

Solving the Mathematics Teacher Shortage: Retention Strategies



James Martinez, Ed.D.
University of Tennessee, Knoxville



Oklahoma, Colorado, Arizona, Kentucky, West Virginia...

Unrest Around the Country



<https://www.youtube.com/watch?v=dkHqPFbxmOU>

In a Different World

Most common number (mode)
of years of service for teachers
in the profession:

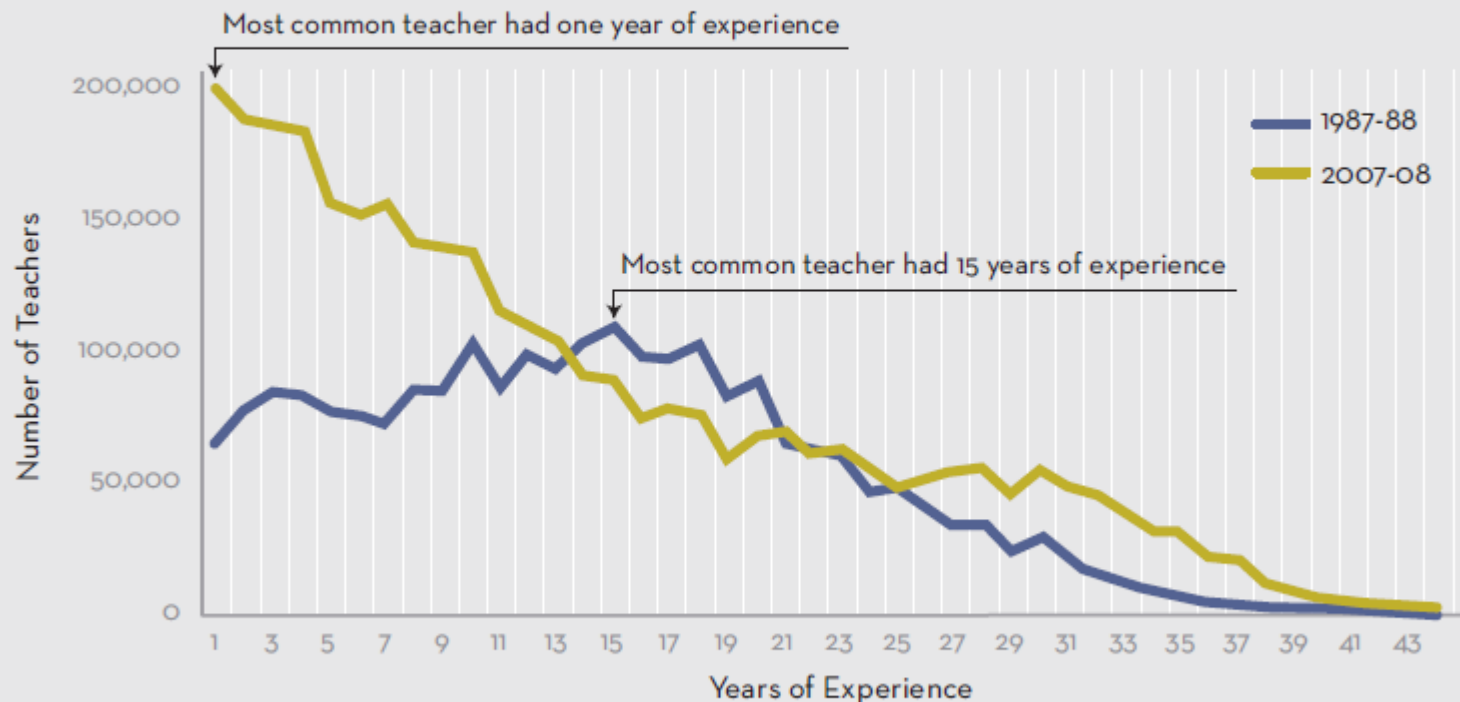
1987 - 15 years

2008?

1 year

Why STRIDES?

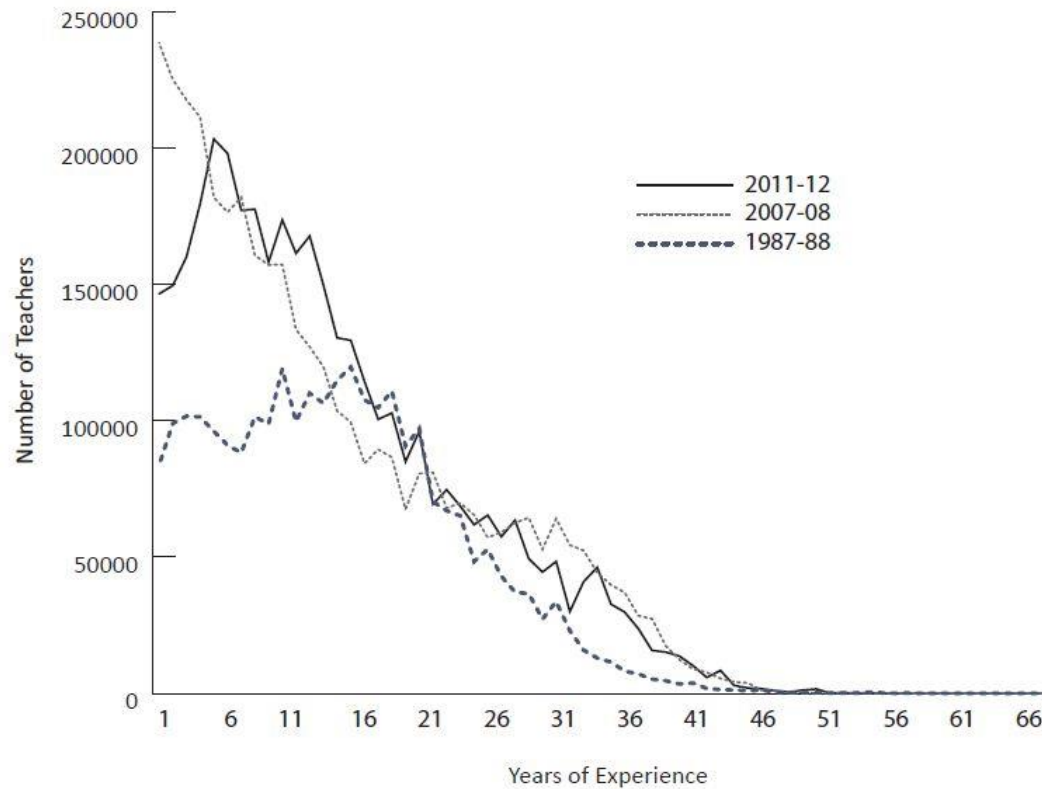
TEACHER EXPERIENCE LEVELS IN PUBLIC EDUCATION 1987-88 and 2007-08



SOURCE: Richard Ingersoll and Lisa Merrill, "Seven Trends: The Transformation of the Teaching Force"

Data (ref: Ingersoll & Merrill)

Figure 6. Teaching Experience of School Teachers, 1987-88, 2007-08, and 2011-12



More Current Data

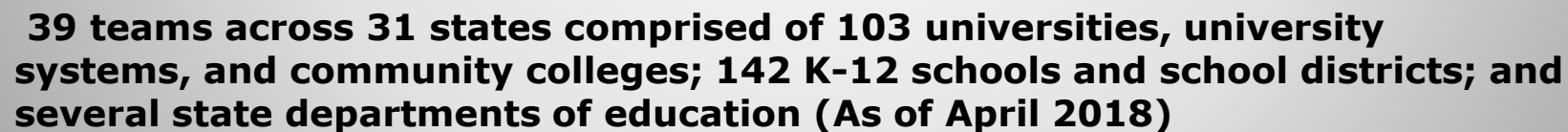
Organized by the Association of Public and Land-grant Universities (APLU)

- *"a research, policy, and advocacy organization representing 230 public research universities, land-grant institutions, state university systems, and related organizations."*

As a part of its Science and Mathematics Teacher Imperative (SMTI):

- *In 2008, APLU launched SMTI in response to the National Academies' recommendation in **Rising Above the Gathering Storm** (2006) to prepare 10,000 new science and mathematics teachers each year.*

MTE-Partnership



MTE-Partnership Teams

- A design developed by the Carnegie Foundation for the Advancement of Teaching through seminal paper “Getting Ideas into Action, Building Networked Improvement Communities in Education” by Bryk, Gomez, and Grunow
- MTE-Partnership decided to adopt NIC approach during Fall 2012

Networked Improvement Communities (NICs)

Collaborations of partnership teams to address specific challenges facing secondary mathematics teacher preparation using the Networked Improvement Community model.



Research Action Clusters (RACs)

- **Developing Effective Clinical Experiences** *Mentor professional development; alternative models*
- **Actively Learning Mathematics** *Improving instruction in introductory mathematics classes at the university level*
- **Mathematics of Doing, Understanding, Learning and Educating for Secondary Schools (MODULE(S2))** *Increase pre-service teacher's mathematical knowledge for teaching*
- **MATH: Marketing for Attracting Teacher Hopefuls** *Moving beyond advertising*
- **STRIDES: Secondary Teacher Retention and Induction in Diverse Educational Settings**

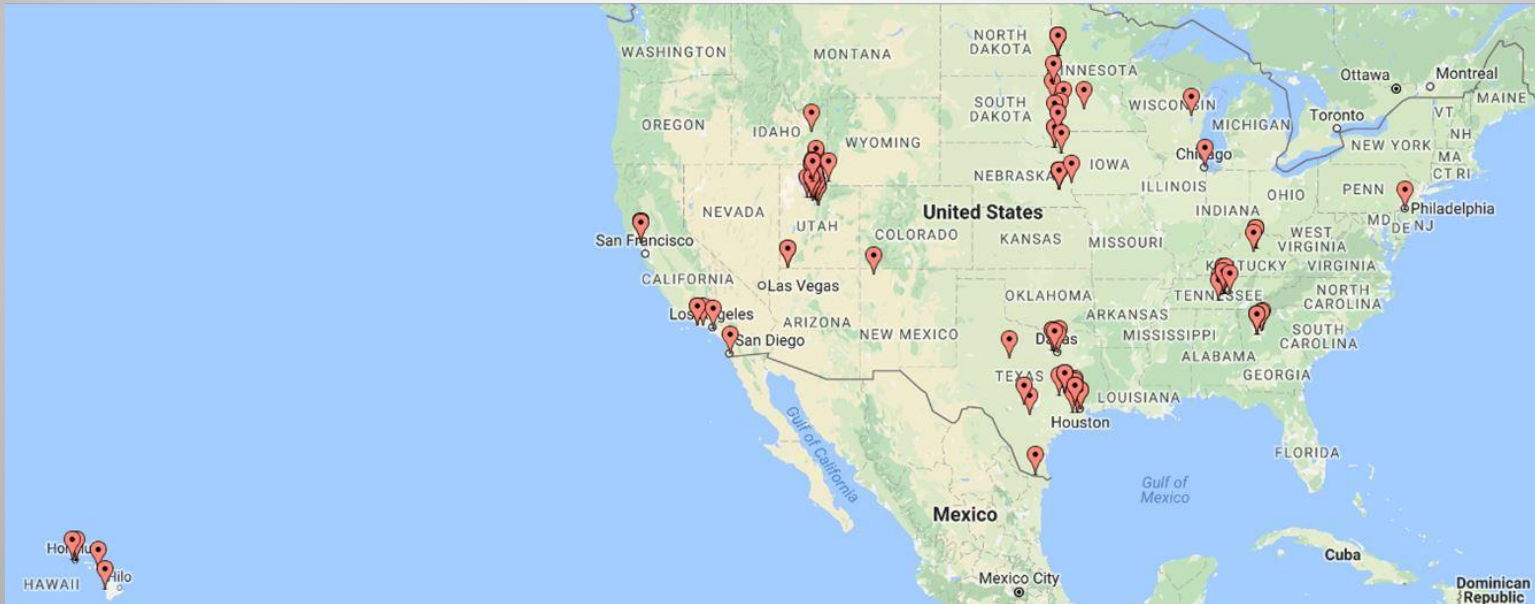
RACs in Progress

- Fall 2015 & Spring 2016
- Pilot Survey
- Revision Summer/Fall 2016
- Revised surveys released:
 - November 2016
 - April 2017



Surveys to Inform Research

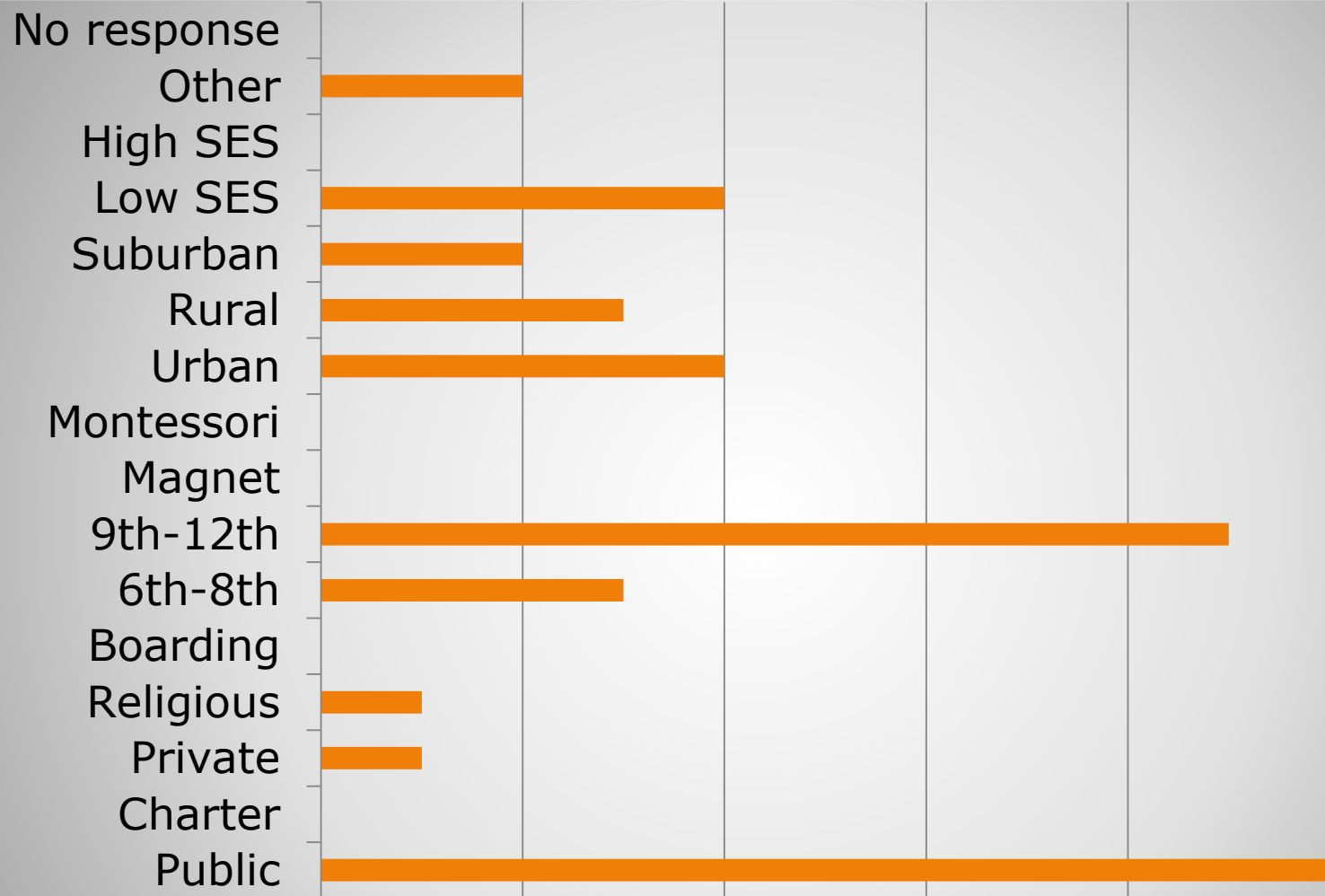
One hundred, forty-one emerging (student teaching) or early-career (first two years) teachers serving diverse student populations with regard to socioeconomic income, race and learning need (ESL/SPED) completed an online survey in November, 2016 and again in April of 2017



Participants and Locations



Quantitative Survey Results



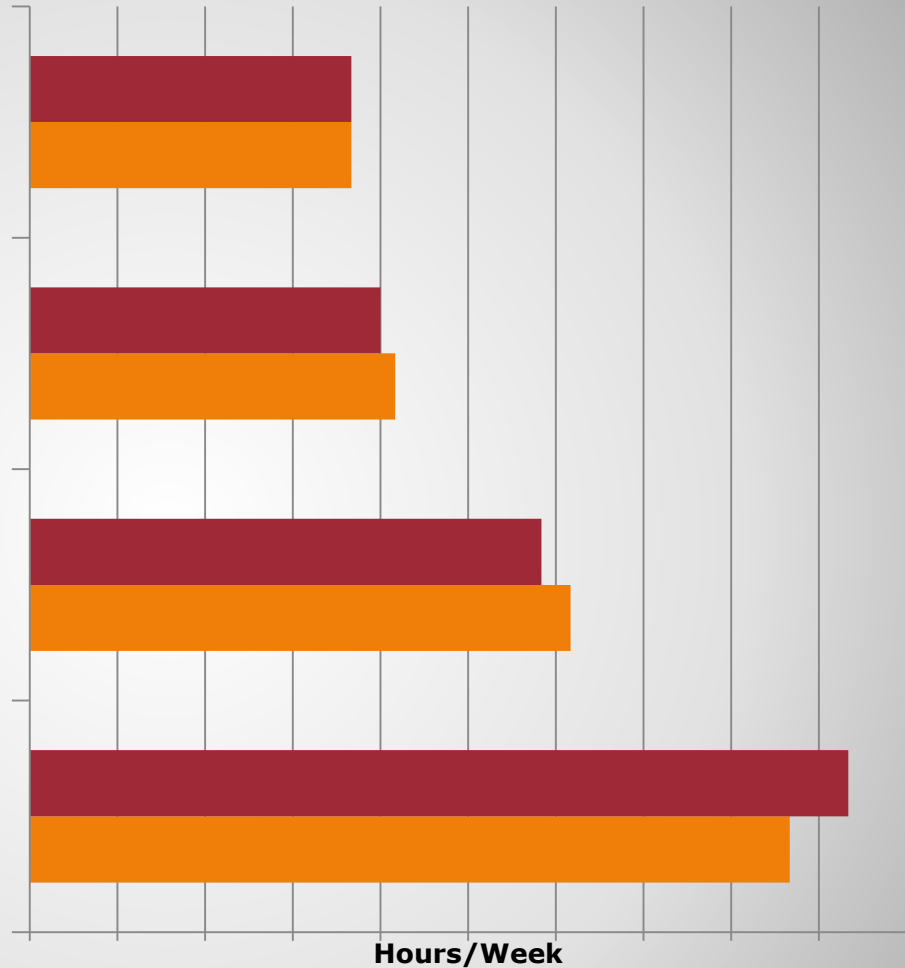
Participant responses to school descriptions

Engaged in professional
learning separate from
teaching and planning

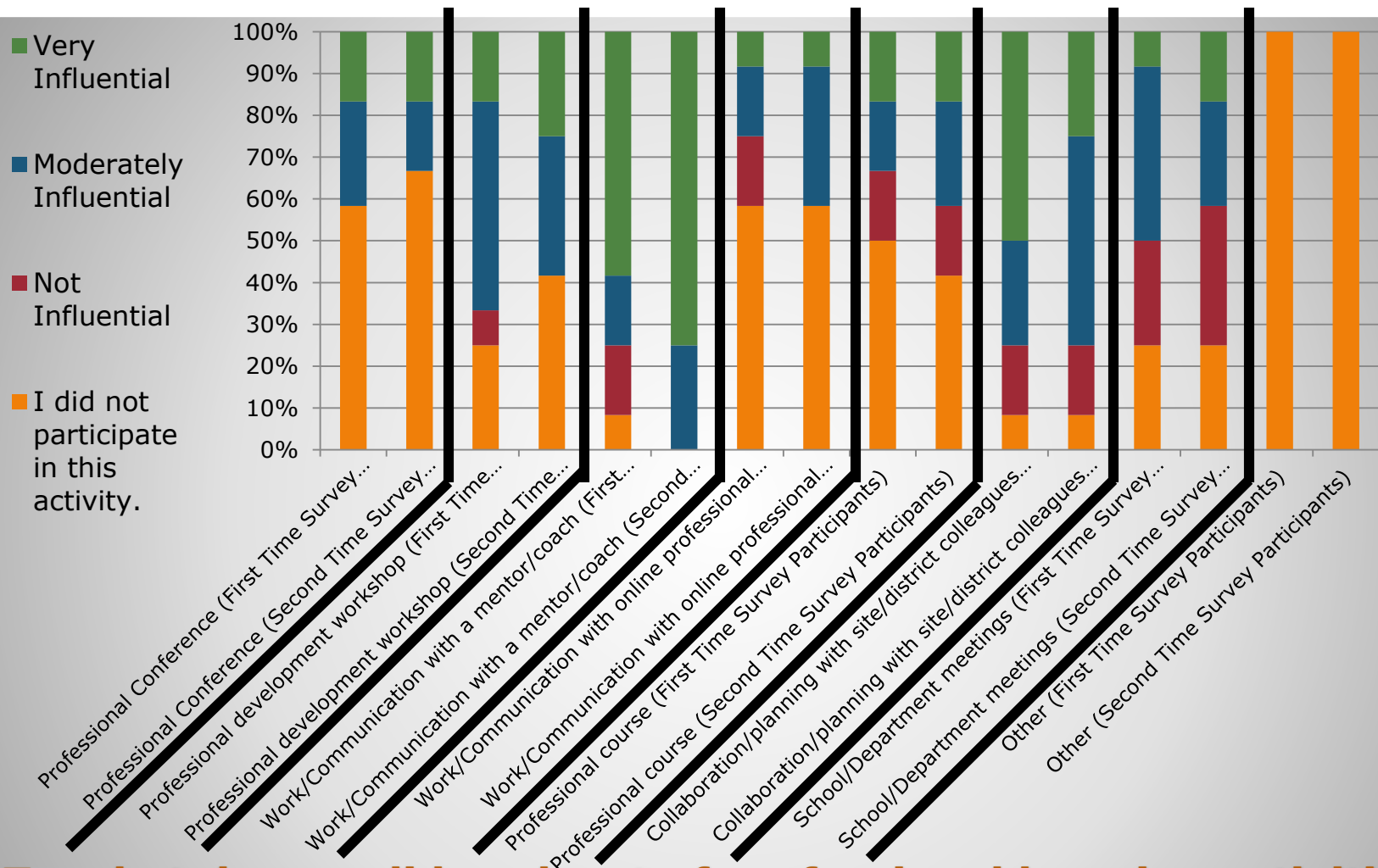
Planning with colleagues

Planning by myself

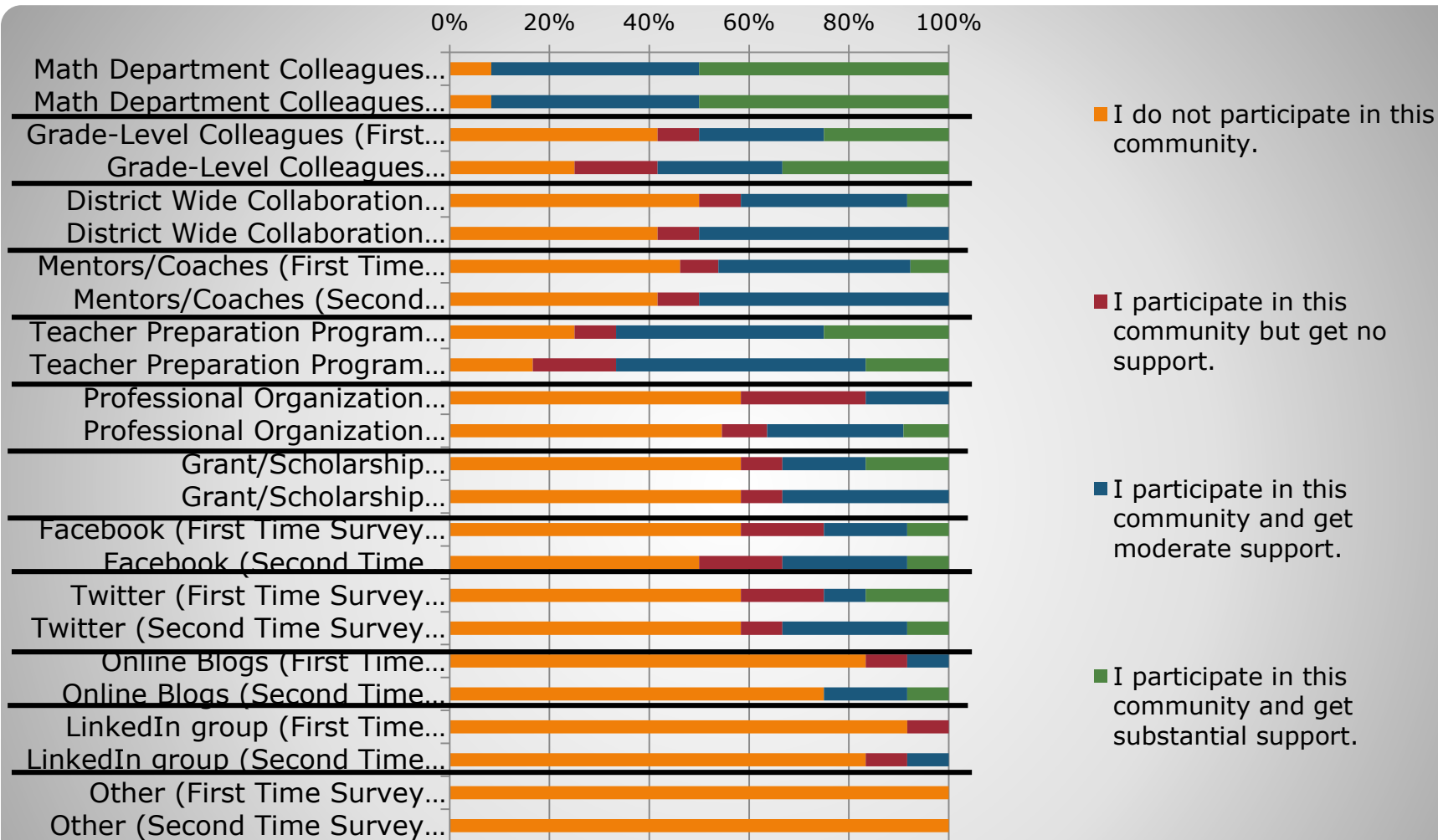
Teaching



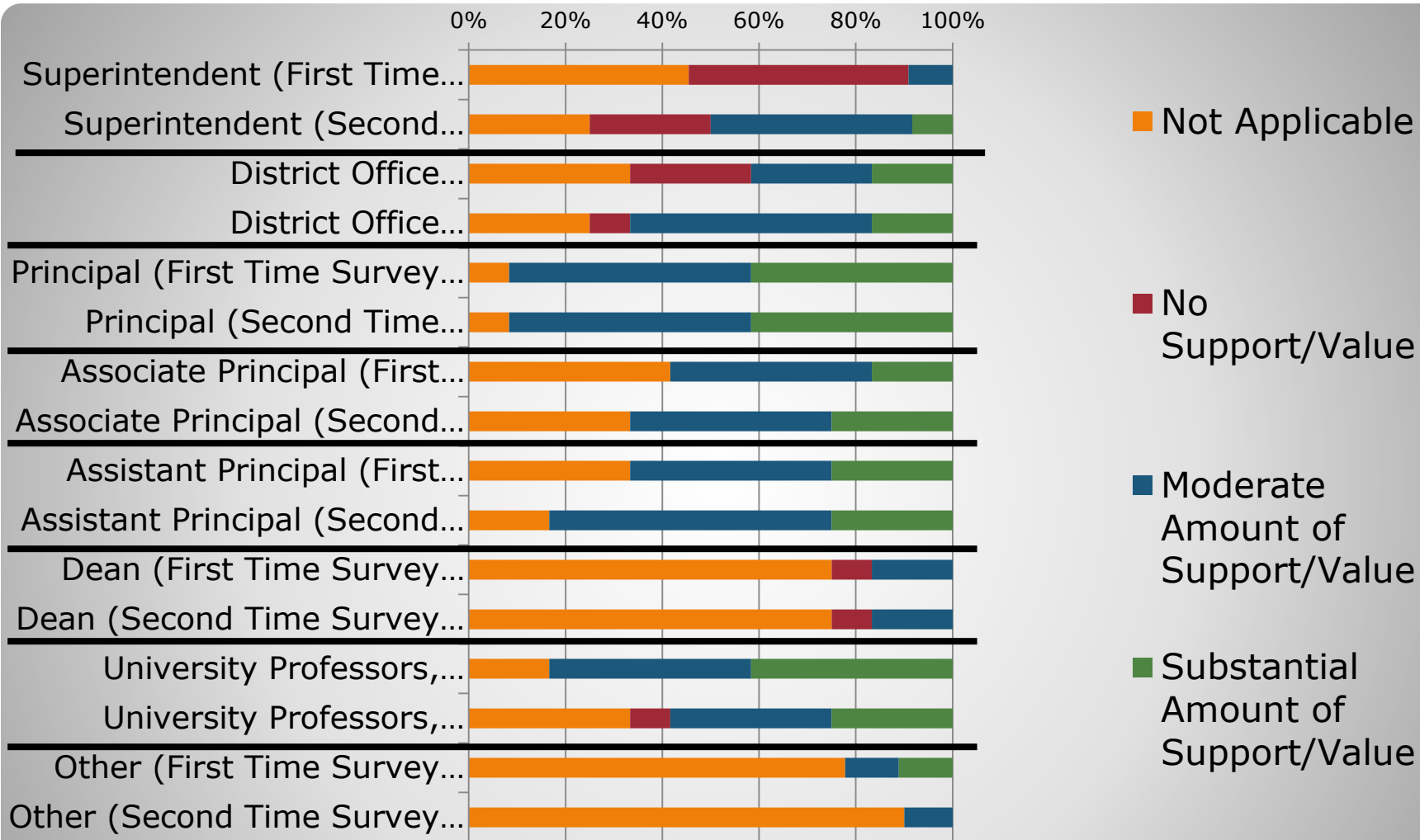
Average participant responses to "On average, how much time do you spend..."



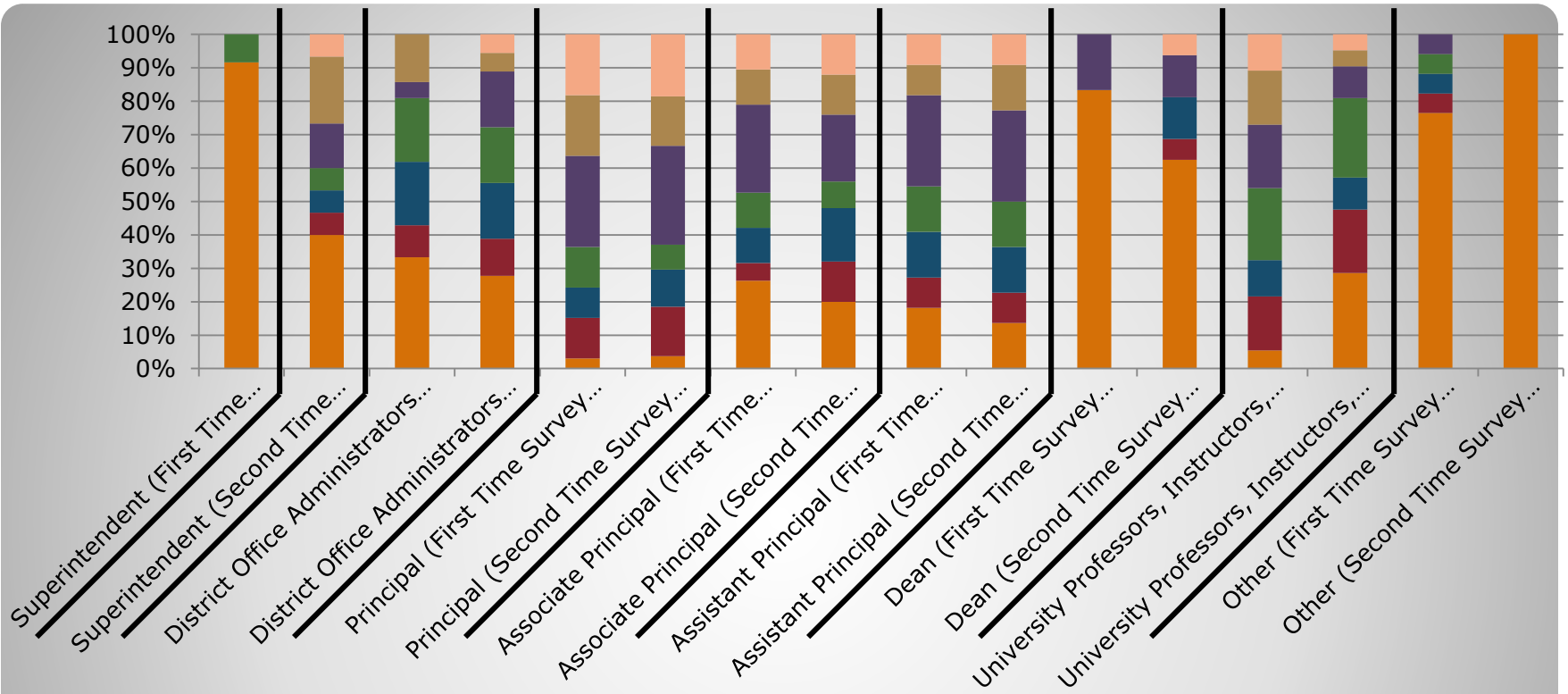
To what degree did each set of professional learning activities you participated in recently increase your enthusiasm for teaching mathematics?



How much support do you receive from the following professional communities?

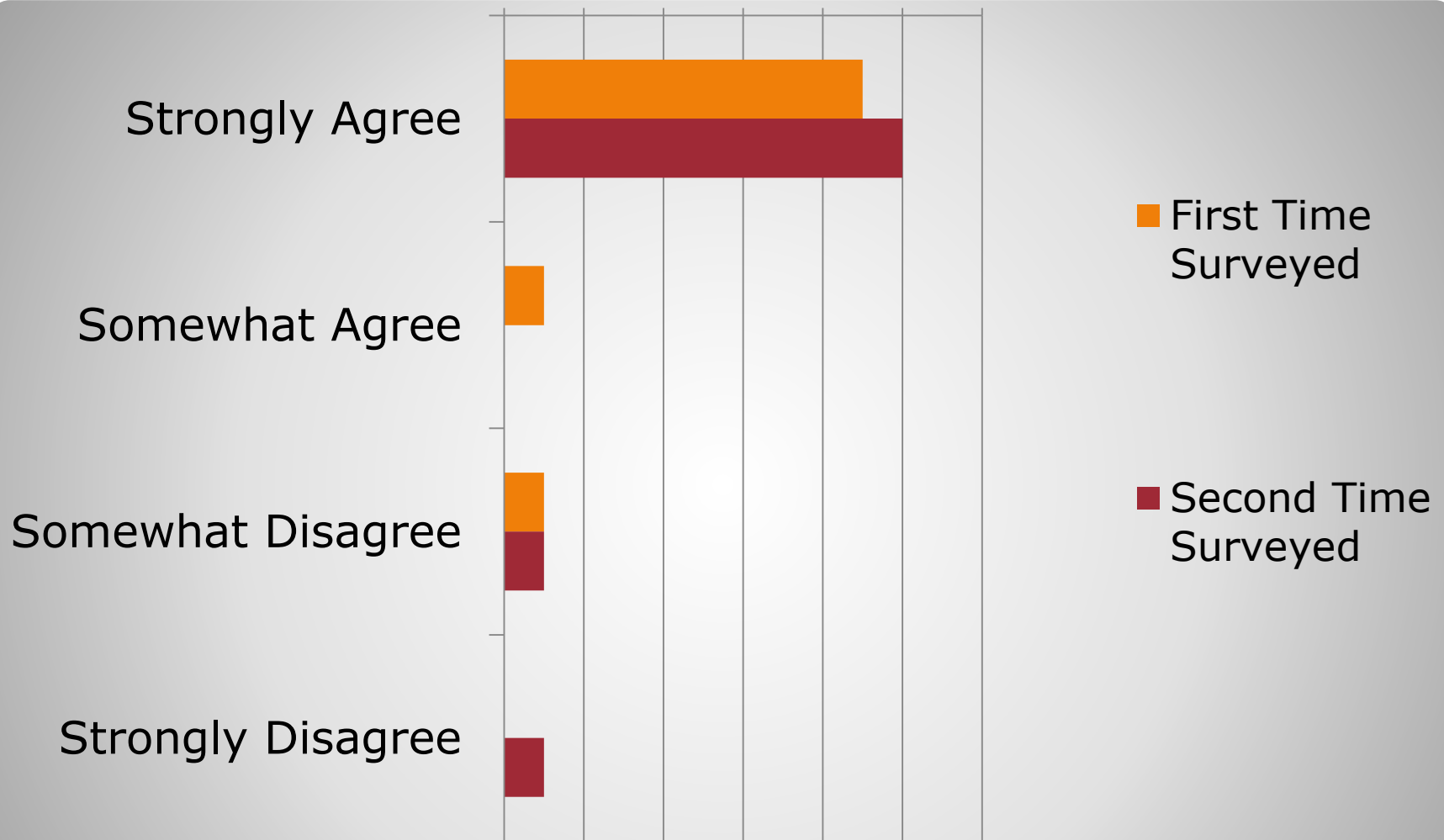


To what degree do you feel supported/valued by the following partners as a mathematics teacher?

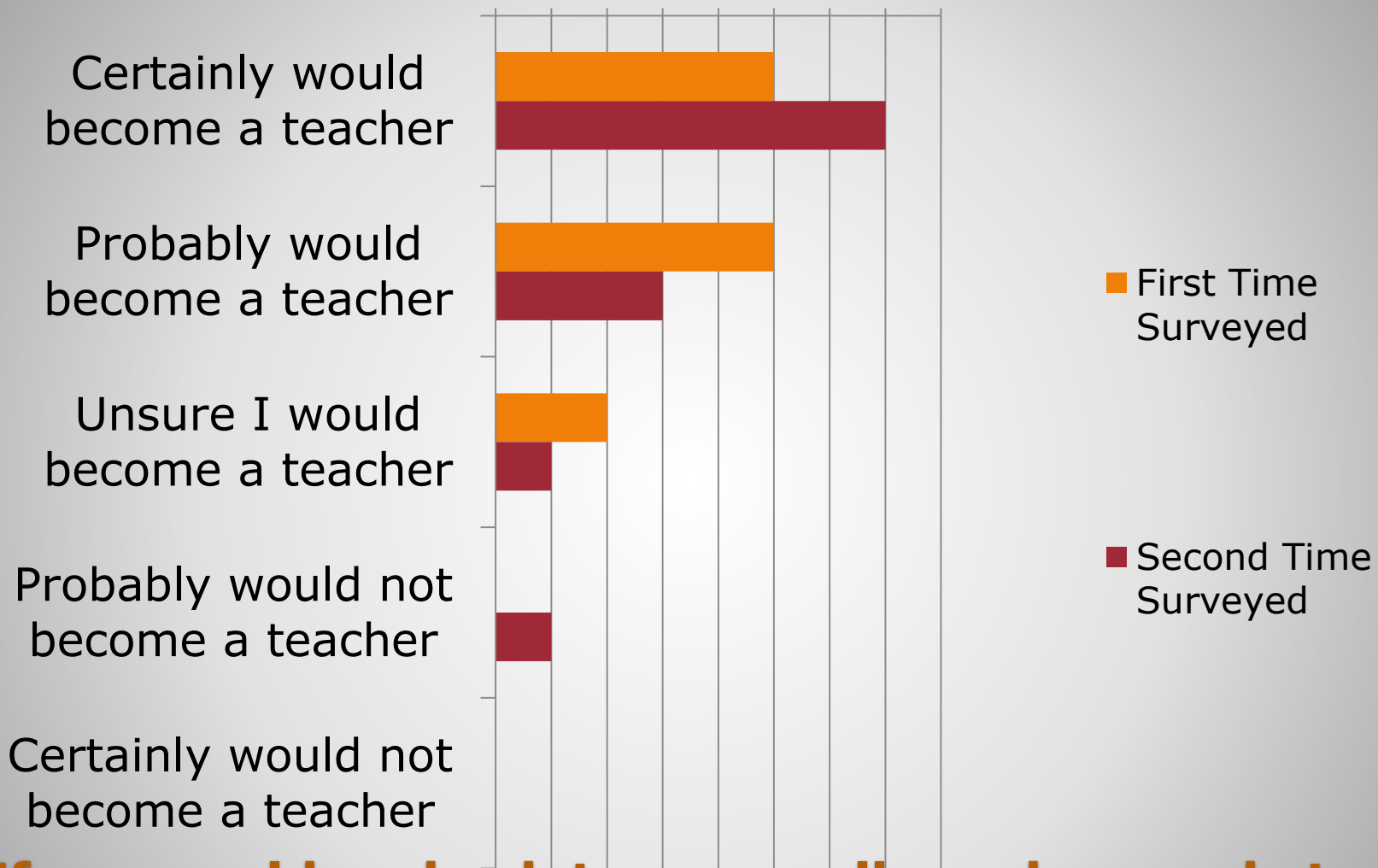


- Not Applicable
- Assessment
- Curriculum
- Instruction/Instructional Materials
- Classroom Management
- Collegial Collaboration
- Course Assignment/Load

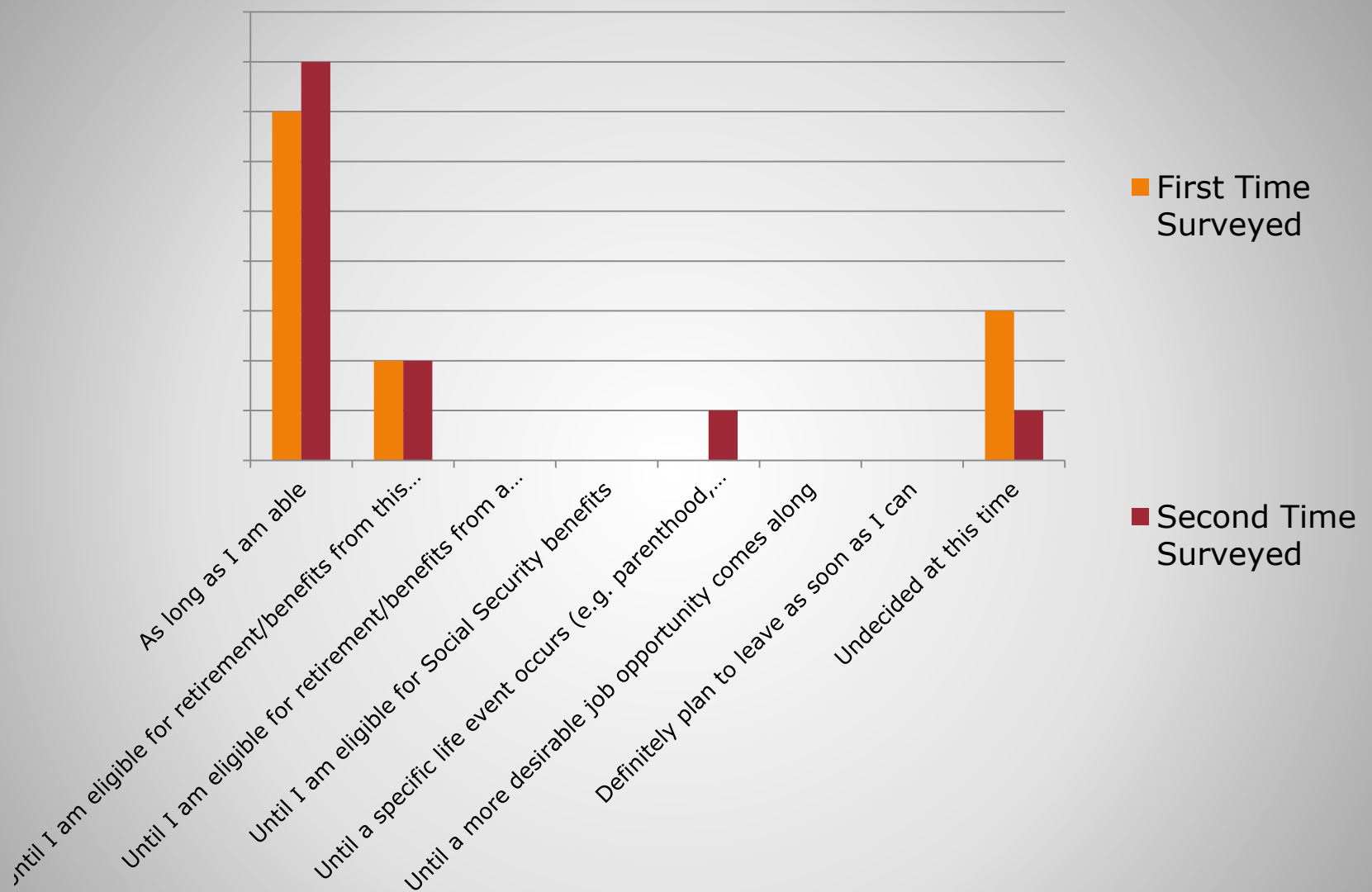
In what areas do you receive support from these administrators/university partners?



To what extent do you agree with the following statement: I am generally satisfied with being a teacher at this school



If you could go back to your college days and start over again, would you become a teacher?



How long do you plan to remain in teaching?



Qualitative Survey Results

Please describe the **most meaningful professional learning activity** you participated in recently and why it was influential on your ability to facilitate student learning.

Responses fell into 4 main categories (n=54):

- Collaboration with Colleagues, Mentor Teachers
 - 23 mentions
- Conferences & Trainings
 - 22 mentions
- University Professors/Courses
 - 5 mentions
- Classroom Observations
 - 4 mentions

**Most Meaningful
Professional Learning Activity**

*Please describe the **most meaningful, mathematics teaching-related support** that you received from an administrator and why it was meaningful for you.*

Responses were personal and varied (n=50):

- No meaningful support
 - 8 mentions
- Observation & Useful Feedback
 - 8 mentions
- Affirmation
 - 4 mentions
- All other responses detailed a specific experience where advice was sought out from an administrator, curriculum director and then implemented into the classroom. Examples include behavior management, parent communication, teaching techniques, and curriculum.

Teaching-Related Support

Please describe the **most meaningful professional community** you participated in recently...

Responses (n=50):

- *Mentor Teacher/Colleagues*
 - 39 mentions
- *Online PLC (Facebook, blogs, NCTM resources, webinars)*
 - 5 mentions
- *NOYCE*
 - 3 mentions
- *College Courses, Speakers/Conferences*
 - 3 mentions

Professional Communities

*If I could **change one thing** about my job, it would be...*

Responses fell into 5 main categories:

- Admin Support, Student Motivation/Behavior
 - 13 mentions
- Salary, Resources, Technology
 - 8 mentions
- Focus on Standardized Tests, Curriculum
 - 6 mentions
- Class Size
 - 6 mentions
- More Time
 - 6 mentions

Change

access accountability administration amount behavior class
classroom college community compensated computer current department discipline
district everything experience extra getting grade help higher home hours lack
learning load meetings motivated na nothing paid paperwork pay plan
problem professional program required resources salary school sizes
students subject support team test work year

**Q5: If I could change one thing
about my current teaching job, it
would be...**



A word cloud featuring various online activities and platforms. The words are in different sizes and orientations, with 'blogs', 'google', 'pinterest', 'teachers', and 'twitter' being the most prominent. Other words include 'activities', 'apps', 'byrdseed', 'century', 'com', 'current', 'ddmeyer', 'department', 'education', 'facebook', 'handles', 'instagram', 'learning', 'math', 'mrs', 'mvp', 'newell', 'pay', 'peers', 'people', 'pintrest', 'reddit', 'rockstar', 'talks', 'teach', 'ted', and 'videos'.

blogs google
activities apps byrdseed century com current ddmeyer department education facebook handles
instagram learning math mrs mvp newell pay peers people pinterest pintrest reddit rockstar
teachers twitter
talks teach ted videos

**Q7: Specific Online Activities
include...**



A word cloud of education-related terms. The words are arranged in a roughly rectangular shape, with 'students' and 'learning' being the largest and most prominent. Other large words include 'activity', 'classroom', 'help', 'professional', and 'strategies'. Smaller words include 'anticipate', 'assessment', 'class', 'collaboration', 'conference', 'create', 'currently', 'curriculum', 'department', 'development', 'different', 'discuss', 'district', 'engage', 'examples', 'experience', 'facilitate', 'focused', 'group', 'ideas', 'implement', 'influential', 'lesson', 'management', 'mathematics', 'meeting', 'mentor', 'observing', 'participated', 'practical', 'presented', 'session', 'share', 'solution', 'standards', 'summer', 'talk', 'tasks', 'thinking', 'together', 'training', and 'understanding ways'.

activity anticipate assessment class classroom collaboration
conference create currently curriculum department development different discuss district
engage examples experience facilitate focused group help ideas implement
influential learning lesson management mathematics meeting mentor
observing participated practical presented professional session share solution standards
strategies students summer talk tasks thinking together training
understanding ways

Q8: Recent professional learning activities that had a positive effect on facilitating student learning...



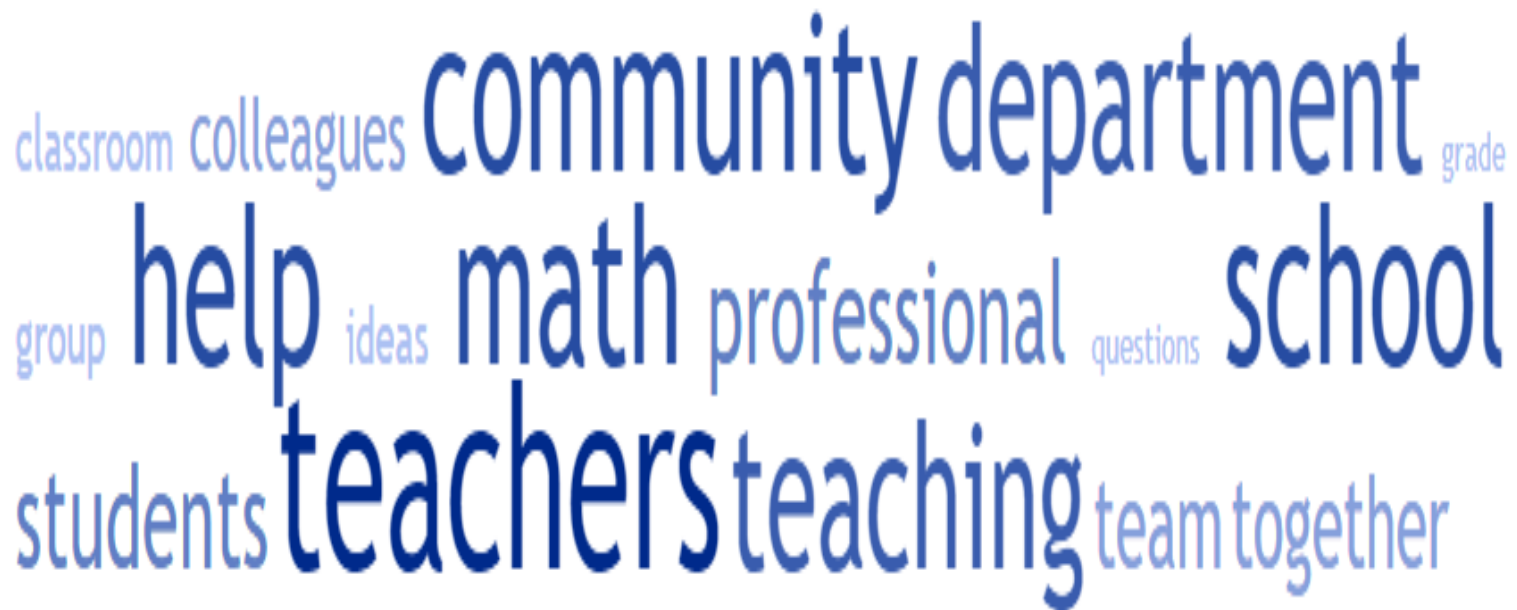
A word cloud of education-related terms. The words are arranged in a roughly rectangular shape, with some words being significantly larger than others. The largest words are 'students', 'teachers', 'teaching', 'learning', 'classroom', 'mathematics', 'excited', and 'love'. Other words include 'book', 'change', 'collaborating', 'colleagues', 'concepts', 'conference', 'course', 'department', 'development', 'different', 'discuss', 'district', 'education', 'engaging', 'enjoy', 'found', 'ideas', 'influential', 'involved', 'kids', 'lessons', 'meet', 'mentor', 'mindset', 'online', 'opportunity', 'participated', 'people', 'positive', 'practice', 'presentation', 'professional', 'reading', 'resources', 'seeing', 'share', 'strategies', 'struggling', 'talk', 'think', 'topics', and 'training'.

book change classroom collaborating colleagues concepts conference course
department development different discuss district education engaging enjoy
excited found ideas influential involved kids learning lessons love
mathematics meet mentor mindset online opportunity participated people positive
practice presentation professional reading resources seeing share strategies struggling
students talk teachers teaching think topics
training

Q9: Recent professional learning activities that had a positive effect on enthusiasm for teaching mathematics...

co-teacher colleagues cooperating counseling coworkers
department districts fellow jackson mentor
nearby parents principal sasa steve students substantial supervisor support
teachers therapist

**Q10: Other Support Avenues
included...**

A word cloud on a white rectangular background, set against a grey gradient backdrop. The words are in various shades of blue. The most prominent words are 'community', 'department', 'school', 'teachers', and 'teaching'. Other visible words include 'help', 'math', 'professional', 'students', 'team', 'together', 'classroom', 'colleagues', 'grade', 'group', 'ideas', and 'questions'.

classroom colleagues community department grade
group help ideas math professional questions school
students teachers teaching team together

**Q11: Participant's most
supportive professional
communities...**

- 93% of participants stated they somewhat or strongly agree that **they are satisfied with being a teacher** or a student teacher.
- 81% of participants stated that if **they could go back and start college again**, they would certainly or probably become a teacher
- Although 20% were undecided, **only 1% of participants planned to leave teaching as soon as possible**. 79% were either going to teach as long as possible or until they could receive retirement/benefits, or leave when a more desirable job or specific life event (e.g. parenthood, marriage) occurred.
- Certain professional **learning activities were very influential in increasing enthusiasm** for the emerging or early-career teachers, including **mentor/coach communications, professional development workshops, and collaboration with colleagues** at both district and school levels.
- Among on/off site support personnel, **school administrators were perceived as leading the way in supporting** the emerging or early-career teachers moderately or substantially.

**Administrative
Support of
Teachers**

**Professional
Growth
For Teachers**

Two Intervention Groups

By July 1, 2022,
ensure that at least
85% of those
completing MTE-P
programs and
employed in partner
school districts begin a
third year of
employment as a
mathematics educator.
(currently: 70%)



STRIDES Improvement Target

“5-minute chats” for principals and early career teachers focused on mathematics content



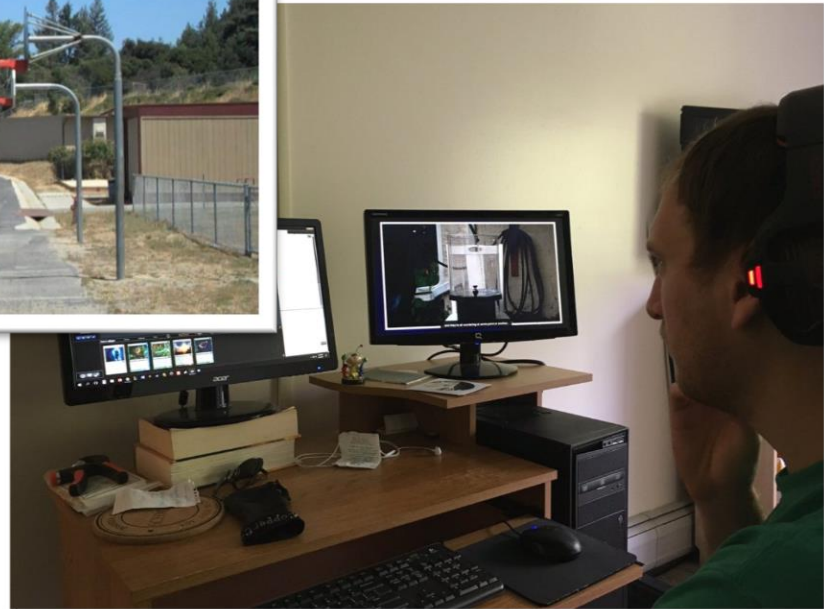
Matching Exercise: Please draw a line from the text descriptions on the left to the associated graphic on the right.

1. Establish mathematics goals to focus learning
2. Implement tasks that promote reasoning and problem solving
3. Use and connect mathematical representations
4. Facilitate meaningful mathematical discourse
5. Pose purposeful questions
6. Build procedural fluency from conceptual understanding
7. Support productive struggle in learning mathematics
8. Elicit and use evidence of student thinking



Potential Interventions-Admin I

“5-minute video content summaries” for administrators to view prior to observation



Potential Interventions-Admin II

(in process) Team led by Dr. Lisa Amick,
University of Kentucky



Potential Interventions – P.D.

- Info: <http://bit.ly/MTEP2018-registration>



7th Annual MTEP Annual Meeting

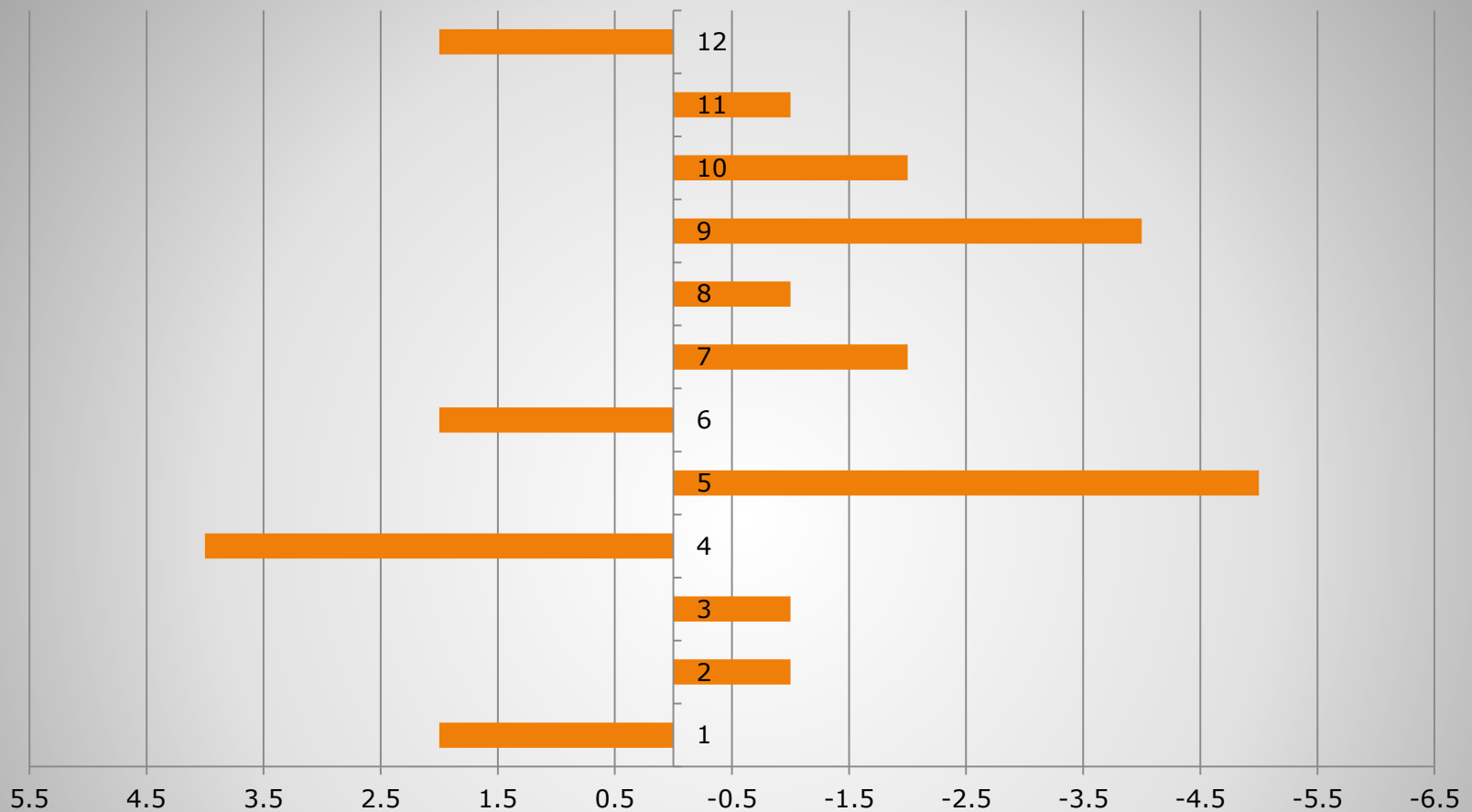


Discussion & Questions



Email: jmart176@utk.edu
Twitter: [@dolphinprof](https://twitter.com/dolphinprof)

Extra Slides



Semesters Remaining

**Number of Semesters Remaining to Complete
your Teaching Certificate Program**