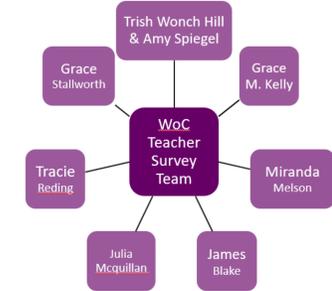




Teacher Professionalization & Inquiry Based Pedagogy: A Social Network Analysis of District Science Teachers' Advice Networks



Research Question:
Are there characteristics associated with which teachers' peers seek advice from?

Characteristics:
*School level *Leadership role *Years of experience
*Participation in professional associations (PAs)

Prior Research:
Teachers are more likely to develop relationships with those considered affable, rather than knowledgeable in STEM, resulting in some isolation of 'expert' teachers.¹

Coaching shaped frequency, closeness and depth of teacher interaction. Coach attendance of professional development mattered.²

Study Design:
We invited all 149 middle and high school science teachers to complete a web survey over the summer. Over half (91 of the 149 teachers from 22 science programs) completed the brief survey; 139 teachers were selected by at least one participant and therefore some networks almost completely represent the district.

- Network data merged with district data.
- Network energized using ForceAtlas2 layout in Gephi.

Science Teacher Survey:

Advice Network: In the box below, please list all the teachers who you have gone to for professional or personal advice about your teaching. You can list as many as 15 teachers.

Inquiry Comfort*: "How comfortable are you implementing inquiry-based lessons?"

Inquiry Efficacy*: "How effective do you think inquiry-based lessons are for student learning?"

Level of Professional Associations (PAs): Please mark all of the professional associations of which you are a member. (NSTA, NATS, ASTE, Other)

District data: School level, Leadership, Years of Experience

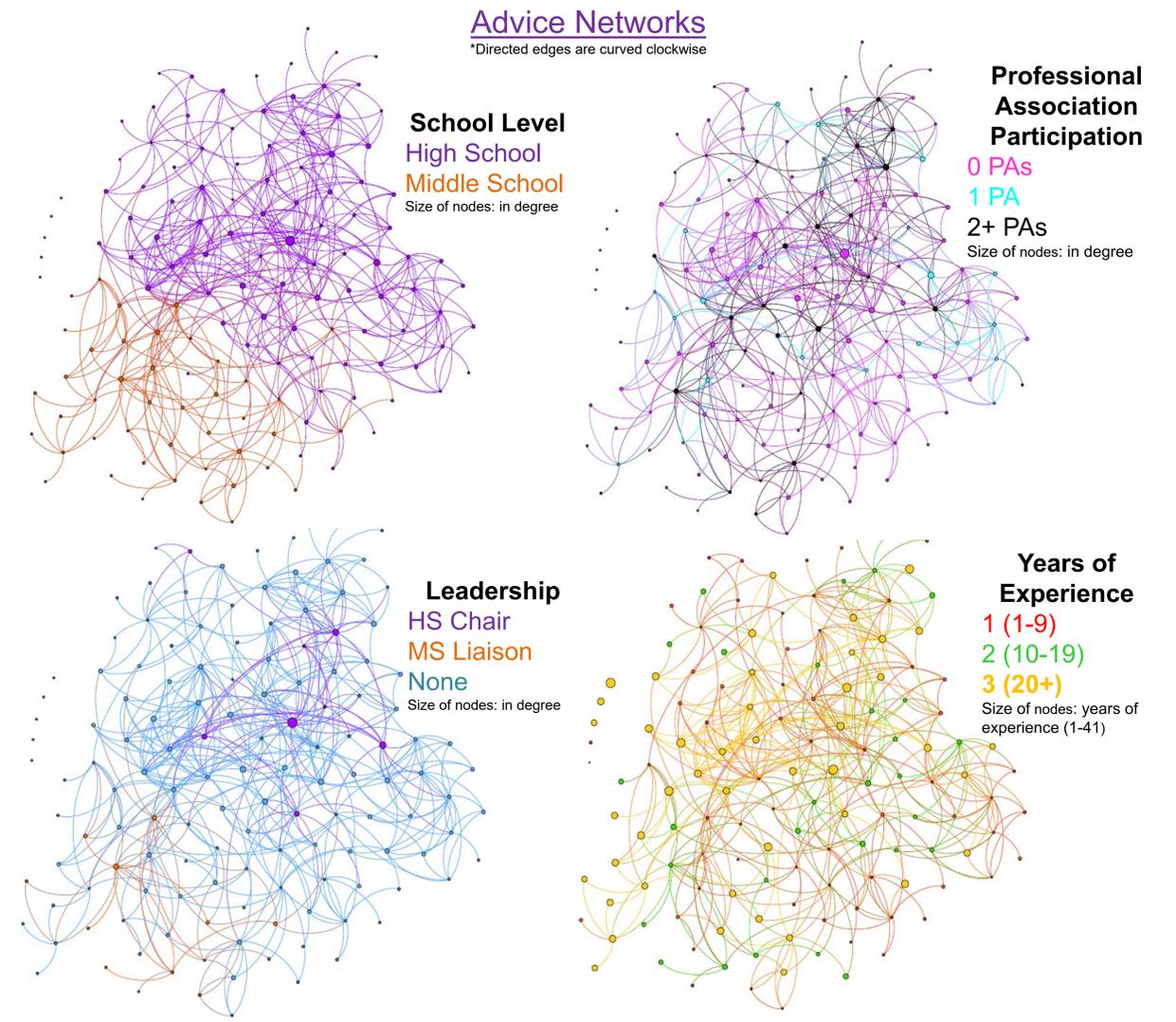


Table 2: Means and Standard Deviations for Network and Teacher Characteristics

Advice Networks by	In Degree	Out Degree	Years of Experience	Inquiry Comfort*	Inquiry Efficacy*
School Level					
Middle School (N=42)	2.6 (2.1)	3.9 (4.5)	15.9 (11.1)	3.1 (.6)	3.2 (.7)
High School (N=96)	4.3 (3.2)	3.9 (.5)	13.7 (10.6)	3.1 (.7)	3.1 (.7)
Level of Professional Associations					
0 (N=89)	3.3 (2.4)	6 (.5)	14.2 (10.5)	2.9 (.7)	3.1 (.7)
1 (N=23)	3.8 (2.9)	4.8 (3.9)	13.6 (11.4)	3.2 (.7)	3.1 (.7)
2+ (N=26)	4.5 (3.1)	7.2 (.5)	13.9 (11.1)	3.4 (.6)	3.4 (.6)
Leadership Role					
None (N=130)	3.4 (2.5)	3.7 (4.8)	13.9 (10.8)	3.1 (.7)	3.1 (.7)
Middle School Liaison (N=11)	3.1 (2.6)	3.3 (4.3)	8.8 (2.7)	3 (.6)	3.3 (.8)
High School Chair (N=8)	8.3 (6.3)	5.5 (4.9)	8.7 (3.1)	3.3 (.5)	3.3 (.5)
Years of Experience (1-41)					
1-9 (N=63)	2.7 (2.1)	3.8 (4.7)	4.8 (2.5)	3 (.6)	3.2 (.7)
9-19 (N=29)	3.9 (2.8)	2.9 (3.8)	14.6 (3.3)	3.1 (.7)	3.1 (.6)
20+ (N=46)	5.1 (3.6)	4.5 (5.4)	27.6 (5.3)	3.1 (.8)	3.1 (.6)

Table 1: Network Characteristics for Advice Networks

Network Characteristics	Professional & Personal Teaching Advice
Nodes (teachers)	138
Total Edges*	494
Reciprocity	.22
Connected Components	1
Maximum Geodesic Distance	7
Average Geodesic Distance	3.16
Graph Density	.03

*Advice network could name up to 15, inquiry 5

In-Degree Trends: On average, who receives more nominations from other teachers seeking advice?

- Teachers with **more years of experience**.
- Teachers who belong to **more PAs**.
- **High school teachers compared to middle school teachers**.

Out Degree Trends: On average, who nominates more teachers they go to for advice?

- Teachers who **taught at more schools**.
- Teachers who **belong to more PAs**
- Teachers with **1-5 years experience** ask more teachers for advice than teachers with 6-10 years experience (but not more than those with 11+ years).

Findings/Discussion:

- More people seek advice from more HS than MS teachers. MS and HS teachers seek advice from similar numbers of teachers.
- Similar proportions of MS and HS teachers have PA+.
- More people seek high PA than lower PA teachers for advice.
- Higher PA teachers seek advice from more other teachers than lower PA teachers.
- PA engagement varies little by years of experience.
- Higher PA teachers are more comfortable with inquiry and see inquiry as more efficacious than lower PA teachers.
- HS Chairs have more others seek them out for advice and they seek out more others for advice than non-chairs. Chairs and Liaisons do not differ regarding inquiry.
- Teachers with more experience seek more advice and others come to them more (but no difference in inquiry-based education). Inquiry does not differ by experience level.