The Rice University Robert Noyce Master Teaching Fellowship Program (RU-MTF)

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Year 3: 2018 Annual Report

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Introduction

Located in the heart of the greater-Houston metropolitan area, Rice University recognizes its responsibility and role to fully engage with the city of Houston and the Houston Independent School District (HISD). The Rice University Robert Noyce Master Teaching Fellowship Program (RU-MTF) is a partnership between the Rice University School Mathematics Project (RUSMP) and HISD to increase the mathematics expertise of secondary teachers. RUSMP identified 16 Master Teaching Fellows (MTF) and in June of 2017 began providing them with focused professional development, leadership development experiences, and salary supplements. Sadly, one of the MTFs died during the first year.

RU-MTF extends RUSMP's prior NSF Mathematics Leadership Institute (MLI) and MLI's Noyce Supplemental Award work, which developed and supported high school teacher leaders. Knowledge about and experience with MLI ensure that all aspects of RU-MTF are designed for maximum impact on mathematics education in the greater-Houston area. RU-MTF expands on MLI's work with high schools to include both middle and high schools.

Over five years (2016-2021) the RU-MTF will deepen the grounding of Master Teaching Fellows (MTFs) in sound mathematical content and research-based pedagogy, leadership, adult education, and mathematics advocacy skills. Reform-based mathematics teaching strategies, a central focus of the RU-MTF, emphasizes problem-solving and motivational strategies, classroom assessment, differentiated instruction, questioning strategies (National Council of Teachers of Mathematics, 2000), and mathematical knowledge for teaching (Hill, Ball, & Schilling, 2008) through sustained professional development that will encompass high-quality instructional methods deemed effective in past research (e.g., Desimone, 2009; Learning Forward, 2011).

By sharing their mathematics content knowledge and pedagogical techniques, MTFs will gain experience in developing meaningful professional learning experiences for teachers at their schools and across the district. In addition, MTFs serve as advocates for equitable mathematics excellence for HISD's ethnically diverse student body.

RU-MTF Goal and Objectives

The overarching goal of RU-MTF is to develop exceptional secondary mathematics teachers into leaders who are deeply grounded in sound mathematical content and research-based pedagogical, leadership, adult education, and mathematics advocacy skills. RU-MTF objectives are to develop MTFs who have:

1. a strong knowledge base in both university-level and secondary mathematics and a solid understanding of the connection between the two;
2. a deep understanding of and skills to implement effective precollege mathematics curriculum, instruction, and assessment;
3. exceptional leadership, mentoring, and adult education skills;
4. a robust understanding of equity and diversity issues in STEM, in particular mathematics; and
5. a repertoire of research-based methods for motivating and supporting ***all*** students to persist and achieve in mathematics with a special focus on motivating URMs.

Evaluation Design

This report concerns the second year of the RU-MTF (spring 2018, summer 2018, and fall 2018). This report presents a description of the evaluation design, a description of the second year of the program, an analysis of assessment results thus far, and a discussion of these results.

The purpose of this evaluation was to determine the extent to which the program's goals were met. Accordingly, the guiding questions of the evaluation were:

- To what extent are activities aligned with and sufficient to meet the project's goals and its objectives?
- How do project activities conform to its planned activities and timelines?
- How responsive are project developers to evidence of needs for project adjustments?
- How well does the mechanism work for tracking MTFs' progress?

Research and evaluation meetings were held with RUSMP administrators to ensure that activities were implemented as planned and when necessary appropriate adjustments were made.

The second summer program for the MTFs took place over three weeks from June 12th through June 28th. Prior to the summer program, MTFs completed a pre-RU-MTF survey measuring their engagement in leadership activities and diversity dispositions. Assessments of their mathematical knowledge for teaching (content and pedagogical knowledge) were administered on the first day of the 2018 summer program. The mathematics assessments and survey results will be used to measure changes in teachers' mathematical knowledge for teaching, engagement in leadership activities, understanding of diversity and equity issues in education, and their colleagues' perceptions of MTFs' leadership characteristics.

The report that follows is divided into three sections. The first section presents a description of the 2018 summer program components. The second section presents the results of teachers' mathematics content tests, survey responses, and 2018 program activities thus far. Finally, the third section presents a discussion of the results.

2018 Summer Program Description

The 2018 summer program extended and reinforced the core of RU-MTF activities initiated in 2017. The summer program was held at The Rice School/La Escuela Rice (June 12-14 and June 18-21) and in the RUSMP classroom (June 15 and June 25-28). Classes met from 8:30 a.m. until 3:30 p.m. each day of the summer program. The program included components on advanced mathematics content, secondary mathematics pedagogy, leadership skills, and diversity and equity issues in STEM.

RUSMP provided each MTF who attended the program with a stipend, classroom materials, and the textbook *Applications of Algebra and Geometry to the Work of Teaching* (2015). To satisfy the requirement of completing the first of two four-hour Rice University graduate courses in Contemporary Topics in Secondary Mathematics, MTFs worked and discussed mathematics problems in both small and large groups under the guidance of PI Dr. Anne Papakonstantinou, RUSMP Director, and Co-PI Dr. Richard Parr, RUSMP Executive Director.

During the last week of the summer program, MTFs also completed two additional AVID Path Trainings under the direction of Angie Potts, AVID instructional coach. The strands (Mathematics 2 and AVID

Culturally Relevant Teaching) complemented the mathematics learned in Contemporary Topics in Secondary Mathematics and supported the program's focus on diversity and equity.

The Mathematics II strand was designed to deepen mathematics teachers' understanding of concepts and methods practiced in Mathematics I (Summer 2017) and continued the focus on strategies outlined in AVID's The Write Path I Mathematics Teacher Guide which emphasized the use of Writing, Inquiry, Collaboration, Organization, and Reading (WICOR) as tools for learning in the mathematics classroom.

The second AVID strand, Culturally Relevant Teaching: Transforming Educators, was designed for experienced teachers ready to work with their colleagues to conduct self-examinations and address issues of race, class, gender, and accountability and provides a framework of effective methodologies that validate the culture of all students in the classroom and on the campus.

During the 2018 summer program, MTFs participated in or lead the following presentations:

- Co-PI Dr. Judy Radigan, Director of the Rice University Teacher Education Program (with MTFs, Federico Hernandez and Jason Ondruch) presented plans for two upcoming events:
    1. the RUSMP Spring Networking Conference (February 9, 2019) and
    2. Life in Schools (March 2, 2019)
- MTFs (Charlie Burrus, Gail Hamilton, Lan Wu with Adem Ekmekci) led a discussion about effective teaching related to their partnership with Noyce Fellows in Lafayette, Louisiana addressing two questions:
    1. What would guests see at your school?
    2. What would guests see as your influence at your school?
- Co-PI Professor Richard Tapia, University Professor, Maxfield-Oshman Chair in Engineering, Rice University discussed two of his recent writings "True Diversity Doesn't Come from Abroad" (published in the Chronicle of Higher Education) and Hiring and Promoting the Precious Few as Faculty (from his forthcoming book, *Using Mathematics to Enhance My Personal Life*)
- MTFs (Jason Ondruch, Ralph Polley, and Kamil Safin) led a discussion on "Growth Mindset and the Learning Pit"
- MTFs (Edmonia Everett, Stacy Jaster, Alexandre Mironychev, and Fabiola Stroud) led a discussion of project-based learning and inquiry-based teaching research findings
- MTFs (Mario Carillo, Maren Haenicke, and Patricia McMorris) led a discussion of research findings about supporting new teachers and teachers in need of assistance presented in *A Guide to Mathematics Leadership*
- Cherry Steinwender, founder of the Center for the Healing of Racism, informed MFTs about various forms of racism, asked teachers to identify forms of racism from written news reports, and led a discussion of "Education's Role in Healing Racism"

RU-MTFs' Mid-program Mathematics Content Test Scores and Survey Responses

Of the 15 MTFs in the 2018 summer program, eight were female; three were African American, seven were Anglo, two were Asian, and three were Latino.

Table 1 through Table 5 present the results of t-tests using MTFs' test scores and survey responses from the 2017 and 2018 Summer Programs. T-tests were conducted to measure the extent to which MTFs' pre-program mathematics and pedagogical knowledge, mathematics advocacy activities, knowledge and skills, beliefs about teaching and learning, and community connectedness changed from 2017 to 2018.

Table 1 presents MTFs' mathematical knowledge for teaching (content and pedagogical knowledge) in three content areas: number and operations content knowledge, geometry content knowledge, and patterns, functions, and algebra content knowledge using z-scores.

MTFs content and pedagogical knowledge increased at statistically significant levels in all three content areas. Not only were MTFs' 2018 mean scores significantly higher from but these differences were substantively meaningful. The values of Cohen's d indicate that RUSMP's Noyce program had moderate to large effect on increases in MTFs' mathematical content knowledge for teaching number concepts, geometry, and functions and algebra.

Table 1. Learning Mathematics for Teaching Assessment Results: t-test Results Presented by Content Area

	Descriptive Statistics					t-test for Equality of Means					
	Summer	N	Mean z-score	SD	SE	t	df	p	Mean Difference	SE Difference	Cohen's d
Number Concepts	2017	15	0.12	1.04	0.27	-2.319	14	0.036	-0.349	0.151	-0.599
	2018	15	0.47	0.92	0.24						
Geometry	2017	15	1.13	1.09	0.28	-2.298	14	0.037	-0.457	0.199	-0.593
	2018	15	1.59	0.80	0.21						
Functions and Algebra	2017	15	0.79	0.58	0.15	-3.252	14	0.006	-0.422	0.130	-0.840
	2018	15	1.22	0.75	0.19						

Table 2 presents MTFs' 2017 and 2018 ratings of their engagement in leadership activities. MTFs' 2018 reports of engaging in the following activities represented statistically significant increases from 2017:

- Involved (or served as a member) in professional teacher organizations
- Planned school improvement
- Presented/led a workshop/session for colleagues
- Initiated school activities

Table 2. Frequency of Teachers Engaging in Activities during Prior 12 Months

Activities	Descriptive Statistics					t-test for Equality of Means				
	Summer	N	Mean	SD	SE	t	df	p	Mean Difference	SE Difference
Involved (or served as a member) in professional teacher organizations	2017	15	2.00	1.00	0.26	-4.026	14	0.001*	-0.867	0.215
	2018	15	2.87	0.99	0.26					
Helped develop school policy	2017	15	2.40	1.06	0.27	-0.899	14	0.384	-0.200	0.223
	2018	15	2.60	1.12	0.29					
Involved in campus level decision-making	2017	15	2.87	0.92	0.24	0.000	14	1.000	0.000	0.195
	2018	15	2.87	0.92	0.24					
Planned school improvement	2017	15	2.40	1.06	0.27	-2.256	14	0.041*	-0.533	0.236
	2018	15	2.93	0.88	0.23					
Redesigned instruction based on student assessment	2017	15	3.53	0.92	0.24	-0.716	14	0.486	-0.200	0.279
	2018	15	3.73	0.46	0.12					
Shared ideas with colleagues	2017	15	3.67	0.49	0.13	NaN [a]				
	2018	15	4.00	0.00	0.00					
Served as a mentor to new teachers	2017	15	2.53	1.19	0.31	-0.587	14	0.567	-0.200	0.341
	2018	15	2.73	1.22	0.32					
Helped make personnel decisions	2017	15	2.80	1.27	0.33	0.673	14	0.512	0.267	0.396
	2018	15	2.53	0.99	0.26					
Created partnerships with the community	2017	15	2.13	1.13	0.29	-0.899	14	0.384	-0.200	0.223
	2018	15	2.33	1.05	0.27					
Involved in selecting types of professional development for my campus	2017	15	2.33	1.05	0.27	-0.222	14	0.827	-0.067	0.300
	2018	15	2.40	0.91	0.24					
Presented/led a workshop/session for colleagues	2017	15	2.07	1.10	0.28	-2.477	14	0.027*	-0.533	0.215
	2018	15	2.60	0.91	0.24					
Influenced school budgeting	2017	15	1.73	0.70	0.18	0.000	14	1.000	0.000	0.258
	2018	15	1.73	0.88	0.23					
Collaborated with peers	2017	15	3.73	0.59	0.15	-1.146	14	0.271	-0.200	0.175
	2018	15	3.93	0.26	0.07					
Led/chaired school committees	2017	15	2.27	1.22	0.32	-0.521	14	0.610	-0.133	0.256
	2018	15	2.40	1.18	0.31					
Reflected on my own teaching practice	2017	15	3.87	0.35	0.09	-1.000	14	0.334	-0.067	0.067
	2018	15	3.93	0.26	0.07					
Initiated school activities	2017	15	2.47	0.83	0.22	-2.358	14	0.033*	-0.600	0.254
	2018	15	3.07	0.80	0.21					

Note: *p<.05, 2-tailed

[a] Variance = 0 in MDP Shared ideas with colleagues

1=Not Yet, 2=Rarely, 3=Sometimes, 4=Often

Table 3 presents MTFs' ratings of their knowledge and skills dispositions related to the beliefs, relations, and knowledge of culturally relevant teaching. There were no statistically significant changes from 2017 to 2018 in MTFs ratings of their knowledge and skills dispositions in this area. In 2017, the mean subscale score of teachers' ratings of their knowledge and skills was 80.5 and this increased to 81.93 in 2018. On over half of these items scores were above 4.5, leaving very little room for significant increases.

Table 3. Diversity Disposition Index—Knowledge and Skills

	Descriptive Statistics					t-test for Equality of Means				
	Summer	N	Mean	SD	SE	t	df	p	Mean Difference	SE Difference
Total Subscale	**2017**	**15**	**80.53**	**8.12**	**2.09**	**-0.833**	**14**	**0.419**	**-1.4**	**1.681**
	2018	**15**	**81.93**	**5.63**	**1.45**					
I teach my students the skills to gain knowledge on their own.	2017	15	4.67	0.62	0.16					
	2018	15	4.67	0.49	0.13					
I work to develop my students' critical thinking skills.	2017	15	4.73	0.46	0.12					
	2018	15	4.87	0.35	0.09					
I am successful at creating meaningful relationships between students' existing knowledge and new information.	2017	15	4.67	0.49	0.13					
	2018	15	4.73	0.46	0.12					
Students enter my class with excitement about what the day will bring.	2017	15	3.87	1.06	0.27					
	2018	15	4.13	0.83	0.22					
I use the teaching moment to enhance my students' understanding of today's world.	2017	15	4.60	0.83	0.21					
	2018	15	4.53	0.52	0.13					
I provide opportunities and structure for my students to work cooperatively.	2017	15	4.47	0.64	0.17					
	2018	15	4.60	0.51	0.13					
I possess a large repertoire of teaching strategies to help students access their prior knowledge.	2017	15	4.33	0.90	0.23					
	2018	15	4.60	0.51	0.13					
I create opportunities for my students to express their knowledge in a variety of ways.	2017	15	4.53	0.64	0.17					
	2018	15	4.67	0.62	0.16					

Table 3. Diversity Disposition Index—Knowledge and Skills (cont'd)

	Descriptive Statistics					t-test for Equality of Means				
	Summer	N	Mean	SD	SE	t	df	p	Mean Difference	SE Difference
I create opportunities for and encourage my students to share their knowledge and talents with their peers.	2017	15	4.33	0.82	0.21					
	2018	15	4.67	0.62	0.16					
I differentiate expectations for individual students.	2017	15	4.53	0.52	0.13					
	2018	15	4.73	0.46	0.12					
I encourage my students to take responsibility for their own and their peers' learning.	2017	15	4.87	0.35	0.09					
	2018	15	4.80	0.41	0.11					
I make an effort to build positive relationships with my students' parents/guardians.	2017	15	4.73	0.59	0.15					
	2018	15	4.67	0.49	0.13					
I deliver instruction using an interactive process that enhances further discovery.	2017	15	4.33	0.90	0.23					
	2018	15	4.27	0.80	0.21					
Many of my lessons require my students to think critically.	2017	15	4.53	0.64	0.17					
	2018	15	4.60	0.63	0.16					
I determine where my students are academically and help them reach their potential.	2017	15	4.60	0.51	0.13					
	2018	15	4.67	0.49	0.13					
I help students understand how they are connected to global issues.	2017	15	4.33	0.90	0.23					
	2018	15	3.93	1.03	0.27					
I continue to reteach my students until they have an understanding of the content.	2017	15	4.27	0.80	0.21					
	2018	15	4.60	0.63	0.16					
I contact my students. parents/guardians about positive growth.	2017	15	4.13	0.52	0.13					
	2018	15	4.20	0.78	0.20					

Note: 1=Strongly Disagree, 2=Disagree, 3=Neither Disagree nor Agree, 4=Agree, 5= Strongly Agree

Table 4 presents MTFs' ratings of their beliefs about teaching and learning related to knowledge of culturally relevant teaching. There were no statistically significant changes from 2017 to 2018 in MTFs ratings of their beliefs about teaching and learning in this area. MTFs' mean subscale scores in 2017 and 2018 were identical. During both years, teachers' ratings of their beliefs about teaching and learning on all of these items were above 4.6, leaving very little room for significant increases.

Table 4. Diversity Disposition Index—Beliefs about Teaching and Learning

	Descriptive Statistics					t-test for Equality of Means				
	Summer	N	Mean	SD	SE	t	df	p	Mean Difference	SE Difference
Total Subscale	**2017**	**15**	**78.13**	**1.80**	**0.46**	**0**	**14**	**1**	**0**	**0.793**
	2018	**15**	**78.13**	**3.70**	**0.95**					
I believe that all students can succeed.	2017	15	4.73	0.59	0.15					
	2018	15	4.80	0.41	0.11					
I believe that all students can learn.	2017	15	4.87	0.35	0.09					
	2018	15	4.80	0.41	0.11					
I believe that students learn in a variety of ways.	2017	15	5.00	0.00	0.00					
	2018	15	4.87	0.35	0.09					
I demonstrate enthusiasm for the content I teach.	2017	15	4.93	0.26	0.07					
	2018	15	4.93	0.26	0.07					
I look for new ways to teach difficult material.	2017	15	5.00	0.00	0.00					
	2018	15	4.93	0.26	0.07					
I am enthusiastic about sharing knowledge with my students.	2017	15	5.00	0.00	0.00					
	2018	15	4.87	0.52	0.13					
I collaborate with others in order to learn and grow.	2017	15	4.80	0.41	0.11					
	2018	15	4.93	0.26	0.07					
I am reflective about how my actions affect student achievement.	2017	15	4.87	0.35	0.09					
	2018	15	4.93	0.26	0.07					
I can express myself creatively as a teacher.	2017	15	4.67	0.49	0.13					
	2018	15	4.73	0.46	0.12					
I continue to look for new information to share with my students.	2017	15	4.93	0.26	0.07					
	2018	15	5.00	0.00	0.00					
I learn from my students.	2017	15	4.93	0.26	0.07					
	2018	15	4.93	0.26	0.07					
I continually search for new knowledge within my content area.	2017	15	4.93	0.26	0.07					
	2018	15	4.87	0.35	0.09					

Table 4. Diversity Disposition Index—Beliefs about Teaching and Learning (cont'd)

	Descriptive Statistics					t-test for Equality of Means				
	Summer	N	Mean	SD	SE	t	df	p	Mean Difference	SE Difference
I am responsible for creating an atmosphere where all students feel free to openly exchange ideas, thoughts, and opinions.	2017	15	4.93	0.26	0.07					
	2018	15	4.93	0.26	0.07					
I believe in setting high standards for all students.	2017	15	4.80	0.41	0.11					
	2018	15	4.87	0.35	0.09					
I am passionate about my own learning.	2017	15	5.00	0.00	0.00					
	2018	15	4.93	0.26	0.07					
I believe that diversity enhances student knowledge.	2017	15	4.73	0.70	0.18					
	2018	15	4.80	0.41	0.11					

Note: 1=Strongly Disagree, 2=Disagree, 3=Neither Disagree nor Agree, 4=Agree, 5= Strongly Agree

Table 5 presents MTFs' ratings of their community connectedness related to the beliefs, relations, and knowledge of culturally relevant teaching. There were no statistically significant changes from 2017 to 2018 in MTFs overall ratings of their community connectedness although there was a slight increase in this subscale.

Table 5. Diversity Disposition Index—Community Connectedness

	Descriptive Statistics					t-test for Equality of Means				
	Summer	N	Mean	SD	SE	t	df	p	Mean Difference	SE Difference
Total Subscale	**2017**	**15**	**35.73**	**8.514**	**2.198**	**-1.54**	**14**	**0.146**	**-1.333**	**0.866**
	2018	**15**	**37.07**	**6.628**	**1.711**					
I collaborate on providing community service opportunities for my students.	2017	15	3.73	1.28	0.33					
	2018	15	4.00	0.93	0.24					
I plan instructional opportunities for my students to interact with peers, family members, and the whole community.	2017	15	3.93	1.03	0.27					
	2018	15	4.07	0.96	0.25					
I help my students make connections in their community.	2017	15	3.87	1.06	0.27					
	2018	15	3.87	0.99	0.26					
I encourage my students to give back to their community.	2017	15	4.47	0.74	0.19					
	2018	15	4.40	0.74	0.19					
I am involved in the community where I teach.	2017	15	3.73	1.34	0.35					
	2018	15	4.00	1.20	0.31					
It is important that I attend activities in my students' neighborhoods.	2017	15	3.80	1.08	0.28					
	2018	15	4.20	0.94	0.24					
I see myself as a part of the community in my role as a teacher.	2017	15	4.13	1.13	0.29					
	2018	15	4.47	0.92	0.24					
I welcome community members into my classes to share their skills.	2017	15	3.93	1.28	0.33					
	2018	15	3.93	0.96	0.25					
I work to establish positive school-community relationships.	2017	15	4.13	0.99	0.26					
	2018	15	4.13	0.99	0.26					

Note: 1=Strongly Disagree, 2=Disagree, 3=Neither Disagree nor Agree, 4=Agree, 5= Strongly Agree

Academic Year Follow-up Activities

Academic-year follow-up activities included a May 2, 2018 meeting of MTFs to discuss summer 2018 program activities and the draft syllabus as well as plans for 2018-2019 academic year. MTFs attended the RUSMP Fall Networking Conference on September 15, 2018 at Rice University in Sewell Hall. During the meeting, MTFs discussed their five-year plans, progress, and how to document their work. In addition, MTFs presenting at the RUSMP Spring Networking Conference (February 9, 2019) and those presenting tech sessions with the Rice University Teacher Education Program's Life in Schools Conference (March 2, 2019) were informed of the deadlines for submitting required materials.

As participants in the Noyce Master Teaching Fellowship Program, MTFs were expected to share the benefits of the expertise they gain with their campus colleagues by developing meaningful professional learning experiences for teachers at their schools and across the district. MTFs maintained activity logs documenting their work with district and campus administrators and teachers as well as their students.

A sample of activities from MTFs' 2018 logs are presented below. The activities are organized by the groups with whom MTFs worked as well as activities they pursued away from their campuses.

Administrators

- *Hosted the meeting with math department chairs of Houston ISD. Use of Texas Instruments technology in the classroom*

- *Building Relationships [b]etween Teachers and Principals Glasscock School of Continuing Studies…Taught a mini lesson in front of future teachers and administrators at Rice. Went over the pitfalls of my particular lesson and…had a panel discussion with the Principals about building a strong teacher/principal relationship.*

Teachers

Creating and Maintaining a Supportive Environment with Colleagues

- *Upper Level Math planning meeting…Follow through with the long-term planning so that students are prepared for the end of semester exams and for post-secondary mathematics.*

- *Walked the math classrooms to norm our observations and provide feedback to the mathematics teachers… Follow through with math teachers and assist them in what they need to have a successful learning environment.*

- *College Readiness, Scaffolding Access for All…take ideas back to school to share with colleagues*

- *Partners with a Purpose (using the 5 purposes in math teaching), The need for creating " horse-proof" questions, Charge!, Creating Sticky Ideas, Simple Unexpected Concrete Credible Emotionally connecting Stories, Quiz, Trade ideas… take ideas back to school to share*

- *Xth grade math teachers…Discussed how Saturday Academy went with their students. Directly named issues I saw that individual students were having… Continue to teach Saturday Academy for the Xth grade math team.*

- *Xth Grade Team…Discipline issues…We all feel exhausted and stressed out that we do not feel like the administration is backing us up. We feel alone.*

- *Xth Grade Math Team…How will we as a grade level prepare our students for STAAR? We need to be a cohesive group so that any Xth grader at any time can come to any class and be at the exact same place…We made them folders with a review, their practice test, and a sheet depicting their struggles.*

- *Interviewed potential Math teachers for math vacancies*

Using Data to Inform Instruction

- *Discussed critical writing in a mathematics class and how notation is very important, plus using correct wording in describing a problem. Ms. X pointed out how students who got 5s on practice exam got 4s on the AP because their inconsistent usage of the correct vocabulary… I will discuss the importance of using correct mathematical notation and word usage in my PAP Pre-Calculus classes.*

- *Xth grade math teachers…Discussed the content on the snapshot and predicted how the students will do compared to other years since the curriculum…Evaluate the trends on how the students did compared to other years since the order of the curriculum has changed.*

- *PLC Xth grade meeting…Assessment reports in OnTrack…Reflections: How can we use the data analysis reports to intervene and help students?... How are students discussing and reflecting in their own growth?*

- *We went over the AP Calculus AB results and noticed that only 7 out 67 passed the exam. We were not part of the AB program last year but X is teaching the course this year. We described strategies needed to improve this pass rate because this was not acceptable…Planning out Saturdays once per person to help with only the AB students be better prepared*

Educating Colleagues

- *Book study with…math teachers regarding effective instructional techniques for mathematics instruction*

- *PLC Xth grade meeting… Analysis of the article "Language and brain-based strategies" Marsha Tate…High achieving classrooms: teacher talks about 55% of the time, Low achieving – 80%...Decrease the teachers talk and increase students' participation.*

- *PLC Xth grade meeting… Analysis of the article "Instructional Strategies for Note-Taking and Summarizing"… Implement note-taking strategies in math classes.*

- *Talked to X today and since she has a better relationship with the PreCalculus students than me (she's also a PAP Algebra 2 teacher), we decided to hand out the text books later. She felt that some students would possibly drop the course within the week…We will be building relationships with students to make sure the classes that they are in are the correct match for their abilities and work ethic.*

Students

- *Hosted scientist, Dr. X, addressing my students about what working scientists really do. Dr.X came to us courtesy of the Rice University STEM Outreach program sponsored by Rice University's Baker Institute for Public Policy.*

- *Purple Comet math competition. The kids said this was the best competition they participated in all year. They enjoyed the collaborative aspect of it. Some of the problems were hard!*

- *We had our first Math Olympiad meeting today. Discussed with students about AMC 12 and Purple Comet competitions. We discussed how we could use this time to teach mathematics and focus on topics that they wished they saw more of in their courses….Setting up GroupMe account for better communication and ideas between students and me. Planning to advertise more and get more students involved in the program.*

- *After school activity…Math Competition: Solving Math and Logic puzzle problems…Create a bank of interesting math and logic problems and puzzles.*

- *20 11th grade female students, teacher …Field trip to Galveston, Women in Industry Conference…Started planning and arranging for this conference in December*

- *SECME Robotics LEGO competition at the South Early College HS…Plan competitions for the next school year*

MTF

- *Spend 40 hours this summer interacting with Bluware Inc. computer scientists as they develop software for the oil and gas industry…Develop[ed] a deeper understanding of the skills and dispositions necessary for success in STEM fields…Share their experiences at the RUSMP 2018 Fall Networking Conference*

- *Presenter in Fall Networking Conference spotlighting the RUSMP Texas Teacher Externship Program (TEX2), a collaboration with Bluware, a software development company. A keynote presentation, Organization Culture in Software Delivery, by Andrew Kennedy, Agile Practice Manager from Bluware…My team shar[ed] our summer externship experiences and the project [we] created.*

- *Math Department Rigor Institute…at Houston Community College…The sequence of remedial math classes has been completely redone and leads to a new selection of classes that count towards majors and certificates. We reviewed data about the degree to which students have been getting through the process and graduating. We have a long way to go.*

- *HISD Job alike day. I participated in professional development on Restorative Justice…my…has been gradually moving my high school in this direction. The training was very positive and, I believe, the beliefs, methods, and attitudes, will help create a more positive and cooperative spirit on our campus.*

- *My calculus skills are much improved. I still cannot do a full derivation for Euler's Identity but it will come.*

- *Spring Networking Conference at Rice Middle School…My presentation "How to get out of the Learning Pit" within the group presentation "Selling the students to themselves"…[Noyce MTF], [Noyce MTF], and me will present it again to Robert Noyce MTF members in June 2018*

- *International symposium "Education and City: Partnership for Success"…Online presentation "Comparison of Geometry Curriculum in American and Russian Schools"…Prepare the publication*

Discussion

RU-MTF activities continue to be both aligned with and sufficient to meet the project's goal and objectives; and these activities continue to conform to the planned activities and timelines outlined in the proposal. RUSMP administrators continue to make appropriate project adjustments as needed. Data collection methods—assessments, observations, portfolio reviews, and surveys—promote the timely tracking of MTFs' progress.

MTFs' 2018 content knowledge assessment results were statistically significantly higher, than their 2017 scores, in all three domains—number concepts and operations, geometry, and functions and algebra. The effect sizes associated with these score increases indicate that participating in the RU-MTF had a

moderate to large effect on MTFs number concepts and operations, geometry, and functions and algebra content knowledge.

In many areas, the activities in which MTFs' engaged increased or remained at high levels (≥3.5) from 2017 to 2018. From 2017 to 2018, MFTs significantly increased their involvement in professional teacher organizations, planning school improvement, presenting or leading a workshop or session for colleagues, and initiating school activities. However, the frequency with which MTFs engaged in many activities remained unchanged from 2017 to 2018. The activities MTFs reported engaging in most frequently were: reflecting on my own teaching practice, collaborating with peers, sharing ideas with colleagues, and redesigning instruction based on students' assessments. During the same timeframes, MTFs reported engaging in the following activities infrequently: creating partnerships with the community, selecting types of professional development for my campus, influencing the school budget, and leading or chairing school committees. However, these activities represent opportunities for MTFs to broaden their spheres of influence.

MTFs entered the program with high ratings on the Diversity Disposition Index's "Knowledge and Skills" and "Beliefs about Teaching and Learning" subscales. Their 2017 and 2018 self-ratings on these subscales were high (with no statistically significant increases) suggesting a ceiling-effect. To the extent that these subscales measure a disposition toward diversity, they can be expected to remain high.

However, MTFs' self-ratings on the "Community Connectedness" subscale of the Diversity Disposition Index remain lower than self-ratings on the "Knowledge and Skills" and "Beliefs about Teaching and Learning" subscales. These results suggest that MTFs' community connectedness is an area for growth. Investigating the institutional barriers MTFs encounter or their reluctance to develop stronger connections with the communities in which their students' live may identify changes MTFs can initiate to strengthen school and community bonds.

In 2018, MTFs continued their work to improve mathematics teaching and learning on their campuses. Their activity log entries documented the multifaceted nature of their work with teachers, administrators, and students. In addition, MTFs broadened their knowledge of mathematics applications in STEM through their work with local industries, made international connections with other educators, and worked with Houston-area instructors at Rice and other institutions of higher education.

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