The Rice University School Mathematics Project (RUSMP)

Evaluation Report for 2022 Summer Campus Program for Teachers (Virtual)

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2022 Summer Campus Program (Virtual)

In the summer of 2022, the Rice University School Mathematics Project (RUSMP) offered its 36th annual Summer Campus Program (SCP) for mathematics teachers in Houston, its neighboring areas, and around Texas. With emphasis on problem-solving, motivation, use of manipulatives, real-world applications, and technology in mathematics classrooms, the SCP provided an active learning approach to professional development in pedagogy and mathematics content. The SCP focused on concept-based learning activities for numbers concepts, algebraic reasoning, and geometry and calculus by "Integrating Geometry into the Algebraic and Number Strands." Participating teachers attended one of three classes: Elementary (2nd–5th grade teachers; 16 attendees), Middle School (6th grade–Algebra I teachers; 21 attendees), and High School (Geometry–Calculus teachers; 17 attendees). RUSMP provided each participant with classroom materials, including books, manipulatives, and other resources to support instruction before the virtual program started on June 13, 2022. At least two Master Teachers led each class. Most Master Teachers were former RUSMP participants themselves. All 54 teachers who attended the SCP were invited to complete pre- and post-surveys. Fifty-two teachers completed the demographic and professional background questionnaire prior to the SCP. These teachers came from 35 different schools (including public schools in three independent school districts, one charter school system, and five private schools) to participate in the program. All participants except for one assistant principal were classroom teachers during the 2021-2022 school.

The program was held from 9:00 a.m. to 3:00 p.m. Mondays through Thursdays via Zoom from June 13 through June 16 and June 20 through June 23. Each morning, teachers joined the Zoom meetings and engaged in different activities where they undertook the role of students and actively explored important mathematics content and discussed pedagogical strategies to enact various educational activities. These activities included hands-on individual work (with resources provided by RUSMP) or mini-projects with peers (using the Zoom breakout rooms). Most of the afternoons were designed for teachers to discuss and engage in various work and tasks with their peers.

All participants received a certificate of attendance and 48 Continuing Professional Education (CPE) contact hours. In addition, Houston ISD awarded 6 hours of Gifted and Talented Professional Development credit.

Program Goals

The program provides rigorous, innovative professional development for teachers who are not "highly qualified" as defined by the former K-12 education law, No Child Left Behind (NCLB) to progress towards this goal. The program assists teachers as they work towards the goal of being "adequately prepared" and helps "adequately prepared" teachers become "highly qualified." Instructional activities foster the development of a conceptual framework that is necessary for a deep understanding of the K-12 mathematics concepts developed.

Program Objectives

- Teachers' technological pedagogical content knowledge will increase in mathematics.
- Teachers' methodology in the appropriate use of technology and manipulatives in the math classroom will improve for the targeted mathematics TEKS.
- Teachers will learn how to implement engaging, student-centered inquiry-based instructional methods for mathematics instruction.
- Teachers will learn how to use a variety of assessment methods including appropriate ongoing formative strategies to guide instruction.
- Teachers' self-efficacy, confidence, and sense of preparedness in teaching mathematics will improve.

Evaluation

Overall, 52 participants completed the pre-survey and 50 completed the post-survey. The number of participants who completed both surveys was 49. The surveys included information about the background of participants in addition to the Likert-scale items to assess RUSMP's impact on SCP participants in specific areas (e.g., teaching self-efficacy, diversity dispositions, and confidence in their preparedness and teaching skills for mathematics instruction). Participants' survey responses were used to conduct paired samples *t*-tests and measure changes as a result of participating in the SCP in the following specific areas: teachers' motivational beliefs about mathematics and mathematics teaching; teachers' knowledge and beliefs about pedagogical content knowledge as well as standards-based mathematics teaching and assessments; confidence in their preparedness and teaching skills for mathematics instruction; and their diversity dispositions (Tables 2-10). The significant improvements in respective areas are marked by *, **, or *** in these tables (more *s mean greater significance). The tables indicate changes for both by class (elementary, middle, and high) and the whole group.

Participants' evaluations of the SCP classroom climate and ratings about their overall satisfaction with the program were also analyzed (Figures 1-7). A summary of the significant results is provided in the Conclusion section at the end of the report. Appendix A contains a list of survey items used to assess teachers' beliefs, attitudes, and perceptions.

As presented in Table 1 below, there were significantly more female teachers than male teachers overall, even though the number of high school male teachers was slightly more than the number than female high school teachers. In term of ethnicity, the SCP had a very diverse composition. More than 30% of the SCP participants were novice teachers who had 5 years or less teaching experience. Most of the teachers did not have a standard teacher certification. Lastly, most of the teachers volunteered to attend the SCP rather than being requested to attend by their school administrations.

Table 1
Program Class Demographics

	SCP Teachers (All)	SCP Teachers (Elementary)	SCP Teachers (Middle School)	SCP Teachers (High School)
	N = 52	*N* = 15	*N* = 21	*N* = 16
Gender				
Female	75%	100%	81%	44%
Male	25%	0%	19%	56%
Ethnicity				
White, Non-Hispanic	39%	20%	57%	31%
Black, Non-Hispanic	17%	33%	5%	19%
Hispanic	27%	40%	24%	19%
Asian/Pacific Islander	13%	7%	9%	25%
Other	4%	0%	5%	6%
Years Teaching				
0-1	13%	20%	14%	6%
2-3	8%	7%	9%	6%
4-5	10%	20%	5%	6%
6-10	32%	20%	38%	38%
11-20	29%	33%	24%	31%
21-30	6%	0%	10%	6%
31+	2%	0%	0%	6%
Certification				
Standard	46%	73%	43%	25%
Provisional	39%	27%	43%	44%
None	15%	0%	14%	31%
Volunteered	79%	40%	95%	94%

Program Outcomes

Self-efficacy for Teaching

Table 2

Paired-Samples t-test Results on Measures of Teacher Self-efficacy Before and After PD

	Time 1		Time 2				95% CI		Cohen's d
Variable	**M**	**SD**	**M**	**SD**	**Mean Δ**	**t**	**LL**	**UL**	
Elementary									
Instruction	4.20	.58	4.60	.39	.40	3.29**	.14	.66	.85
Student Engagement	4.27	.60	4.67	.35	.40	3.23**	.13	.67	.83
Middle School									
Instruction	3.90	.71	4.04	.68	.14	1.10	-.13	.41	.26
Student Engagement	4.07	.59	3.92	.76	-.15	-.96	-.49	.18	-.23
High School	4.28	.53	4.28	.53	.00	1.13	-.27	.27	.00
Instruction	4.08	.60	4.25	.61	.17	.00	-.15	.48	.00
Student Engagement									
Overall									
Instruction	4.11	.65	4.29	.59	.18	2.37*	.03	.33	.34
Student Engagement	4.14	.63	4.26	.67	.12	1.34	-.06	.30	.34

Note. *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$

Self-efficacy for Mathematics Teaching

Table 3

Paired-Samples t-test Results on Measures of Teachers' Self-efficacy for Mathematics Teaching Before and After PD

	Time 1		Time 2				95% CI		Cohen's d
	M	**SD**	**M**	**SD**	**Mean Δ**	**t**	**LL**	**UL**	
Elementary	3.91	.48	4.32	.32	.41	2.22*	.03	.78	.60
Middle School	4.02	.56	3.96	.59	-.06	-.69	-.25	.13	-.16
High School	4.16	.44	4.19	.59	.02	.27	-.16	.21	.07
Overall	4.03	.50	4.14	.53	.11	1.51	-.04	.26	.22

Note. *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$

Mathematics Self-Concept

Table 4

Paired-Samples t-test Results on Mathematics Self-Concept Before and After PD

	Time 1		Time 2				95% CI		Cohen's d
	M	**SD**	**M**	**SD**	**Mean Δ**	**t**	**LL**	**UL**	
Elementary	3.53	.73	3.66	.65	.13	2.25*	.00	.26	.58
Middle School	4.00	.56	4.11	.55	.11	1.11	-.10	.33	.26
High School	3.84	.69	3.82	.74	-.02	-.20	-.23	.20	-.05
Overall	3.80	.67	3.88	.66	.08	1.48	-.03	.18	.21

Note. *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$

Epistemic Beliefs for Mathematics

Table 5

Paired-Samples t-test Results on Measures of Teachers' Epistemic Beliefs for Math (non-Availing) Before and After PD

	Time 1		Time 2				95% CI		Cohen's d
Variable	**M**	**SD**	**M**	**SD**	**Mean Δ**	**t**	**LL**	**UL**	
Elementary									
Certainty of Knowledge	2.78	.55	2.60	.62	-.18	-1.27	-.48	.12	-.33
Middle School									
Certainty of Knowledge	2.74	.50	2.59	.49	-.15	-1.64	-.35	.04	.39
High School									
Certainty of Knowledge	2.55	.53	2.42	.56	-.13	-.95	-.43	.17	-.25
Overall									
Certainty of Knowledge	2.69	.52	2.54	.55	-.15	-2.22*	-.29	-.01	-.32

Note. *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$

Technological Pedagogical Content Knowledge

Table 6

Paired-Samples t-test Results on Technological Pedagogical Content Knowledge Before and After PD

	Time 1		Time 2				95% CI		Cohen's d
	M	**SD**	**M**	**SD**	**Mean Δ**	**t**	**LL**	**UL**	
Elementary	3.96	.57	4.15	.94	.19	.77	-.34	.71	.20
Middle School	3.88	.45	4.12	.63	.24	1.48	-.10	.59	.35
High School	4.20	.59	4.41	.51	.21	1.13	-.19	.62	.29
Overall	4.00	.54	4.22	.71	.22	1.93	-.01	.44	.28

Note. *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$

Standard-Based Teaching

Table 7

Paired-Samples t-test Results on Measures of Teachers' Standards-Based teaching Before and After PD

	Time 1		Time 2				95% CI		Cohen's d
Variable	**M**	**SD**	**M**	**SD**	**Mean Δ**	**t**	**LL**	**UL**	
Elementary									
Student Tasks	3.98	.44	4.38	.69	.40	1.93	-.04	.84	.50
Student-Student Interaction	4.44	.45	4.49	.62	.04	.27	-.31	.40	.07
Teacher's Role	4.33	.52	4.60	.60	.27	1.10	-.26	.79	.28
Discovery	3.53	.92	3.80	1.52	.27	.89	-.38	.91	.23
Middle School									
Student Tasks	3.83	.56	4.13	.72	.30	1.27	-.20	.79	.99
Student-Student Interaction	4.11	.63	4.46	.63	.35	1.96	-.03	.73	.76
Teacher's Role	3.78	.58	4.42	.55	.64	3.17**	.21	1.06	.85
Discovery	3.28	1.02	4.22	.73	.94	3.45**	.37	1.52	.81
High School									
Student Tasks	3.87	.55	4.36	.65	.49	2.24	.02	.96	.58
Student-Student Interaction	4.28	.56	4.47	.52	.19	1.05*	-.20	.58	.27
Teacher's Role	3.80	.62	4.50	.57	.70	5.50***	.43	.97	1.42
Discovery	3.73	.59	4.13	1.19	.40	1.03	-.43	1.23	.27
Overall									
Student Tasks	3.89	.52	4.28	.68	.39	3.08**	.14	.64	.45
Student-Student Interaction	4.27	.56	4.47	.58	.21	2.02*	.00	.41	.29
Teacher's Role	3.96	.62	4.50	.57	.54	4.70***	.31	.77	.68
Discovery	3.50	.88	4.06	1.16	.56	3.03**	.19	.94	.44

Note. *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$

Assessment

Table 8

Paired-Samples t-test Results on Teachers' Beliefs about Assessment Before and After PD

	Time 1		Time 2				95% CI		Cohen's d
	M	**SD**	**M**	**SD**	**Mean Δ**	**t**	**LL**	**UL**	
Elementary									
Summative	2.65	.52	3.07	.98	.42	2.65*	.08	.75	.68
Formative	4.24	.44	4.31	.47	.07	.96	-.08	.22	.25
Testing	1.56	.53	1.83	.80	.28	1.27	-.19	.75	.33
Large-scale	2.32	.98	2.32	.70	.00	.00	-.43	.43	.00
Middle School									
Summative	2.97	.72	2.71	.55	-.26	-2.00	-.54	.01	-.47
Formative	4.34	.41	4.04	.69	-.30	-2.11	-.60	.00	-.50
Testing	2.04	.39	2.06	.61	.02	.21	-.17	.20	.05
Large-scale	3.03	.71	2.64	.74	-.39	-2.72*	-.69	-.09	-.64
High School									
Summative	2.43	.84	2.70	1.03	.27	.98	-.32	.85	.25

	Time 1		Time 2				95% CI		Cohen's d
	M	**SD**	**M**	**SD**	**Mean Δ**	**t**	**LL**	**UL**	
Formative	4.24	.51	4.41	.44	.17	1.68	-.05	.39	.43
Testing	1.76	.51	1.74	.65	-.01	-.08	-.30	.28	-.02
Large-scale	2.45	.92	2.68	.97	.23	1.75	-.05	.50	.45
Overall									
Summative	2.70	.73	2.82	.86	.11	.99	-.12	.35	.14
Formative	4.28	.44	4.24	.57	-.04	-.53	-.18	.11	-.08
Testing	1.80	.51	1.89	.69	.09	1.04	-.09	.27	.15
Large-scale	2.63	.91	2.55	.81	-.08	-.77	-.27	.12	-.11

Note. *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$

Level of Preparedness to Use Pedagogical Techniques

Table 9

Paired-Samples t-test Results on Pedagogical Preparedness Before and After PD

	Time 1		Time 2				95% CI		Cohen's d
	M	**SD**	**M**	**SD**	**MeanΔ**	**t**	**LL**	**UL**	
Elementary	2.96	.32	4.47	.43	1.51	20.85***	1.35	1.66	5.38
Middle School	2.83	.52	4.11	.55	1.28	8.75***	.97	1.59	2.06
High School	3.07	.52	4.33	.53	1.26	10.27***	1.00	1.53	2.65
Overall	2.95	.47	4.29	.52	1.35	18.94***	-.27	.12	2.73

Note. *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$.

Diversity Dispositions

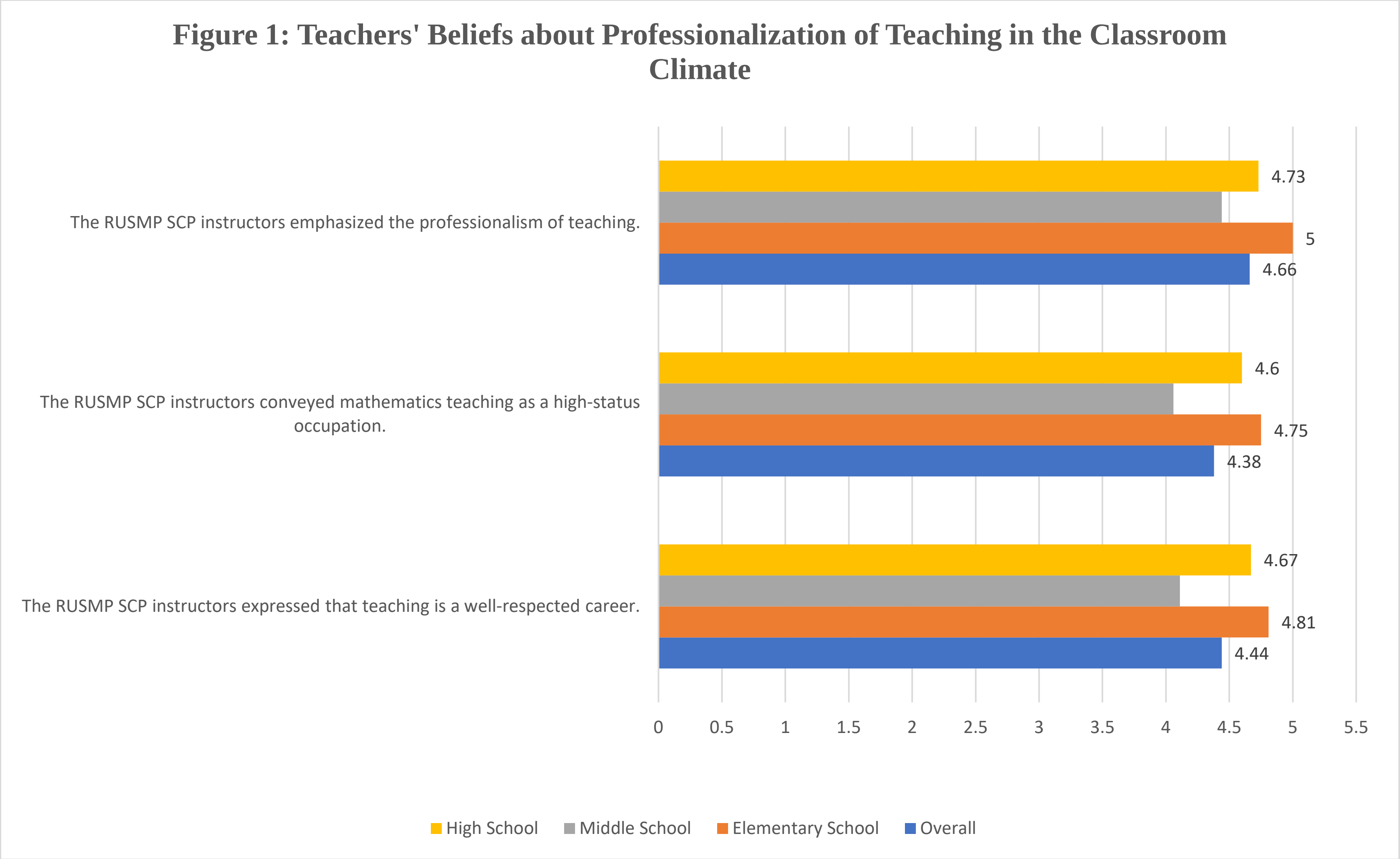
Table 10

Paired-Samples t-test Results on Teachers' Diversity Disposition Before and After PD

	Time 1		Time 2				95% CI		Cohen's d
	M	**SD**	**M**	**SD**	**MeanΔ**	**t**	**LL**	**UL**	
Elementary	1.17	.23	1.31	1.02	.15	.52	-.45	.75	.14
Middle School	1.34	.40	1.56	.99	.22	.87	-.31	.74	.21
High School	1.34	.42	1.90	1.56	.56	1.38	-.31	1.43	.36
Overall	1.29	.36	1.59	1.20	.30	1.70	-.06	.66	.25

Note. *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$.

SCP’s Classroom Climate



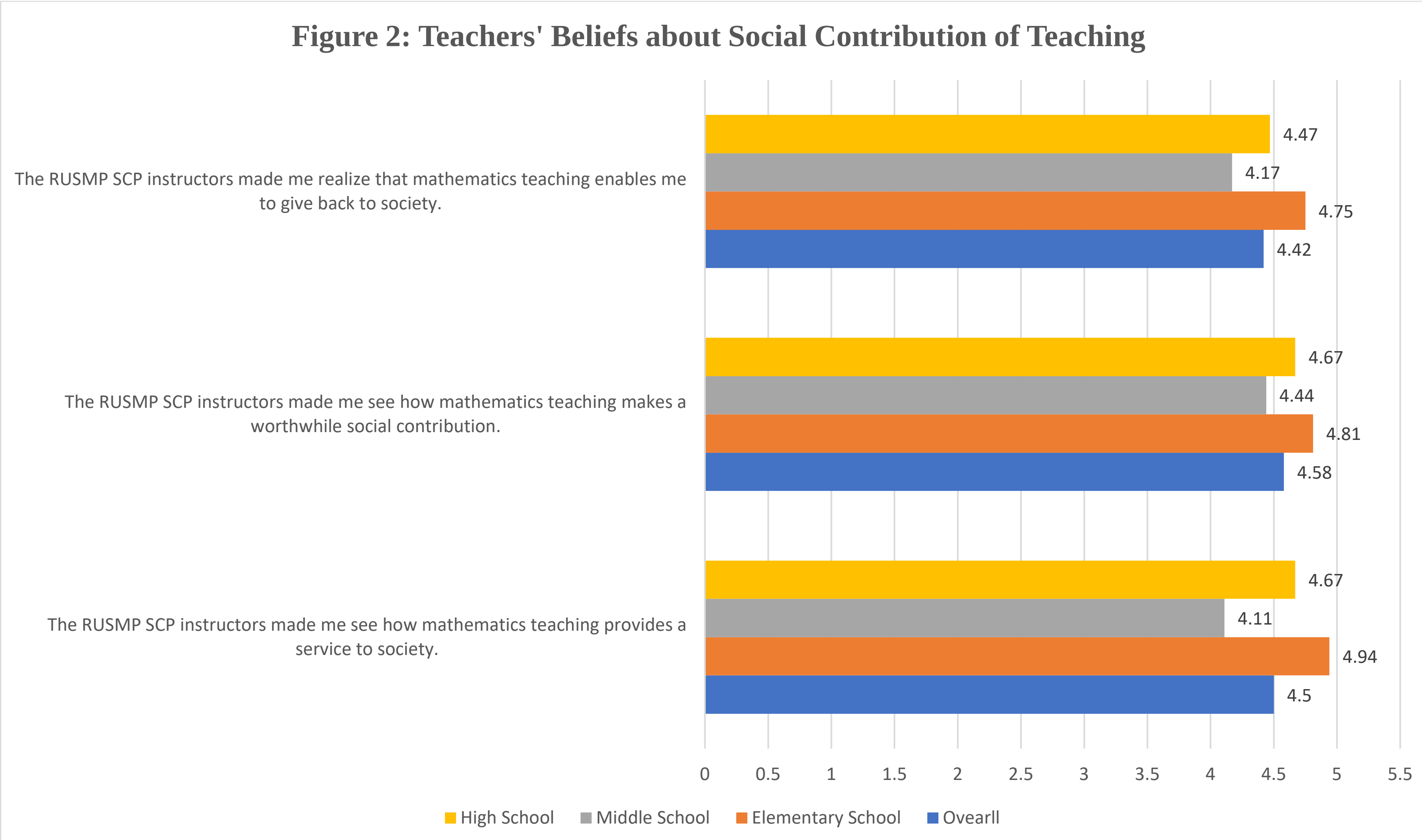


Figure 2: Teachers' Beliefs about Social Contribution of Teaching
The RUSMP SCP instructors made me realize that mathematics teaching enables me to give back to society.
4.47
4.17
4.75
4.42
The RUSMP SCP instructors made me see how mathematics teaching makes a worthwhile social contribution.
4.67
4.44
4.81
4.58
The RUSMP SCP instructors made me see how mathematics teaching provides a service to society.
4.67
4.11
4.94
4.5
0 0.5 1 1.5 2 2.5 3 3.5 4 4.5 5 5.5
High School
Middle School
Elementary School
Ovearll

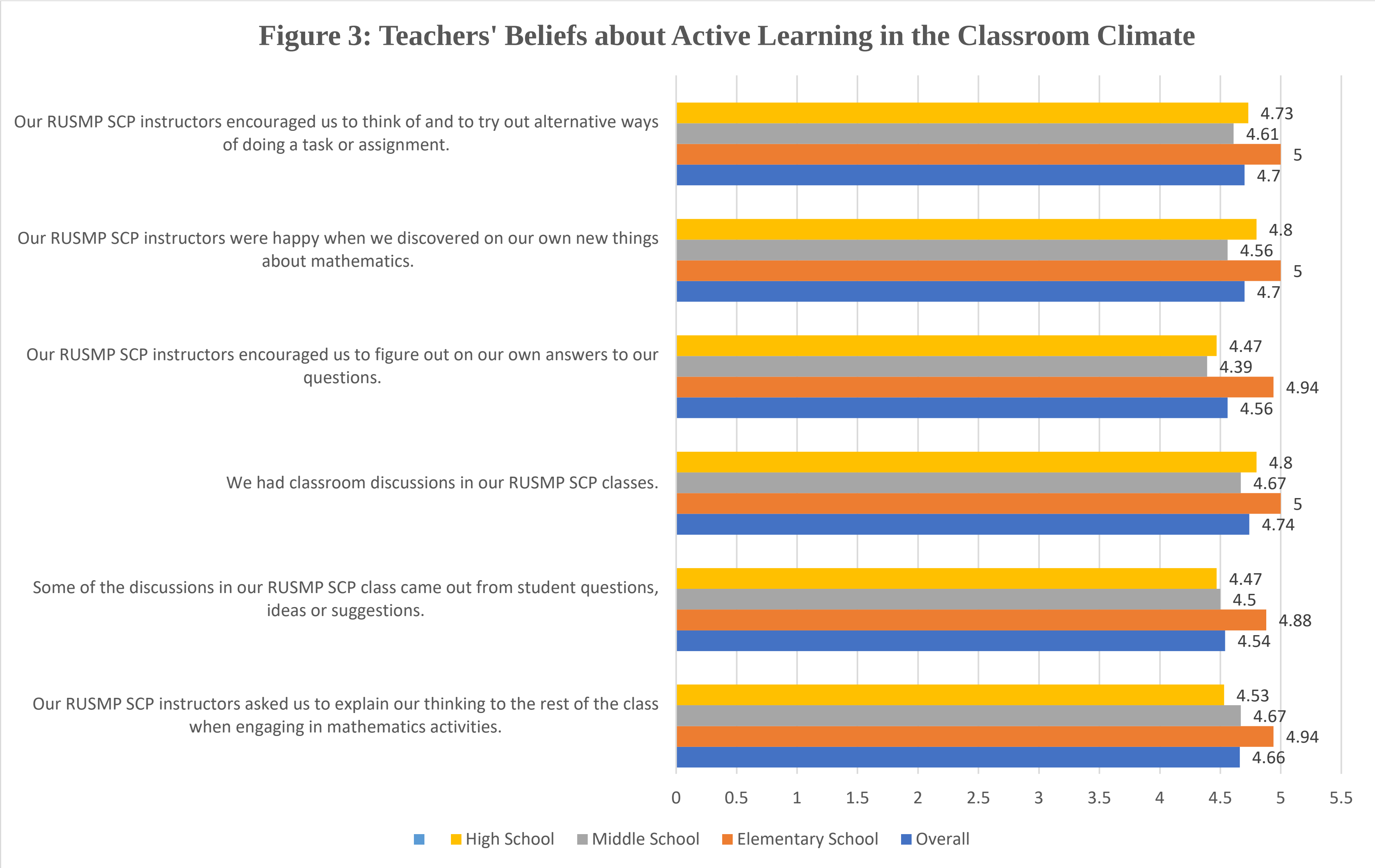


Figure 3: Teachers' Beliefs about Active Learning in the Classroom Climate
Our RUSMP SCP instructors encouraged us to think of and to try out alternative ways of doing a task or assignment.
4.73
4.61
5
4.7
Our RUSMP SCP instructors were happy when we discovered on our own new things about mathematics.
4.8
4.56
5
4.7
Our RUSMP SCP instructors encouraged us to figure out on our own answers to our questions.
4.47
4.39
4.94
4.56
We had classroom discussions in our RUSMP SCP classes.
4.8
4.67
5
4.74
Some of the discussions in our RUSMP SCP class came out from student questions, ideas or suggestions.
4.47
4.5
4.88
4.54
Our RUSMP SCP instructors asked us to explain our thinking to the rest of the class when engaging in mathematics activities.
4.53
4.67
4.94
4.66
0 0.5 1 1.5 2 2.5 3 3.5 4 4.5 5 5.5
High School
Middle School
Elementary School
Overall

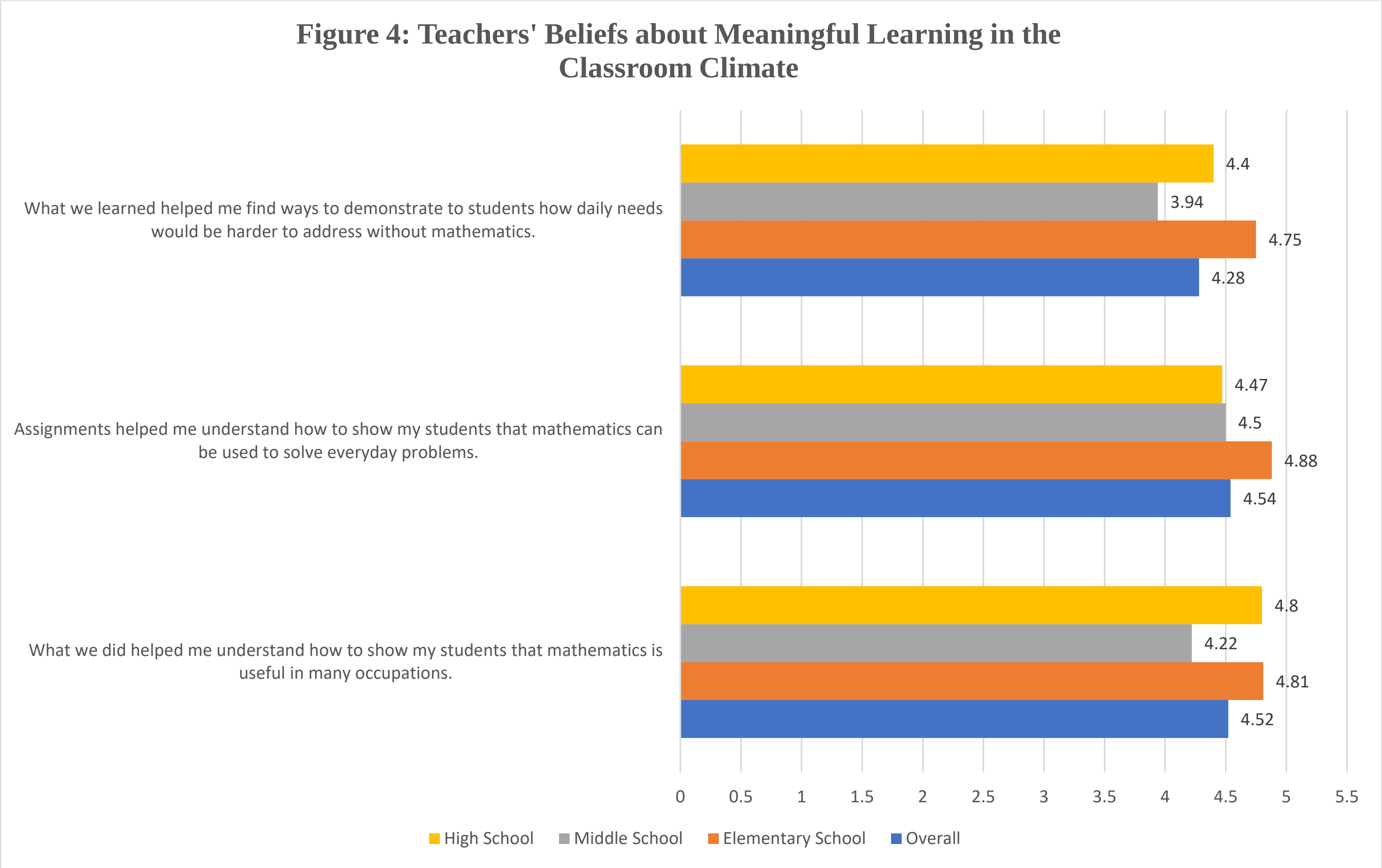


Figure 4: Teachers' Beliefs about Meaningful Learning in the Classroom Climate
What we learned helped me find ways to demonstrate to students how daily needs would be harder to address without mathematics.
Assignments helped me understand how to show my students that mathematics can be used to solve everyday problems.
What we did helped me understand how to show my students that mathematics is useful in many occupations.
4.4
3.94
4.75
4.28
4.47
4.5
4.88
4.54
4.8
4.22
4.81
4.52
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
5
5.5
High School
Middle School
Elementary School
Overall

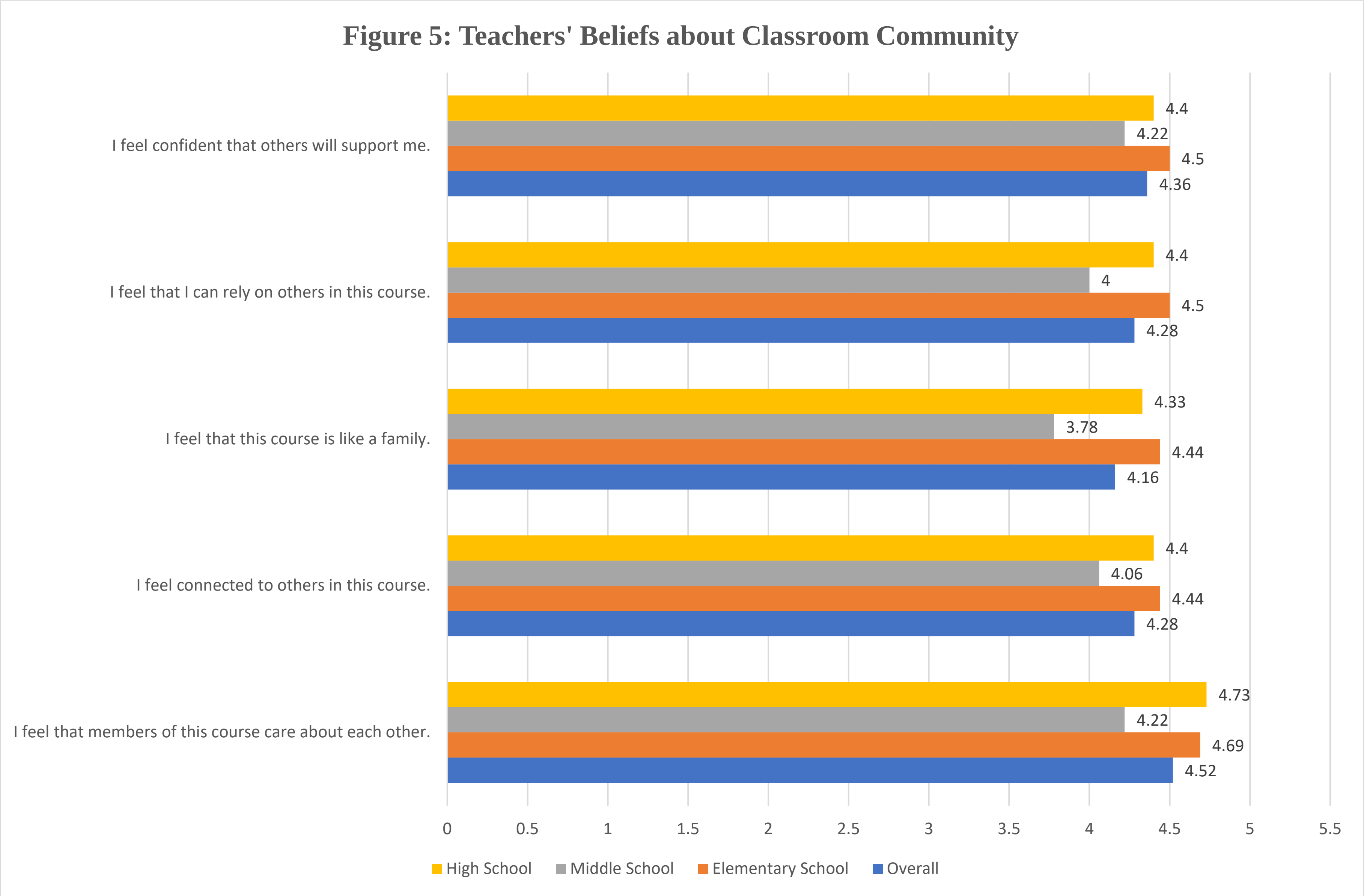


Figure 5: Teachers' Beliefs about Classroom Community
I feel confident that others will support me.
4.4
4.22
4.5
4.36
I feel that I can rely on others in this course.
4.4
4
4.5
4.28
I feel that this course is like a family.
4.33
3.78
4.44
4.16
I feel connected to others in this course.
4.4
4.06
4.44
4.28
I feel that members of this course care about each other.
4.73
4.22
4.69
4.52
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
5
5.5
High School
Middle School
Elementary School
Overall

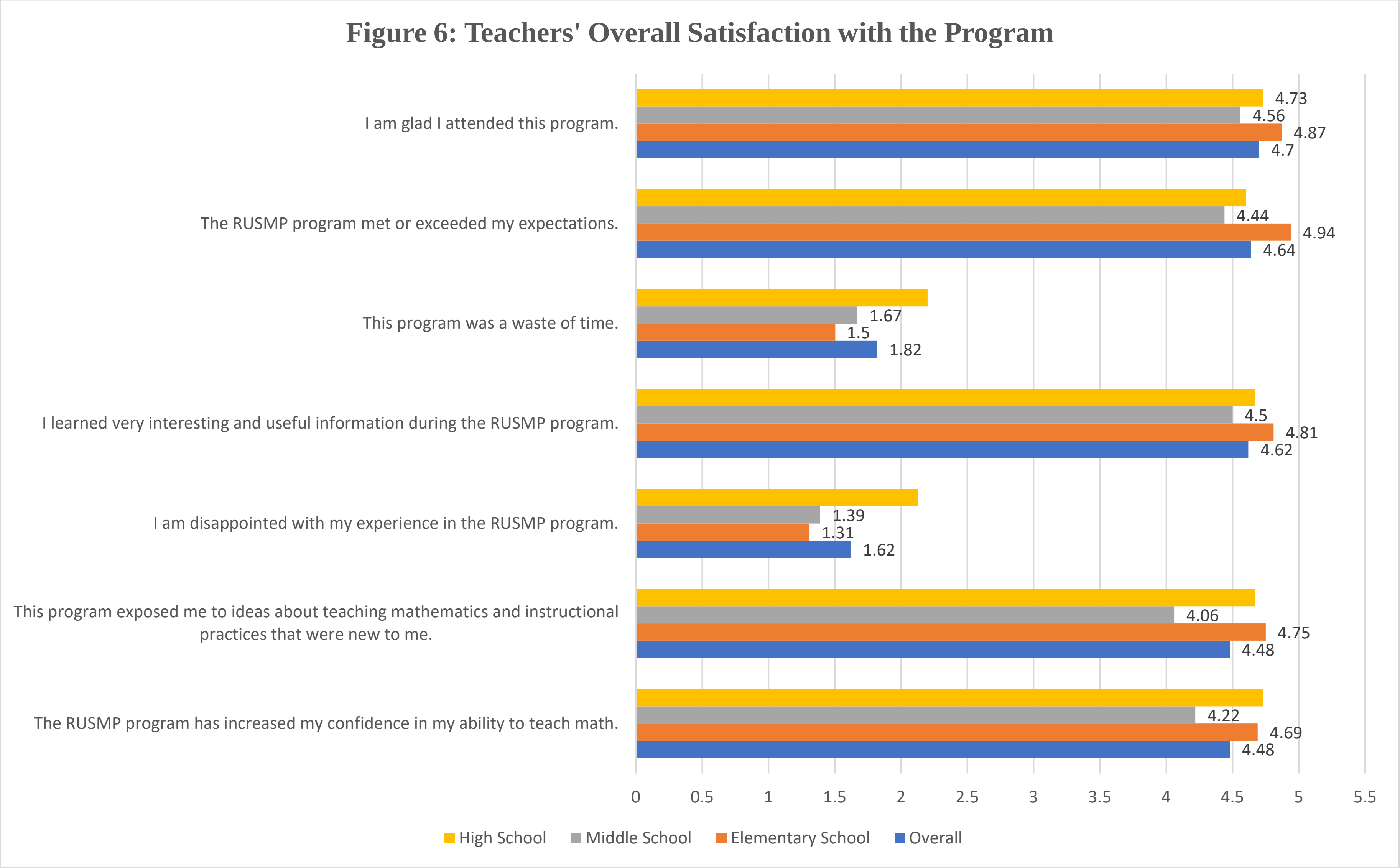
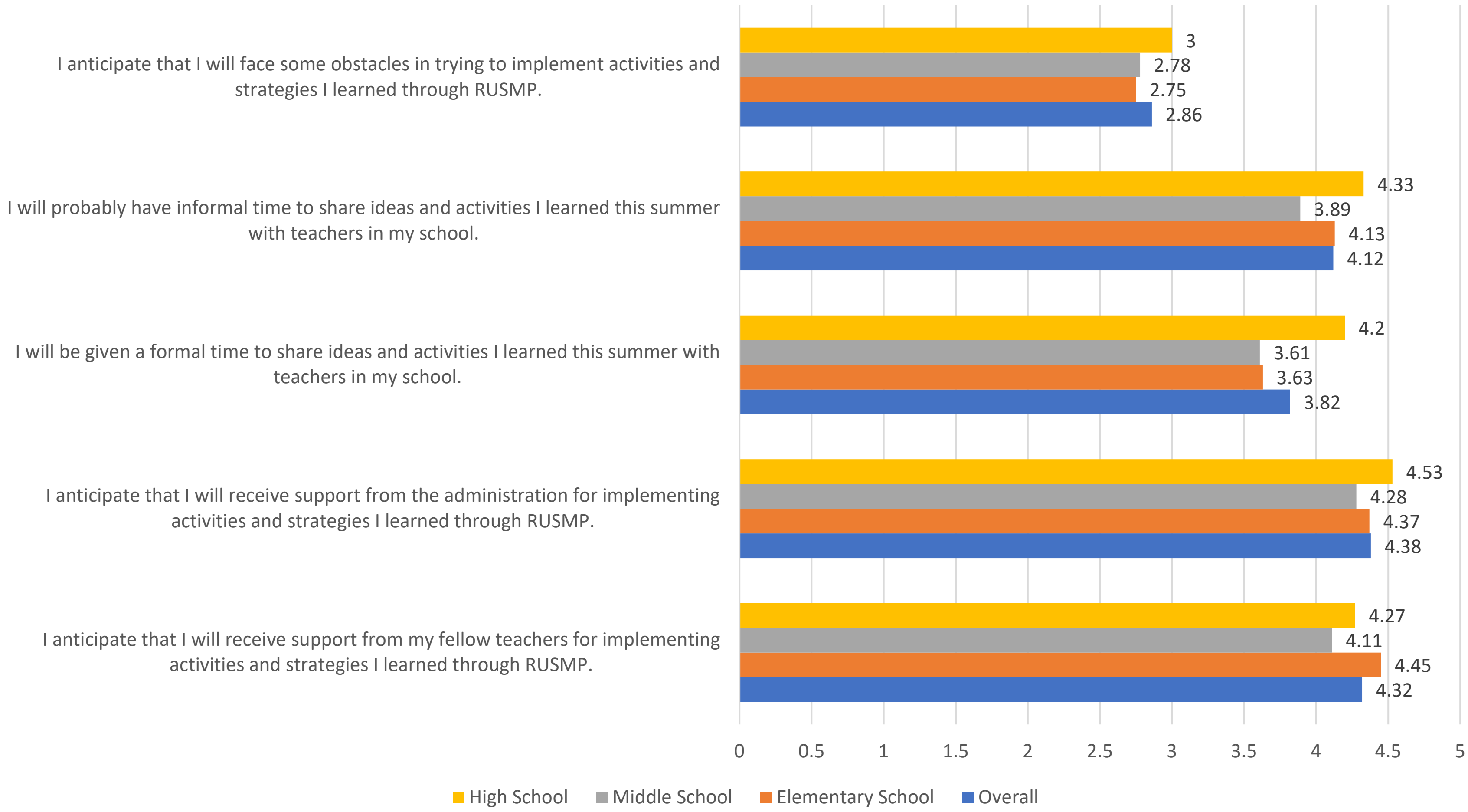


Figure 6: Teachers' Overall Satisfaction with the Program
I am glad I attended this program.
4.73
4.56
4.87
4.7
The RUSMP program met or exceeded my expectations.
4.44
4.94
4.64
This program was a waste of time.
1.67
1.5
1.82
I learned very interesting and useful information during the RUSMP program.
4.5
4.81
4.62
I am disappointed with my experience in the RUSMP program.
1.39
1.31
1.62
This program exposed me to ideas about teaching mathematics and instructional practices that were new to me.
4.06
4.75
4.48
The RUSMP program has increased my confidence in my ability to teach math.
4.22
4.69
4.48
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
5
5.5
High School
Middle School
Elementary School
Overall

Figure 7: Teachers' Beliefes about Implementation Support



Conclusion

Overall, the participants have benefited from the SCP in several ways. The paired-samples *t*-tests indicated some significant changes in teachers' beliefs, knowledge, and confidence in teaching mathematics. Elementary teachers significantly improved their self-efficacy for teaching in terms of instruction and student engagement as well as their self-efficacy for mathematics teaching after participating in the SCP. Even though there were slight changes in middle and high school teachers' self-efficacy, these changes were not statistically significant.

Elementary teachers' mathematics self-concept significantly improved after participating the SCP. Regarding epistemic beliefs, although the changes by class level do not indicate any significant results, when all teachers taken together, teachers significantly improved their epistemic beliefs about mathematics from pre- to post-SCP.

Even though the changes in teachers' technological pedagogical content knowledge (TPACK) by class level and overall were not statistically significant, these changes were all positive after participating the SCP.

When all class levels are combined, teachers' beliefs about standards-based teaching changed significantly and positively after participating in the SCP. Standards-based teaching has four categories: student tasks, student-student interaction, teacher's role, and discovery. Collectively, all teachers significantly progressed in all the sub-categories of standards-based teaching. When the changes by each class level explored, both middle and high school teachers increased their belief about the teacher's role category of standards-based teaching. Additionally, the change in discovery category of standards-based teaching for middle school teachers and the change in student-student interactions category of standards-based teaching for high school teachers were both significant and positive.

Regarding assessment, there were four categories for which teachers were asked to state their perceptions: summative, formative, testing, and large-scale. Elementary teachers' beliefs about assessment significantly changed in the favor of summative form rather than a formative form. Middle school teachers developed significantly negative stance against large-scale assessments after participating the SCP.

When teachers were asked about their level of preparedness to use pedagogical techniques aligned with reform-based mathematics teaching, they all significantly improved their selfperceptions of their preparedness to use these techniques. This was the case for both the overall level (whole group) and for each class level.

Diversity dispositions was the last area of exploration for the impact of the SCP. Even though the changes were not statistically significant, teachers had more availing beliefs about diversity in teaching and learning after participating in the SCP. This was the case for both the overall level (whole group) and for each class level.

Teachers were also asked about the overall classroom climate during the SCP, rating of their SCP instructors and overall SCP program rating. Overall, teachers had positive feedback about their experiences in the SCP. The SCP at RUSMP provided opportunities for these teachers to learn about and engage in activities and discussions about classroom climate including teaching professionalization and societal contribution of teaching as well as active and meaningful learning. The RUSMP's SCP helped teachers to see the value in the teaching profession and highlighted the importance of attending to the community's needs.

Appendix A
Scale Items and Their Sources

*Indicates reverse-coded items

Teaching Self-Efficacy (Instructional strategies) - Klassen et al. (2009)

How much can you do to craft good questions for students?
How much can you do to implement a variety of assessment strategies?
How much can you do to provide an alternate explanation when students are confused?
How much can you do to implement alternative strategies in your classroom?

Teaching Self-Efficacy (Student engagement) - Klassen et al. (2009)

How much can you do to motivate students who show low interest in school work?
How much can you do to get students to believe they can do well in school work?
How much can you do to help students value learning?
How much can you do to assist families in helping their children do well in school?

Self-Concepts in Mathematics - Marsh (1990)

Please indicated how much you agree or disagree with the following statements:

Compared to my colleagues, I am good at mathematics.
I usually received good grades in mathematics courses.
Work in mathematics courses was easy for me.
I struggle with mathematics.*
I learn things quickly in mathematics.
I have always done well in mathematics.

Epistemic Beliefs for Mathematics (Certainty of knowledge) - Hofer (2000)

Please indicated how much you agree or disagree with the following statements:

Answers to questions in mathematics change as experts gather more information.*
All experts in mathematics understand the field in the same way.
Truth is unchanging in mathematics.
In mathematics, most work has only one right answer.
Principles in mathematics are unchanging.
All professors in mathematics would probably come up with the same answers to questions in this field.
In mathematics, it is good to question the ideas presented.*
Most of what is true in mathematics is already known.

Self-Efficacy for Mathematics Teaching - Enochs et al. (2000)

Please indicated how much you agree or disagree with the following statements:

I'm continually finding better ways to teach mathematics.
Even if I try very hard, I don't teach mathematics as well as I teach other subjects.*
I know the steps to teach mathematics concepts effectively.
I'm not very effective in monitoring mathematics activities.*
I generally teach mathematics ineffectively.*
I understand mathematics concepts well enough to be effective in teaching mathematics.
I find it difficult to use manipulatives to explain to students why mathematics works.*

I'm typically able to answer students' questions.
I wonder if I have the necessary skills to teach mathematics.*
Given a choice, I would not invite the principal to evaluate my mathematics teaching.*
When a student has difficulty understanding a mathematics concept, I'm usually at a loss as to how to help the student understand it better.*
When teaching mathematics, I usually welcome student questions.
I don't know what to do to turn students on to mathematics.*

Technological Pedagogical Content Knowledge - Schmidt et al. (2009)
Please indicated how much you agree or disagree with the following statements:

I can teach lessons that appropriately combine mathematics, technologies, and teaching approaches.
I can use strategies that combine content, technologies, and teaching approaches that I learned in my coursework in my teacher preparation/certification program.
I can select technologies to use in my classroom that enhance what I teach, how I teach, and what students learn.
I can provide leadership in helping others to coordinate the use of content, technologies, and teaching approaches at my school and/or district.
I can choose technologies that enhance the content for a lesson.

Standards-Based Mathematics Teaching - Ross et al. (2003)
Please indicated how much you agree or disagree with the following statements:

I like to use math problems that can be solved in many different ways.
I regularly have my students work through real-life math problems that are of interest to them.
When two students solve the same math problem correctly using two different strategies, I have them share the steps they went through with each other.
I often learn from my students during math time because my students come up with ingenious ways of solving problems that I have never thought of.
In my classes, students learn math best when they can work together to discover mathematical ideas.
I encourage students to use manipulatives to explain their mathematical ideas to other students.
When students are working on math problems, I put more emphasis on getting the correct answer than on the process followed.*
I don't necessarily answer students' math questions but rather let them puzzle things out for themselves.
I teach students how to explain their mathematical ideas.
Using computers to solve math problems distracts students from learning basic skills.*
If students use calculators, they won't master the basic math skills they need to know.*
It is not very productive for students to work together during math time.*

Assessment-Summative - Brown (2004)
Please indicated how much you agree or disagree with the following statements:

The main purpose of assessment is to assign a grade or level to student work."
The main purpose of assessment is to place students into categories.
The main purpose of assessment is to determine if students meet certain standards.
Assessments should only be used to determine how much students have learned from teaching.

Assessment-Formative - Brown (2004)

Please indicated how much you agree or disagree with the following statements:

Assessment information should be used to modify ongoing teaching of students.
Assessments should be integrated with teaching in the classroom.
Assessments should be used to inform instruction for different student needs.
Assessments should be used to help students improve their learning.
Assessments should be used to provide students with feedback about their learning needs.

Assessment-Testing

Please indicated how much you agree or disagree with the following statements:

Assessment equals testing.
There is a lot more to assessment than just testing.*
There are different types of assessment including classroom discourse and observations.*

Assessment-Large-Scale - Brown (2004)

Please indicated how much you agree or disagree with the following statements:

Large-scale assessments are an accurate indicator of a school's quality.
Large-scale assessments are a good way to evaluate a school.
Large-scale assessments provide reliable information on how well schools are doing.
Large-scale assessments are an accurate indicator of teacher effectiveness.
Large-scale assessments are an accurate indicator of student learning.

Level of Preparedness to Use Pedagogical Techniques - Germuth et al. (2003)

Please rate each of the following statements about how prepared you feel to do the following in mathematics instruction:

Providing concrete experiences to introduce abstract concepts.
Developing students' conceptual understanding of mathematics.
Taking students' prior understanding into account when planning curriculum and instruction.
Practicing computational skills and algorithms.
Making connections between mathematics and other disciplines.
Having students work in cooperative learning groups.
Having students participate in appropriate hands-on activities.
Engaging students in inquiry-oriented activities.
Having students prepare project/laboratory/research reports.
Using calculators.
Using computers.
Engaging students in applications of mathematics in a variety of contexts.
Using performance-based assessment.
Using portfolios.
Using questioning strategies to assess student understanding.

Diversity Deposition Index - Schulte et al. (2009)

Please indicated how much you agree or disagree with the following statements about diversity:

I believe that all students can succeed.
I believe that all students can learn.
I believe that students learn in a variety of ways.
I demonstrate enthusiasm for the content I teach.

I look for new ways to teach difficult material.
I am enthusiastic about sharing knowledge with my students.
I collaborate with others in order to learn and grow.
I am reflective about how my actions affect student achievement.
I can express myself creatively as a teacher.
I continue to look for new information to share with my students.
I learn from my students.
I continually search for new knowledge within my content area.
I am responsible for creating an atmosphere where all students feel free to openly exchange ideas, thoughts, and opinions.
I believe in setting high standards for all students.
I am passionate about my own learning.
I believe that diversity enhances student knowledge.

Bibliography

Brown, G. T. (2004). Teachers' conceptions of assessment: Implications for policy and professional development. *Assessment in Education: Principles, Policy & Practice, 11*(3), 301–318.

Enochs, L. G., Smith, P. L., & Huinker, D. (2000). Establishing factorial validity of the mathematics teaching efficacy beliefs instrument. *School Science and Mathematics, 100*(4), 194–202. http://dx.doi.org/10.1111/j.1949-8594.2000.tb17256.x

Germuth, A., Banilower, E., & Shimkus, E. (2003). *Test-retest reliability of the Local Systemic Change teacher questionnaire*. Chapel Hill, NC: Horizon Research.

Hofer (2000). Dimensionality and disciplinary differences in personal epistemology. *Contemporary Educational Psychology, 25*, 378–405.

Klassen, R. M., Bong, M., Usher, E. L., Chong, W. H., Huan, V. S., Wong, I. Y., & Georgiou, T. (2009). Exploring the validity of a teachers' self-efficacy scale in five countries. *Contemporary Educational Psychology, 34*(1), 67–76.

Marsh, H. W. (1990). The structure of academic self-concept: The Marsh/Shavelson model. *Journal of Educational Psychology*, *82*(4), 623–636. https://doi.org/10.1037/0022-0663.82.4.623

Ross, J. A., McDougall, D., Hogaboam-Gray, A., & LeSage, A. (2003). A survey measuring elementary teachers' implementation of standards-based mathematics teaching. *Journal for Research in Mathematics Education*, *34*(4), 344–363.

Schmidt, D. A., Baran, E., Thompson, A. D., Mishra, P., Koehler, M. J., Shin, T. S. (2009). Technological pedagogical content knowledge (TPACK)-The development and validation of an assessment instrument for preservice teachers. *Journal of Research on Technology in Education*, *42*, 123–149.

Schulte, L. E., Edwards, S., Edick, N. A. (2008). The development and validation of the diversity dispositions index. *Teacher Education Faculty Publications*, *5*(3), 11–19.