

Research Study¹**What perceptions do individuals, involved in mathematics teaching and learning, hold of the use of mathematics specialist teachers in Grades 6-8?**

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This research study, taking place in the province of Saskatchewan (Canada), was conducted with five different stakeholder groups: 1) elementary (K-8) school administrators, 2) Grade 6-8 teachers, 3) Grade 6-8 students, 4) their parents, and 5) university pre-service middle years teachers. Since these five groups of individuals are connected with mathematics education at the middle years/intermediate level, they each offer important perspectives on the benefits (perceived and/or observed) of educating mathematics specialist teachers for Saskatchewan elementary schools, specifically at the Grade 6-8 level. The research study was funded by a *Social Sciences and Humanities Research Council of Canada* (SSHRC) Insight Grant and was approved on ethical grounds by the University of Regina Research Ethics Board (REB). In addition, each of the four Saskatchewan school divisions involved in the study granted approval for schools within the division to participate in the research study.

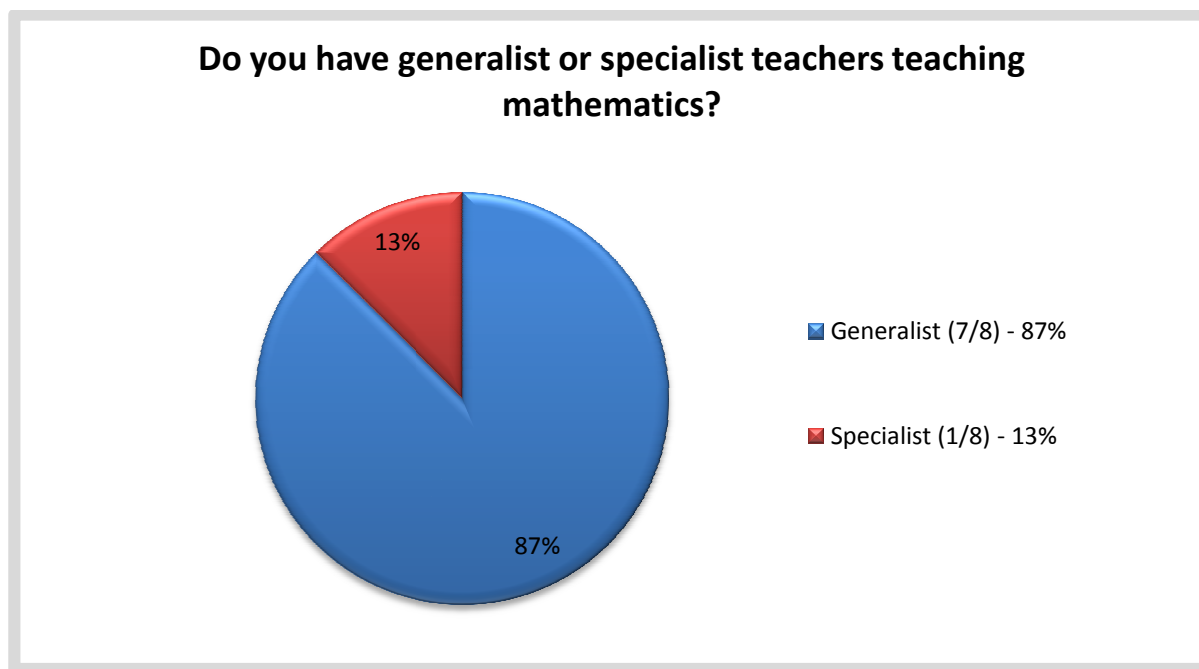
Report on**K-8 SCHOOL ADMINISTRATOR QUESTIONNAIRES**

The key aim of this part of the research study is to understand school administrators' experiences of, and perceptions on, the role of mathematics specialist teachers in grades 6-8 classrooms. This report represents a summary of responses to select questions from completed administrator questionnaires returned by mail to the researcher (Dr. Kathleen Nolan). In total, approximately 22 questionnaires were distributed to Grade K-8 school administrators in 15 schools across 4 Saskatchewan school divisions. Administrators were asked to complete the questionnaire and return it by mail in the postage paid envelope provided. **Eight (8) school administrator questionnaires were returned** (approximately a 36% response rate).

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PART A: Current Attitudes and Practices

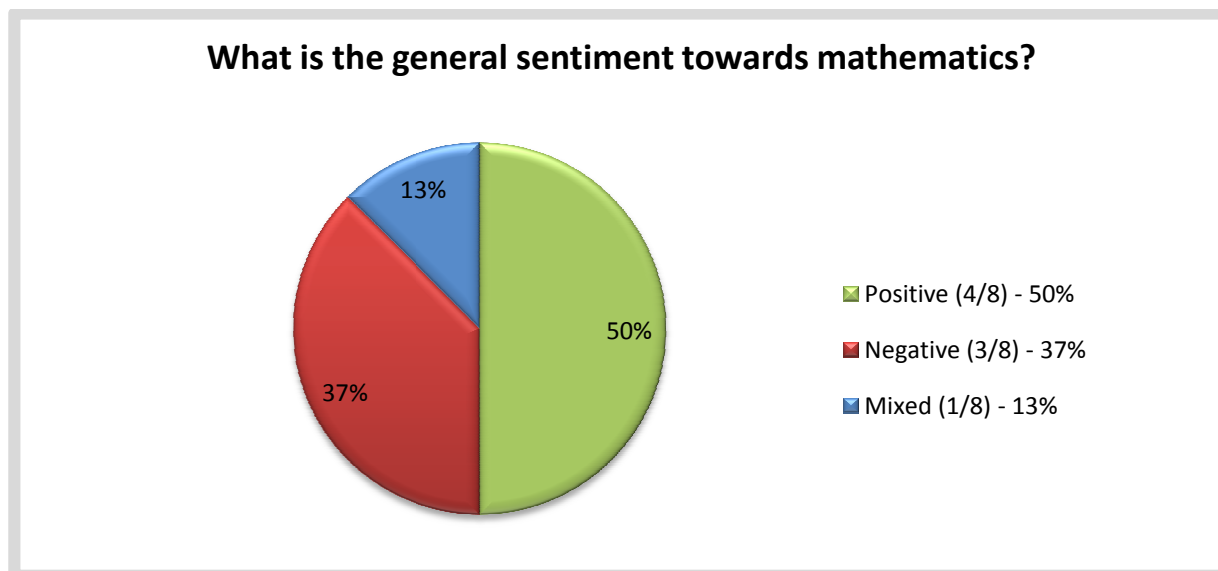
1. Currently, in your school, do you have generalist or specialist teachers teaching mathematics in grades 6-8?



Of the 8 respondents, only 1 indicated the use of specialist mathematics teachers in her/his school. In addition, 1 other school administrator reported having a mathematics specialist for intervention.

Questionnaire Responses
Generalist Teachers
No
Generalists & a specialist for intervention
No, not at this time.
We have a specialist math teacher school-wide
Generalist Teachers
Generalists
Generalists

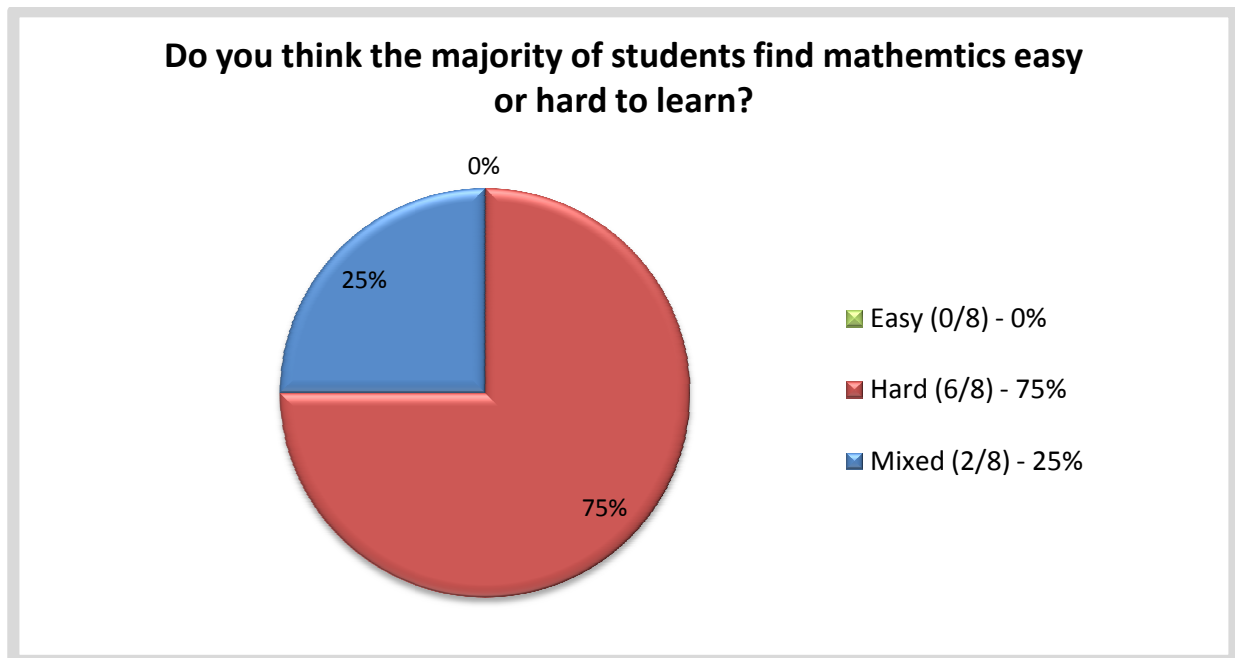
2. What is the general sentiment towards mathematics among grade 6-8 teachers in your school?



Sentiment	Questionnaire Responses
Positive (4/8) – 50%	<p>They are very enthused & have a strong focus on math.</p> <p>They are glad they can focus on perfecting the craft of literacy instruction. For the last 5 years they have asked their specialist time to remain as math.</p> <p>In general, I believe that most Gr. 6-8 teachers feel comfortable teaching Mathematics. A few teachers would probably enjoy taking on the role of Math specialist. Next year we will have a Gr. 7/8 Math specialist for 90 students.</p> <p>Most teachers prefer/enjoy teaching math.</p>
Negative (3/8) – 37%	<p>Over the past few years, with the use of Math Makes Sense as one of the ways to teach math, frustration level has increased. Teachers are now starting to use Math Makes Sense as a Resource <u>NOT</u> as a program.</p> <p>They become frustrated because the children do not do well.</p> <p>That there is too much whole language in the new curriculum and that it needs to refocus on some of the basics.</p>

Sentiment	Questionnaire Responses
Mixed (1/8) – 13%	Staff feel math is an important part of a student's education. They often feel that the province doesn't allocate enough hours per cycle to math. Math is allocated less than 1/2 the time as ELA and equal to the time given to Arts Education.

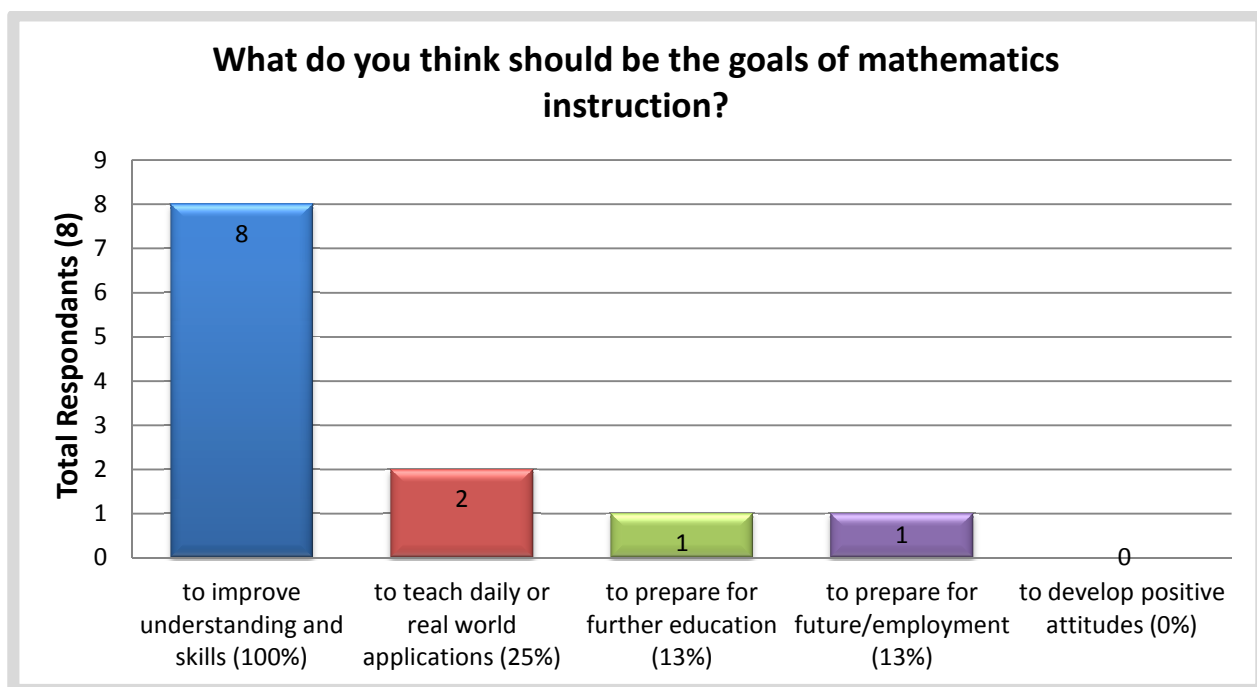
3. Do you think the majority of students find mathematics easy to learn or hard to learn? Why?



Students' Learning	Questionnaire Responses
Easy (0/8) – 0%	
Hard (6/8) – 75%	<p>Majority find it more challenging. More of the Math used in Math Makes Sense has so much language in it that students find the program difficult to understand.</p> <p>Some find it difficult. Many of our students are very transient and this makes skill acquisition difficult.</p> <p>Hard because historically there is no deep understanding of why just procedures memorized i.e. BEDMAS</p>

Students' Learning	Questionnaire Responses
Hard (6/8) – 75% continued	<p>I think that the numerous approaches to working through the problems make it confusing for students.</p> <p>I think the majority find it hard to learn because they struggle with language (recognizing keywords, interpreting what is asked in the question).</p> <p>Majority find it a little difficult because they seem to have poor basic operation skills</p>
Mixed (2/8) – 25%	<p>I would say it is a 50/50 split.</p> <p>As in every other subject area, students who are naturally gifted in Math would say that Math is easy to learn. More and more, teachers are providing small group instruction to students who need more support and providing challenge tasks for students who have already mastered outcomes.</p>

4. What do you think should be the goals of mathematics instruction in grades 6-8?



Note: The five categories shown in the graph were selected to relate administrator questionnaire responses to parent and student questionnaire responses. Hence, 'to develop positive attitudes'

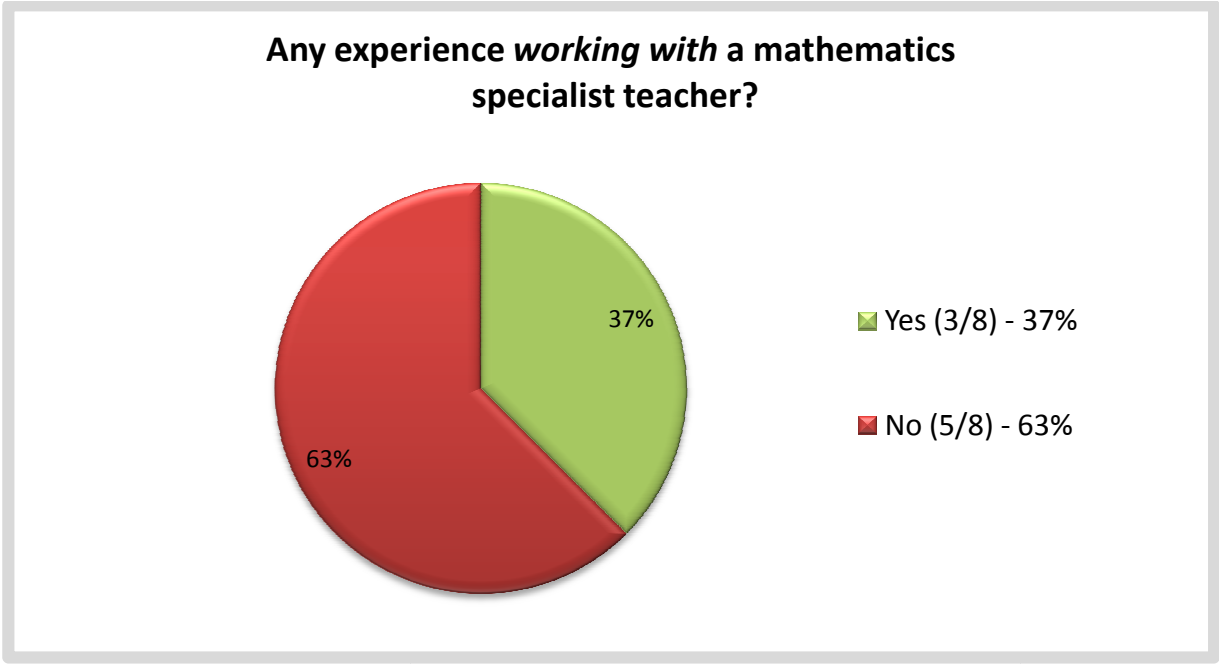
was included in the graph since that category appeared in the parent and student data, even though no administrator responses seemed to fit this category.

Goals	Questionnaire Responses
To improve understanding and skills (8/8) – 100%	<p>Basic skills first (directly taught & practiced)</p> <ul style="list-style-type: none"> • addition, subtraction, multiplication, division <p>Children will have a good understanding of the concept taught</p> <p>To teach for deep understanding To help std construct math knowledge</p> <p>Interpreting quantitative information</p> <ul style="list-style-type: none"> • Estimating • Performing mental calculations • Understanding spatial relationships • Problem solving <p>Know the basics and then expand from there.</p> <p>Lots of repetition in areas of multiplication/division including rational numbers.</p> <p>Limit the areas covered at each level and allow more time to work on and improve the concepts focussed on at that grade. For example, introduce area/volume etc. at Grade 7 or 8 but allow lots of time for the concept to be understood and only minimal review is needed at later grades.</p>
To teach daily or real world applications (2/8) – 25%	<p>We need to check prior knowledge. Fill gaps with tutorials and ensure they have a solid understanding of math in real world applications.</p> <p>Through inquiry, stimulate mathematical thinking and reasoning so that students can function competently with confidence with everyday situations that require the use of Math concepts, thinking and reasoning.</p>
To prepare for further education (1/8) – 13%	To provide a solid foundation for high school and beyond which focuses on mastery of math skills.
To prepare for future/employment (1/8) – 13%	Allow time for students to develop their math facts (that needs to be a strong skill for success later)
To develop positive attitudes (0/8) - 0%	

PART B: Mathematics Teaching Specialists

A mathematics specialist teacher is one who acts as a catalyst for promoting and supporting good attitudes and good pedagogical practices in mathematics classrooms in schools and in school divisions. Mathematics specialists may act as mentors or coaches to their colleagues, or they may take on the exclusive role of mathematics teacher in many classrooms, while other teachers take on the responsibility for teaching other subjects.

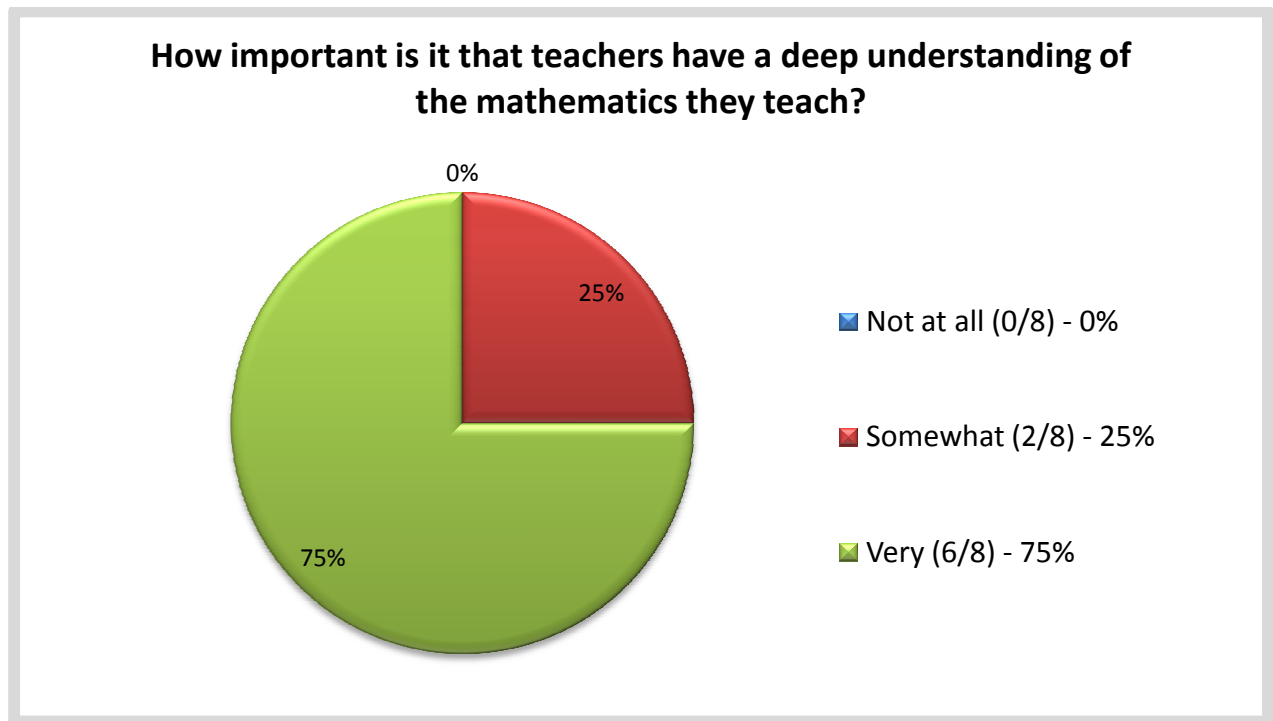
1. What, if any, experience do you have *working with* a mathematics specialist teacher?



Experience	Questionnaire Responses
Yes (3/8) – 37%	<p>I work with a Math specialist</p> <p>No math specialist in elementary school. We have a math consult</p> <p>Our school division has a specialist teacher hired that is available upon request and oversees the division’s math programs.</p> <p>I have spoken with the person about issues in the school, but have not worked with the person extensively in a classroom.</p>
No (5/8) – 63%	None

2. How important is it that teachers have a deep understanding of the mathematics they teach?

- a. Not at all
- b. Somewhat
- c. Very

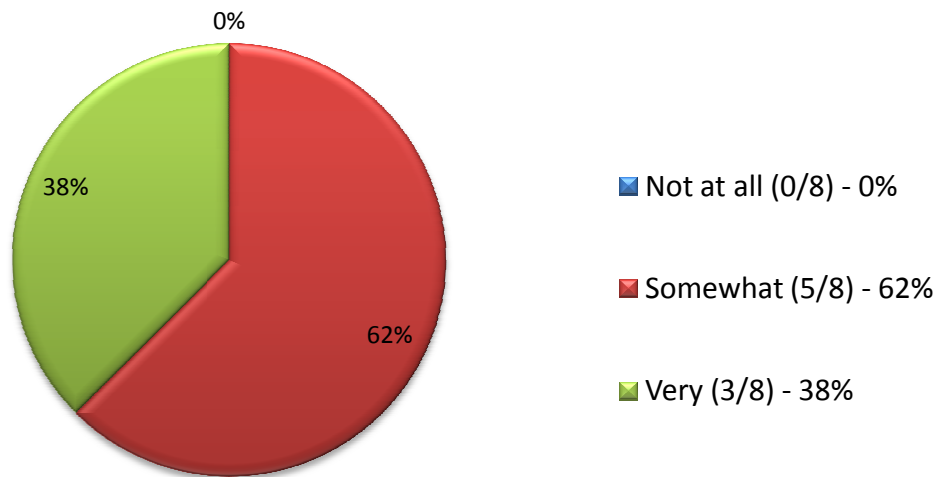


3. How comfortable are you with the mathematics concepts that should be taught in grades 6-8?

- a. Not at all
- b. Somewhat
- c. Very

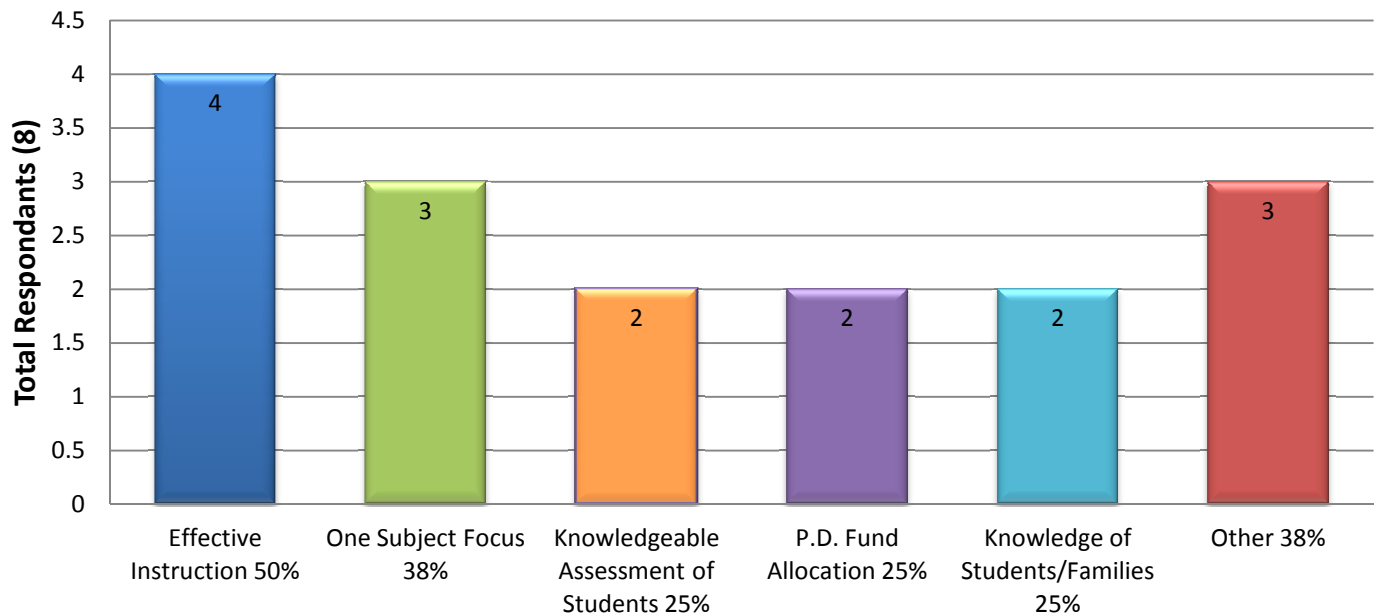
See graph of results next page.

How comfortable are you with the mathematics concepts?



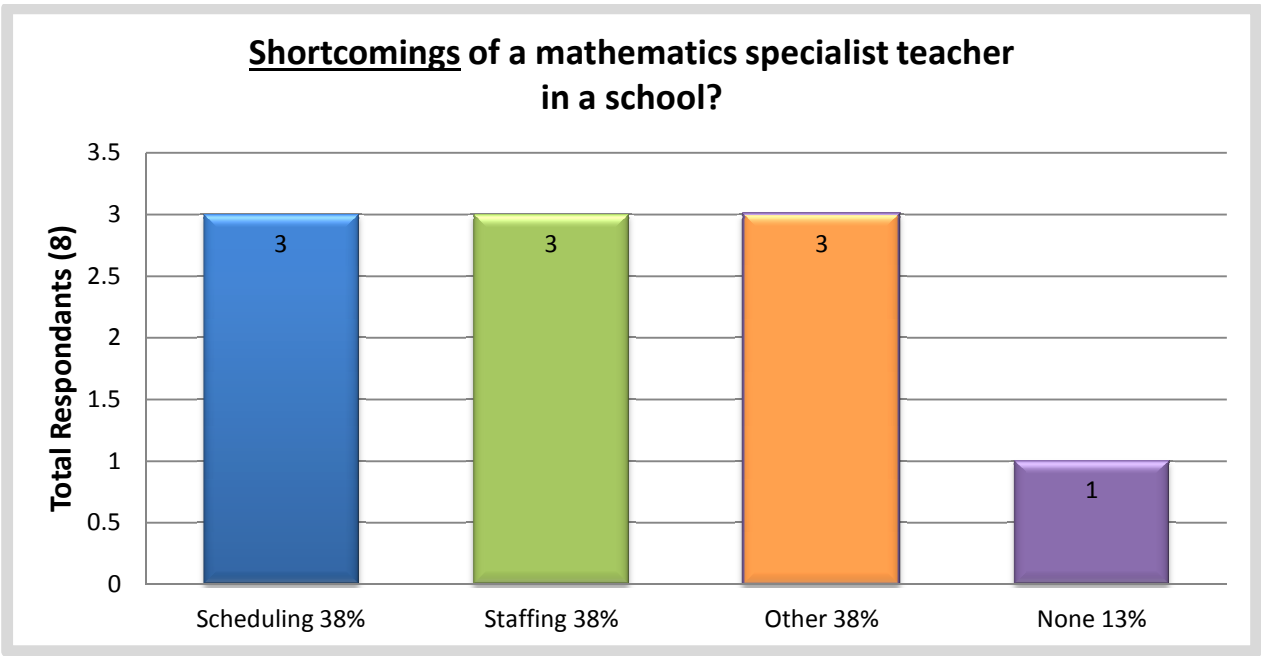
4. What would you consider to be the benefits of a mathematics specialist teacher in a school?

Benefits of having a mathematics specialist teacher in a school?



Benefits	Questionnaire Responses
Effective Instruction (4/8) – 50%	<p>Students would benefit from a person who is knowledgeable in the subject & may be able to provide multiple ways to complete the assignment</p> <p>Concentrate his/her efforts into delivering a high quality Math program.</p> <p>Any specialist provides expertise in the specific area. This leads to better and more effective instruction.</p> <p>A person could directly monitor lessons to improve teaching on a daily basis</p>
One Subject Focus (3/8) – 38%	<p>1 area to focus on not spread thin over curriculum from many subject areas</p> <p>Trained professional who understands math</p> <p>Becoming more proficient in this area of concentration.</p>
Knowledgeable Assessment of Students (2/8) – 25%	<p>Intervention—building from year to year and meeting stds where their knowledge begins</p> <p>Being able to assess gaps in students learning. We have Reading Specialists that do this, we need more support for understanding math.</p>
P.D. Fund Allocation (2/8) – 25%	<p>Focused professional development— pour pd into the ‘math teacher’</p> <p>Prof development could be more targeted to Math for this teacher rather than spread out over many subject areas.</p>
Knowledge of Students/Families (2/8) – 25%	<p>Students stick with a math specialist over many years</p> <p>Person knows kids/families and could better identify the additional supports that would work for that child/family.</p>
Other (3/8) – 38%	<p>Someone who is passionate about math teaches math (hopefully this passion will spread!! 😊)</p> <p>It would be good but I’m not sure how it could be scheduled.</p> <p>Easy and immediate access to a person in the building to ask questions (teacher support)</p>

5. What would you consider to be the shortcomings of a mathematics specialist teacher in a school?

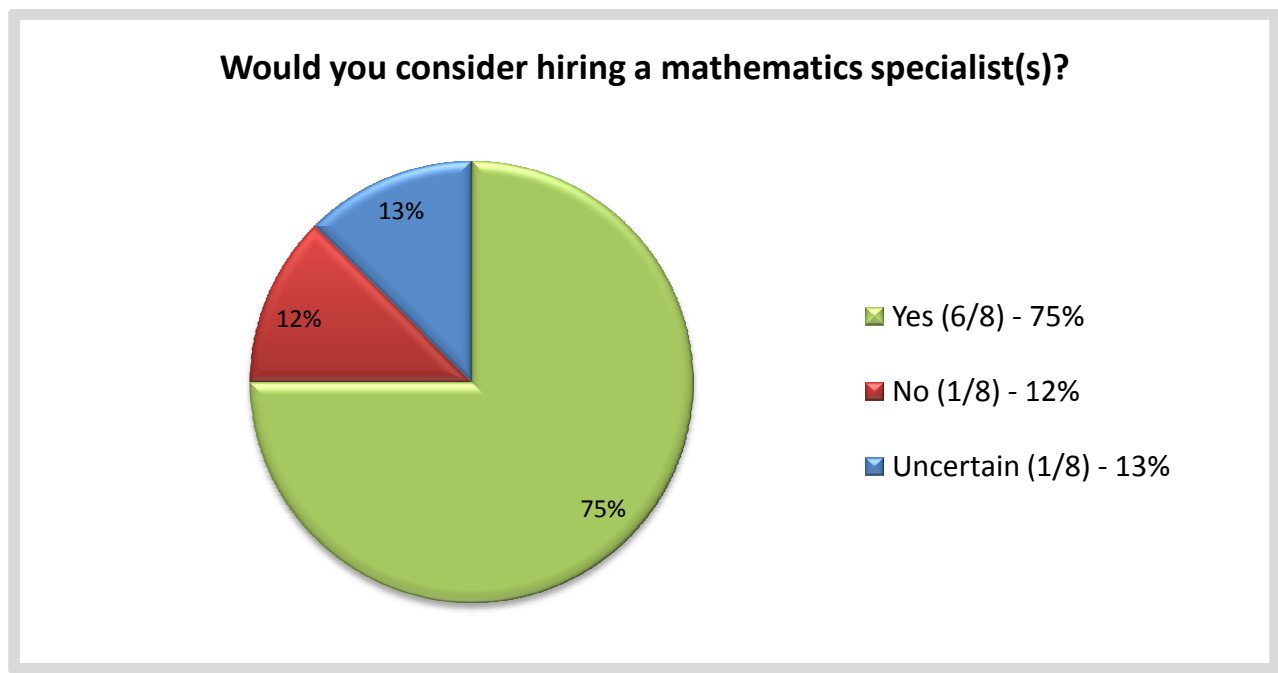


Shortcomings	Questionnaire Responses
Scheduling (3/8) – 38%	<p>Difficulty scheduling</p> <p>You cannot match the curriculum hours in an elementary school with the “specialist” assignment</p> <p>That person wouldn’t be able to teach math exclusively in the lower grades due to scheduling issues</p>
Staffing (3/8) – 38%	<p>Sometimes having a specialist is added to our staffing component & takes away from our teacher numbers</p> <p>A specialist would most likely have to teach another subject & they may not [be] well suited for that subject</p> <p>Teachers (many) like to teach their own math</p>

Shortcomings	Questionnaire Responses
Other (3/8) – 38%	<p>Lack of knowledge/deep understanding of the classroom teacher about math</p> <p>Students have a higher number of teachers. In elementary school, it is important for students to feel connected to their classroom teacher (not too many teachers coming and going)</p> <p>Not realistic because of cost</p>
None (1/8) – 13%	<p>None 😊</p> <p>They are difficult to find- <u>18 interviews</u> 😊</p>

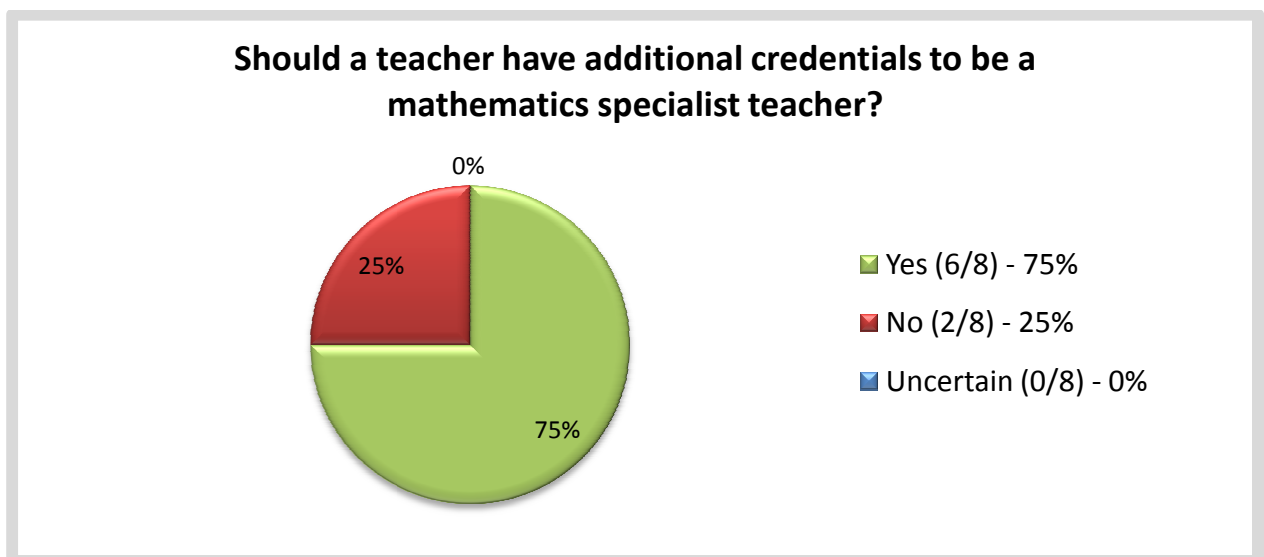
6. Please respond to the following 3 related questions:

- i. Would you consider hiring mathematics specialist(s) for the teaching of mathematics in grades 6-8 in your school? Why/why not?



Consider Hiring	Questionnaire Response
Yes (6/8) – 75%	<p>Yes, if extra staffing allotment time was given to compensate & not take away from classroom teacher time.</p> <p>If it could be scheduled.</p> <p>Yes—same benefits as #4</p> <p>Yes, our achievement data in lit & num has gone from 30% of students are Grade Level Readers to 80% are grade level readers in 3 years (because T[eacher]s can focus on one craft). Numeracy followed a similar trajectory.</p> <p>Yes—for Grade 6 to 8 if our grade configurations could support it. Next year we are assigning a Math Specialist to our Gr. 7/8 classes.</p> <p>At the 6-9 level, if available a teacher with a strong math background would be beneficial and would be nice to include in their teaching load the Grade 6-9 math classes.</p>
No (1/8) – 12%	No—it cannot be timetabled in the traditional manner.
Uncertain (1/8) – 13%	Not sure because then most likely I would probably need to specialize the other subjects & then finding suitable candidates becomes an issue.

- ii. Do you think a teacher should have additional credentials to be a mathematics specialist teacher? Why/why not?

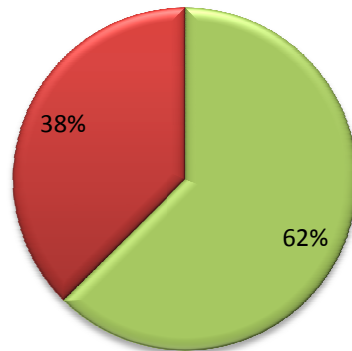


Additional Credentials	Questionnaire Responses
<p>Yes (6/8) – 75%</p>	<p>Yes</p> <p>Yes, because they would need to have a deeper understanding of skills & processes.</p> <p>Yes because it incorporates an entirely new approach which involves multiple disciplines.</p> <p>Yes, foundational math knowledge is critical especially when we want to teach our students to “understand & explain” math. When we do not want to be memorization & formula based.</p> <p>I would like to see Math specialists obtain prof development in the first two years (in Math). Unfortunately, we cannot <u>require</u> this accreditation prior to becoming a specialist because we have difficulty finding enough French Immersion Teachers.</p> <p>I feel as a professional, teachers should be able to do inservices yearly that are associated with their field of teaching. So teachers should be expected to have completed a certain # of hours of inservice per year.</p>
<p>No (2/8) – 25%</p>	<p>Not necessarily. A <u>really</u> good teacher who understands how kids learn & can instruct in a differentiated way is very valuable.</p> <p>Not for the younger grades.</p>
<p>Uncertain (0/8) – 0%</p>	

- iii. Do you think teachers should be paid higher salary if they are mathematics specialist teachers? Why/why not?

See graph and questionnaire responses next page.

Do you think mathematics specialists should be paid a higher salary?



■ Yes, if re-classified (5/8) - 62%

■ No (3/8) - 38%

Higher Salary

Yes, if re-classified (5/8) – 62%

No—unless they qualify for a re-classification.

Not necessarily. Our Learning Resource Teacher & special program teachers are usually class 5 teachers & are paid more according to the STF grid.

Depends on specific job &/or education & responsibilities

No, usually specialists have a B.Ed. & another degree or masters, which in the STF system automatically places them in another class and a higher salary level.

If they have additional degrees they will be higher on the pay grid.

No (3/8) – 38%

No—it is against the law as stipulated at the provincial level and causes dissention within the teachers.

No. They are still teachers. They don't need additional classes just ones that are specific to numeracy. (A major in elementary math)

No. Teachers work hard in every subject area, not only Math.

- Do you have any additional thoughts or comments to offer on the topic of mathematics teaching and mathematics teaching specialists?

Additional Comments Offered	
Specialist teachers are good start but a math resource that allows teachers to determine a gr. Level for math (e.g., in reading we use Fountas & Pinnell) would be better.	
It is good to have a math 'enthusiast' on staff.	
[School name] is a great place to send others who are interested in how this role works. Our DNA results have been proving to be very promising as is our student satisfaction surveys.	
Mathematics has always been one of my favorite subject areas. I am very pleased with the direction we are taking next year with our Math Specialist for Gr. 7/8. I will be suggesting some Math professional development.	
Harder to implement in the elementary system.	