then be used as the basis from which ground-level reform-related groupings are formed. The pitfall with this approach is that it does nothing to address the top-down system that is also present in a common content area approach. Administration is still responsible for determining and deploying group membership. Also, it requires a high degree of trust, buy-in, and participation from teachers before the implementation of the reform itself.

A second alternative is self-selection, wherein teachers self-select into ground-level reform-related groupings based on a set of criteria provided by administration. While this does not eliminate the possible perception that the reform is an administrative dictum, it does ameliorate those critiques by placing the burden of group formation in the hands of those most directly affected by the reform: the teachers. It not only recognizes but also honors the preexisting, informal collegial learning of teachers by asking them to consider their work with their colleagues (the majority of which has been informal) and then make a decision about who they need and want to work with to accomplish the goals of the reform. This approach is not without issues either. Homophily, the tendency to group based on similarities, will likely inform the grouping choices of teachers most in need of the resources offered by the reform, thus reinforcing patterns of behavior that are antithetical to the goals of the reform.

A hybrid approach, one in which data regarding a school's learning network is given to teachers so that they can make well-informed self-selections, might yield better results. This would involve a high level of transparency on the part of administration, which would need to be built at the very earliest stages of the reform. Administrative transparency would involve co-construction of common organizational goals, clear communication about the purpose and use of social network data, and commitment to faithfully enact the decisions of teachers' self-selections.

For teachers. Teachers are often disconnected from the design of processes and systems that most affect their work. Preservice training, induction, certification, and in-service professional development all highlight the relative impotence of teachers within their own

occupation. Reforms in education are, by and large, no different than these other processes and systems, often relying on a top-down approach to change. PLC reforms offer a promising means of instructional empowerment for teachers, but they have not differed in any meaningful or systemic way from other reforms in their approach to design or implementation. The PLC reform in SPSD was, in large part, the result of a change in top-tier leadership after the election of a new superintendent, and contrary to decades-old research (Elmore & McLaughlin, 1988), teachers were neither part of the design nor consulted about its implementation.

Based on my experience as an educator, a teacher educator, and a researcher of educators, I believe most teachers would consider the idea of informal collegial learning as a powerful lever of change for professional practice to be both self-evident and valid on its face. Unfortunately, the self-knowledge and voice of teachers is often marginalized in the public discourse, and as a result, this kind of work is necessary to provide ballast to practitioners. This study reveals the immense power of teachers' preexisting, informal learning, both for positive and maladaptive ends. It not only has the power to change professional practice but also to stymie reform.

APPENDICES

Appendix A. SNA Survey

We are asking you and the other instructional staff at XYZ High School to respond to the following survey. We are trying to understand professional learning among teachers in your school. We are NOT evaluating the effectiveness of your school, and administrators will NOT have access to your individual responses. We will use the results of this research to generally help your school and district understand teachers' professional learning. **In addition, all participants in this survey will be entered into drawings for \$50 VISA gift cards.**

We plan to collect the following data as part of this research study:

- This 5-15 minute survey regarding professional learning among teachers
- Observations of some teacher-to-teacher interactions
- Interviews of some teachers
- A second 5-15 minute survey to be completed near the end of this school year

Completing this survey indicates your consent as a participant in this study insofar as your responses will be analyzed. Participation in this study is voluntary, and we will keep all data collected confidential. Your privacy will be protected to the maximum extent allowable by law.

We will protect your confidentiality by using a pseudonym for each school and identification numbers for individual teachers in all external publications and written reports. You or others may be able to discern some of the identities in these external publications and written reports based on reported attributes of the school and person. Identifying information may be of the form: "A senior math teacher at Pseudonym High School said '...'"

You will not be able to click the "Back" button on your Internet browser once you complete a page on the survey. If you need to change your response to an item that you answered on a previous page or if you have any questions or comments, please contact Christopher Lee at the email address below.

Your participation is greatly appreciated. Thank you!

What is your gender?

What is your race/ethnicity?

What year were you born?

How many years in total (including this year) have you been a teacher?

How many years (including this year) have you been a teacher at this school?

What is your lunch period?

What, if any peer leadership positions do you hold in your school?

Please mark all that apply.

- Department head
- Professional Learning Community (PLC) facilitator
- Committee chair / co-chair
- Other
- None

This question includes a list of all XYZ High School administration and instructional staff, organized alphabetically by last name.

Think about the last 12 months, including the Spring 2014 semester, summer break, the 2014 preplanning period, the Fall 2014 semester, and all the way through the recent winter holidays and the beginning of this semester.

In the last 12 months, which colleagues have you learned from regarding any topic of professional concern?

- A, Mr.
- B, Ms.
- C, Mr.
- D, Ms.
- E, Mr.

[Possible responses to this item will be generated from the selections made in the previous item.]

In the last 12 months, how often did you learn from the following colleagues regarding any topic of professional concern?

	Once a Year	Once a Semester	Twice a Semester	Once a Month	Once Every Two Weeks	Once a Week	Twice a Week	Daily
A, Mr.								
B, Ms.								
C, Mr.								
D, Ms.								
E, Mr.								

In the last 12 months, what were the top three topics of discussion when you learned from the colleagues you listed in the previous question? Please be as specific as possible.

In the last 12 months, how much time did you spend in professional development activities related to Professional Learning Communities (PLCs)?

These PD activities could have been provided by your school, district, or other educational agencies (including, but not limited to, orientations, workshops, seminars, or other meetings that addressed work-related issues)?

- Never
- 1-4 hours (half day)
- 5-8 hours (1 day)
- 2 days
- 3 days
- 4 days
- 1 week (5 days)
- 2 weeks (10 days)
- More than 2 weeks

In the last 12 months, how much time did you spend in professional development activities NOT related to PLCs?

These PD activities could have been provided by your school, district, or other educational agencies (including, but not limited to, orientations, workshops, seminars, or other meetings that addressed work-related issues)?

- Never
- 1-4 hours (half day)
- 5-8 hours (1 day)
- 2 days
- 3 days
- 4 days
- 1 week (5 days)
- 2 weeks (10 days)
- More than 2 weeks

The following question asks about the PLC initiative. There are no right or wrong answers, and your individual response will NOT be seen by any of your colleagues or any administrator.

Please answer as honestly as possible.

Indicate the degree of confidence you have in your implementation of the PLC initiative using the following scale:

- 0 = no confidence
- 1
- 2
- 3
- 4
- 5 = moderate confidence
- 6
- 7
- 8
- 9
- 10 = complete confidence

Thank you very much!

If you have any questions or comments or if you need to change your response(s) to any item(s), please contact Christopher Lee at the email address below.

Gift card winners will be notified after all surveys have been submitted.

Lastly, please click the button below to complete the survey.

Appendix B: Interview Protocols

Check-ins

Hello, my name is Chris. You might remember me from the survey that was emailed to you. I wanted to stop by and see how you're doing and ask if you had any questions about the survey. Is there anything you want to talk about or have questions about?

During check-in, gauge if teacher may be willing to be interviewed later in the study. If yes, say...

I have some more questions about how you learn here, at your school, and I was wondering if you would be willing to talk to me again during my next visit?

If yes, send "thank you" email the following day and follow-up email one week before next visit in order to schedule semi-structured interview.

Semi-structured Interviews

NOTE: This protocol is highly tentative due in large part to the lack of contextual information I currently possess. The check-ins will play a large part in guiding the development of the semi-structured interview protocol.

General probes:

"What happened next?"

"Can you tell me more about that?"

"What did/do you think about that?"

Echo last statement

Bait statement

Today, I'd like to ask you some questions that relate to what we talked about when we first met. Or we may talk about the survey and how you responded. If it's OK with you, we may branch out into other related topics.

So, how is your year going so far?

What do you (others) think about ...

Insert bridging comment.

I'm interested in how teachers like you learn about their job. As you might remember, the survey focused on how teachers learn from their colleagues.

Choose one example

Example #1

In the survey, you said that your top three topics of discussion were X, Y, and Z. What did you mean by X, Y, and Z? What were you thinking about when you thought of X, Y, and Z? What experiences were you thinking about specifically when X, Y, and Z popped into your head?

Example #2

In the survey, you said that you learned from Mr. A, Ms. B, and Ms. C. What made you think of Mr. A, Ms. B, and Ms. C? What experiences were you thinking about when Mr. A, Ms. B, and Ms. C popped into your head?

Example #3

Some people mentioned that...*[always in the affirmative]*

The survey was used to figure out who learns from who and how often they learn from each other. Here is a list of the school staff divided into groups that represent those who learn from each other most often.

Pause while interviewee looks at list

What are your thoughts about this list?

Do you notice anything interesting?

Aside from your own group, which of these groups would you seek out if you needed to learn something about your work? What kinds of things would you need to learn about? Why?

This is the second year of the PLC initiative in your district, and I'd like to know about your understanding of this initiative.

When you think about the groups listed here *[point to the list]* and the PLCs, how might you describe the relationship between the two?

Some people say the PLCs and the groups overlap when the PLCs work well. Others say that PLCs work well for learning some things and their groups work well for learning other things. What do you think?

Anything else...?

Thank you very much for your time today. I hope that you found this discussion helpful. If you like, I'd be happy to provide you with a transcript of our conversation. Would you like me to send that to you once it is finished?

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