

Research Study<sup>1</sup>**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****UNIVERSITY PRE-SERVICE MIDDLE YEARS TEACHER QUESTIONNAIRES**

The key aim of this part of the research study is to understand pre-service teachers' experiences of, and perceptions on, the role of mathematics specialist teachers in grades 6-8 classrooms. This report represents a summary of responses from completed pre-service teacher questionnaires, completed and submitted online to the researcher (Dr. Kathleen Nolan). In total, approximately 96 pre-service teachers (years 1-4 of the teacher education program at the University of Regina) were invited to complete the online questionnaire. **Seventeen (17) pre-service teachers completed and submitted questionnaires** (approximately an 18% response rate).

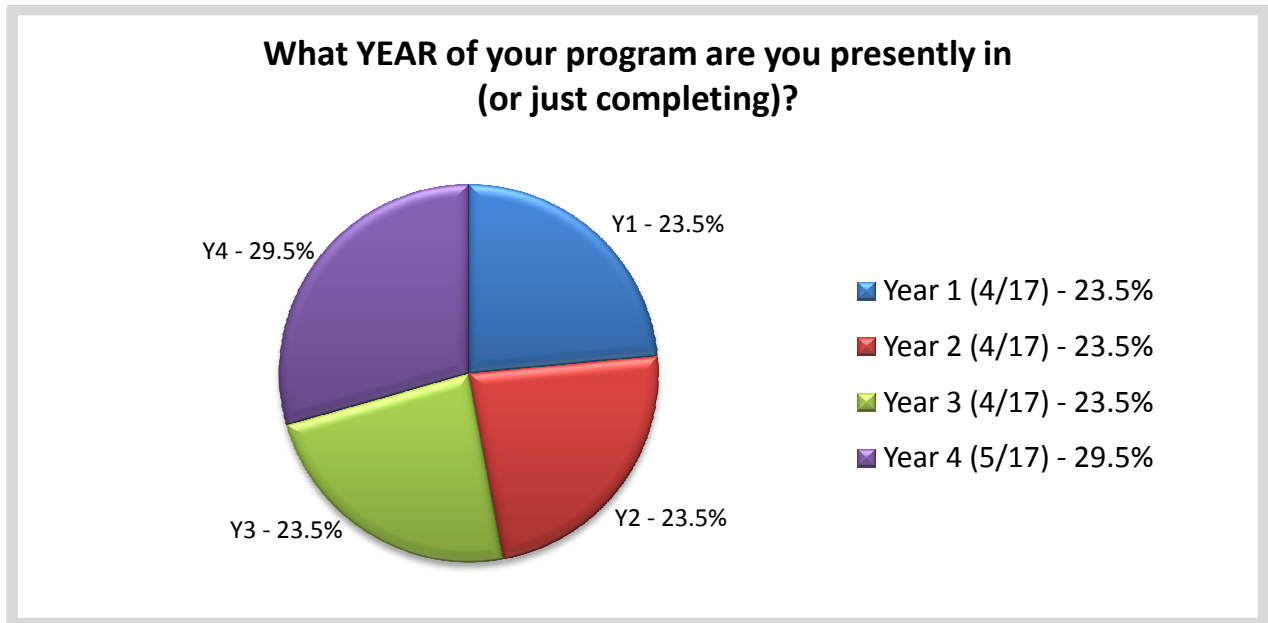
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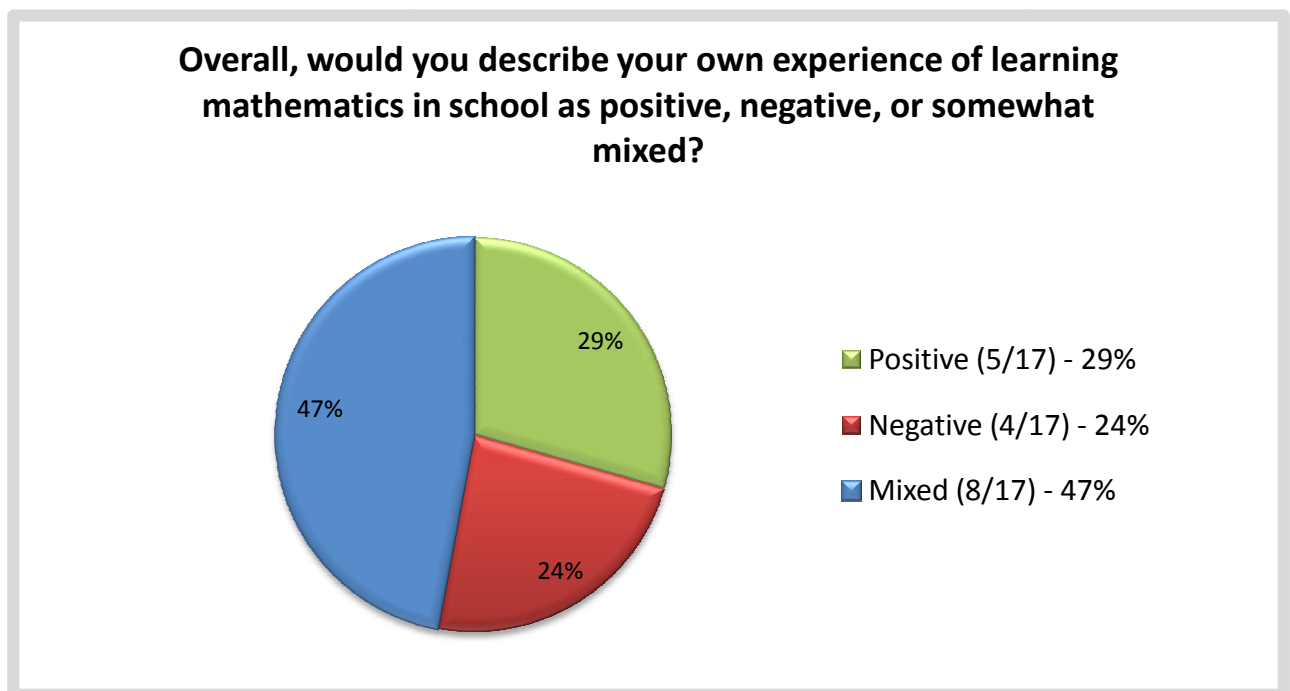
## PART A: Current Attitudes and Practices

1. What YEAR of your teacher education program are you presently in (or just completing)?

**NOTE:** Year 1 students are the students in the first month of Year 2. First year BEAD (Bachelor of Education After-Degree) students are included as Year 3 students. Second year BEAD students are included as Year 4 students.



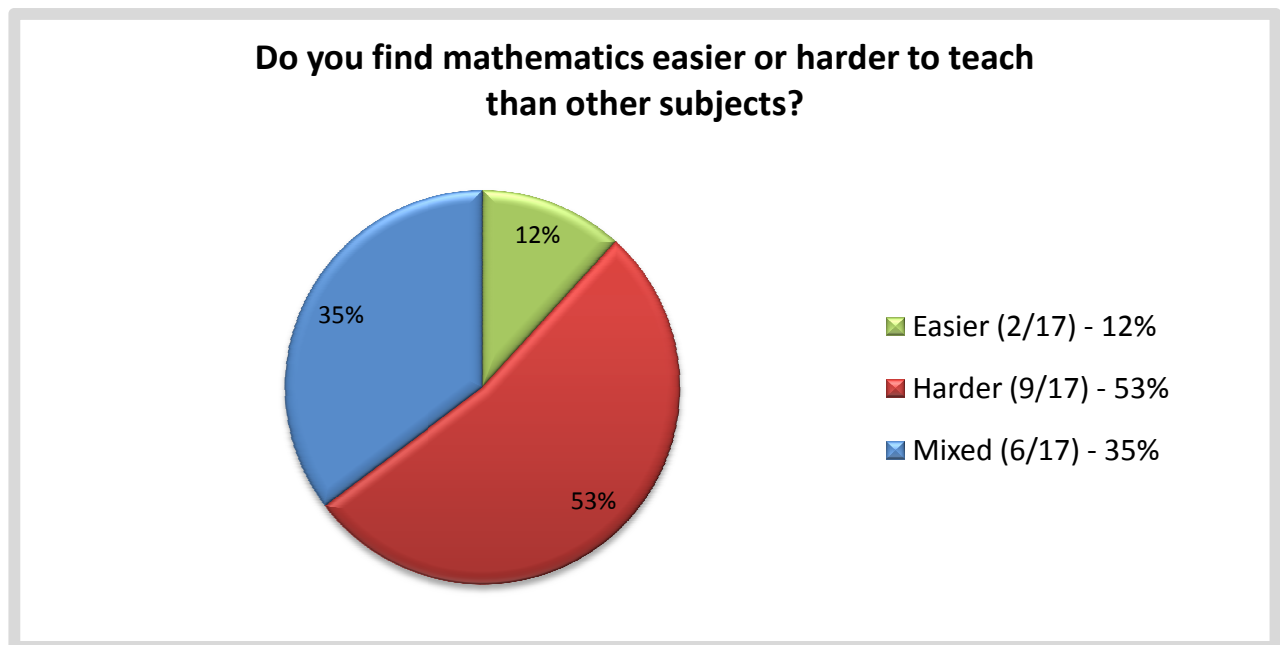
2. Overall, would you describe your own experience of learning mathematics in school as positive, negative, or somewhat mixed? Please explain.



Experience	Questionnaire Responses
<p>Positive (5/17) – 29%</p>	<p>Positive, I loved math and I was very good at it.</p> <p>Positive. I had lots of practice when I was younger, so math came easy to me.</p> <p>Positive</p> <p>Positive</p> <p>Positive. I loved math and it was always my highest grade. I liked how math was concrete and there were specific ways of doing things</p>
<p>Negative (4/17) – 24%</p> <p>Negative (4/17) – 24% continued</p>	<p>My personal experience of learning math ... was not overly positive. I remember math being a chore and not engaging.</p> <p>I hated math, I was always stressed and couldn't comprehend many of the concepts.</p> <p>Negative. Often I was left behind during lessons because I did not understand the methods. I required a lot of extra help and still do today as I was never taught in a way that I could understand. When I did ask questions in the beginning when things started to get difficult for me I was told that I was being silly or acting out in class because my questions were inappropriate and I was asking such questions for attention. Really I was just confused and was trying to make sense of the lesson.</p> <p>I never really liked learning mathematics. The teacher would just stand at the front of the class dictate the lesson and then expect us to learn and work on the problems ourselves. I had high anxiety over mathematics and I never wanted to take the classes in high school although required to. OVERALL negative experience.</p>
<p>Mixed (8/17) – 47%</p>	<p>Somewhat mixed because I loved it when I easily understood it, but as it got more and more complicated and I struggled more I began to dislike mathematics.</p> <p>It was fine. I was a fairly strong math student and had support at home. Math wasn't my favourite subject but I did well and generally enjoyed the challenge.</p> <p>Mixed. Learning math in school was fun for me but difficult at the same time.</p> <p>Mixed</p> <p>Mixed. I have taken 2 EMTH classes and one non-ed math class. One of my EMTH classes put emphasis on strategies and one put emphasis on current curriculum. The 200 Level EMTH on strategies should have been taken after the curriculum class. Both were good classes and I felt like I learned a lot, although</p>

Experience	Questionnaire Responses
	<p>it would have made more sense to take them that way and I would have got more out of each class.</p> <p>I have a somewhat mixed experience of math in school. I excelled in elementary school math then declined in high school. My teachers had a large impact on my learning experience.</p> <p>Mixed. I was fairly good at math, though I found some teachers were not able to explain a certain process to me, so I had to try and teach myself how to do it.</p> <p>Somewhat mixed. I loved math when I understood it. I found it extremely frustrating when I did not understand it.</p>

3. Based on your teaching experience thus far, do you find mathematics easier or harder to teach than other subjects? Please explain.



Explanation	Questionnaire Response
<b>Easier (2/17) – 12%</b>	<p>I was actually surprised during my internship. I found my experiences teaching math quite positive. With a bit of vision and prep, math can be relevant and engaging....</p> <p>Easier</p>

**Harder (9/17) – 53%**

I find it harder, simply because I believe the 'Math Makes Sense' textbook is garbage.

I have not taught a whole lot of math, but I think that it is harder for me to teach because i want to tell them exactly what to do to get the right answer, whereas other subjects you can't really do that.

Harder

Still pretty hard, still don't know how to teach it so I understand and how my students couldn't understand

Harder to teach

At first I found it harder, but as my internship progressed I found it got easier and easier. I would still say it is harder than other subjects to teach.

Much more difficult because there are so many different learning styles that I myself have trouble and confusion with. I am afraid that I will have difficulty teaching to students that do not require extensive instruction, to the students that just get it. I am afraid that those students won't have complete faith in me as a teacher because I won't have all the answers when their questions stump me or get difficult.

It will be hard, due to the fact it was hard when i was taught mathematics and now i have to teach it to students... how is this possible?

To teach in a more open questioned format will be difficult as I am so used to a very structured, rule-based system of mathematics. I can easily see how inquiry learning works for subjects like English, Science, Social Studies, Art, Music, PhysEd, etc, but have to think a lot more to see that in mathematics

**Mixed (6/17) – 35%**

Math is no harder or easier than any other subject to teach if you know what you are talking about.

I find marking math a lot easier because it is pretty straight forward. Teaching was not that difficult but harder to think of ways to vary teaching styles. I think that for students who are not clicking with information you need to use different strategies than you might in different subjects because it isn't about explaining again it is figuring out different ways to explain ideas

I would say its in the middle not as hard as grammer but harder than social studies.

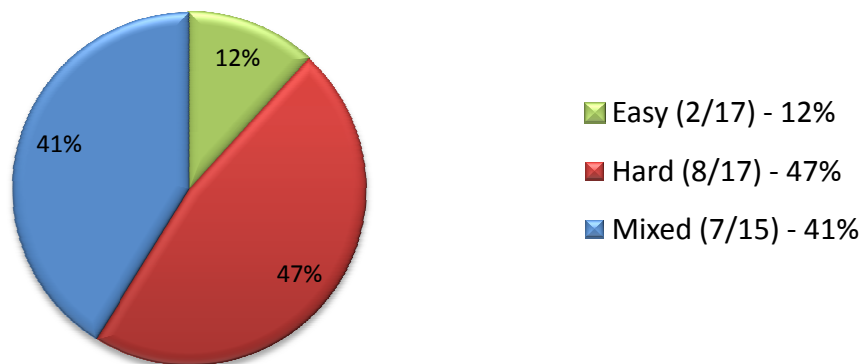
I loved Math as a student, and I enjoy teaching Math. Although, in my University classes we never looked at Math Makes Sense and learned how to use it properly so I feel ill-prepared for that. As well, Explore +4 was pushed although I don't feel that I have the resources to effectively use that program.

I wouldn't consider mathematics harder to teach generally speaking but I do find it difficult to explain things in different ways if students 'don't get it.' I think a lot of the difficulty that comes with teaching math stems from the fact that we are required to teach this subject much differently than what we learned and therefore it just takes time to understand the new ways of solving problems introduced in the text.

I think mathematics will be difficult to teach however, EMTH 217 changes my perception with teaching math.

4. Do you think grade 6-8 students find mathematics easy to learn or hard to learn? Why?

### Do you think Grade 6-8 students find mathematics easy or hard to learn?

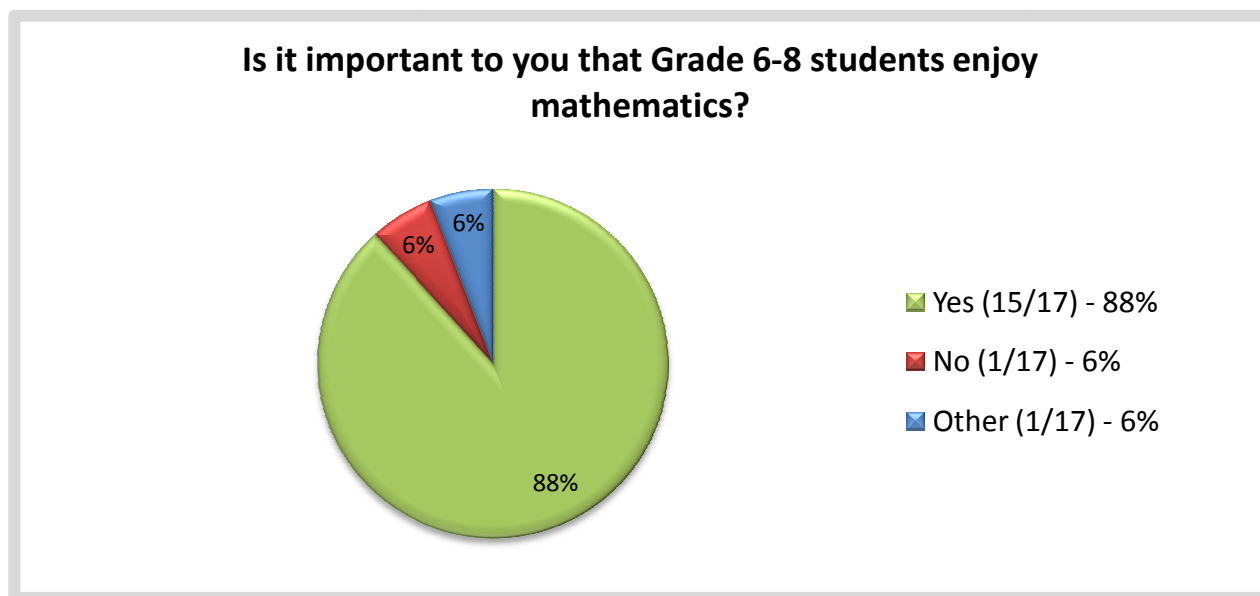


Mathematics Learning	Questionnaire Responses
Easy (2/17) – 12%	<p>I think when math is taught in an engaging, connected, and relevant way - it is easier to see math's use and learn!</p> <p>Math has traditionally been built up as a difficult subject, but students usually have an easier time with math than they think they will.</p>
Hard (8/17) – 47%	<p>I think they find it hard to learn because Math Makes Sense makes it way more complicated than it needs to be.</p> <p>Traditional means of teaching math has seemed to make the kids struggle. They find it boring and unchallenging. It doesn't peak their interest so they often coast through it.</p>

Mathematics Learning	Questionnaire Responses
<p><b>Hard (8/17) – 47%</b> continued</p>	<p>Difficult to learn. The classes are too large to correctly teach them all.</p> <p>Hard because most aren't independent learners</p> <p>Hard to learn - many have missed out on basic facts which makes it difficult to complete some tasks in middle years math. Many have already checked out from Math and do not see a use for it.</p> <p>No, it is difficult, time consuming and hard.</p> <p>I think this age group finds mathematics difficult because the curriculum/program changes so drastically from elementary to middle year mathematics.</p> <p>Currently I think they find it very difficult. I work with students this age as a coach, and hear their woes about mathematics. They find it confusing and are frustrated when other adults can't help them solve problems.</p>
<p><b>Mixed (7/15) – 41%</b></p>	<p>I think that it depends on the student, because some find it really difficult and others find it really easy.</p> <p>I think it varies a lot by the student. With some it clicks and they get it with hardly any explanation, for others it is quite a bit of additional work. I think that at this age students are dragged back if they fell behind in the past. It is hard for them to make it up.</p> <p>Some do and some find it very hard.</p> <p>Depends on the teacher and the student. If the student is strong in math they will be fun. The teacher can make or break a students learning experience.</p> <p>I think it depends on how they are taught. Not all students learn the same so we need to teach a variety of ways to do math. Having said that I also find although we need to teach multiply ways we need to be careful not to confuse those that get it with the first method or two by showing too many.</p> <p>I think that grade 6-8 students are gradually finding mathematics easier to learn and they become accustomed to the new ways of doing things. I think that when the kids can use hands on materials it makes it much easier and introducing multiple ways of doing things also makes it easier. This question is really general because I really think that it depends on the kid - some will find it easy and some will find it much harder. During middle years students might start losing interest in school and therefore may find mathematics harder to learn if they are disengaged.</p> <p>I think that saying that math is easy to learn or hard to learn is an over</p>

Mathematics Learning	Questionnaire Responses
	generalization. It is different for every student. From my experience it was difficult but I have a biased opinion because I had such a tough time in my experiences.

5. Is it important to you that grade 6-8 students enjoy mathematics?

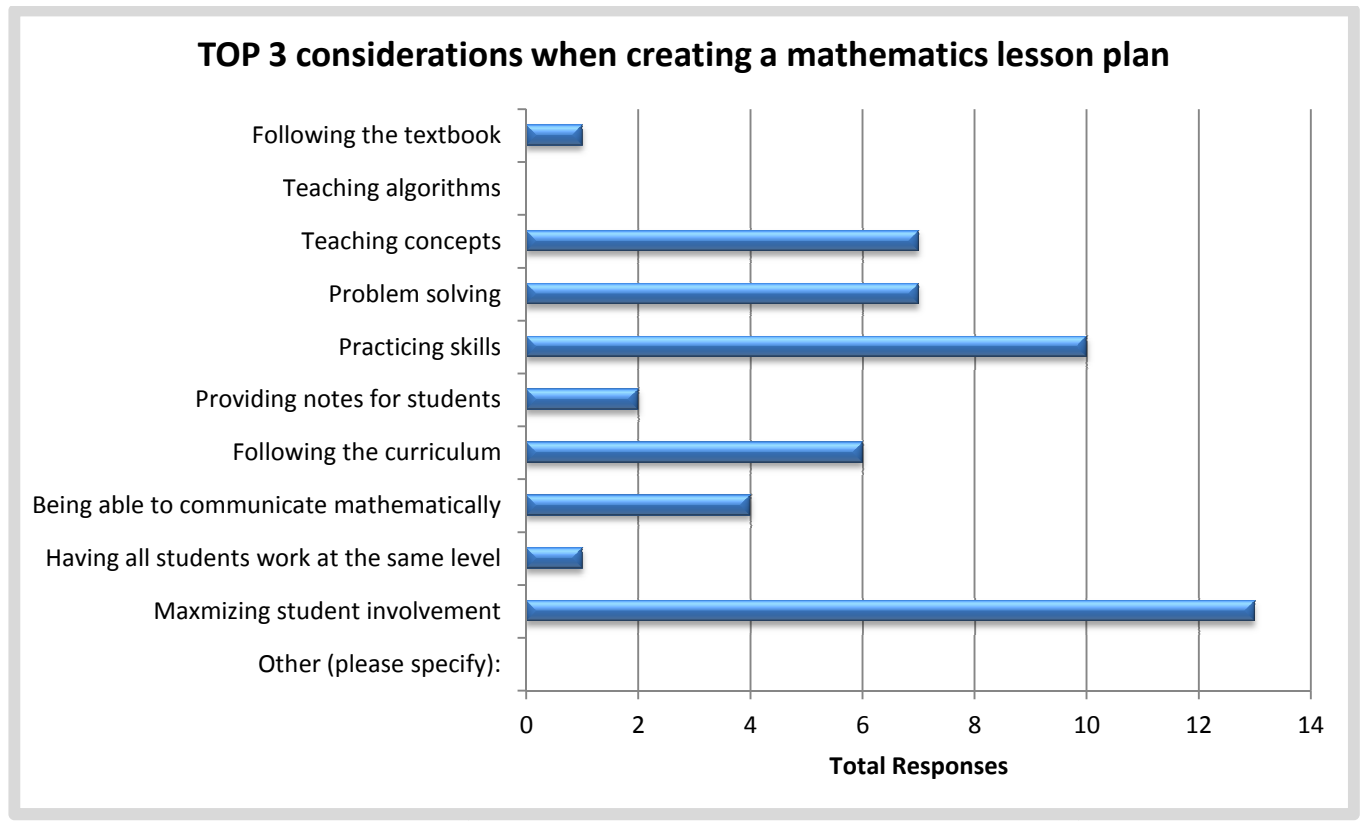


Enjoy Mathematics	Questionnaire Responses
<b>Yes (15/17) – 88%</b>	<p>Yes, because if they do not enjoy it at that age, they will never enjoy it and probably won't excel at it.</p> <p>I think it is because the more a person enjoys something, the harder they will try to be good at it and are more likely to succeed.</p> <p>Yes.</p> <p>Yes, math is so often treated as a necessary evil. A just grit your teeth to get through this. Math can be fun and doesn't have to be an awful experience. I think that teaching math should be something positive for the teacher and student.</p> <p>Yes, math is something to celebrate and look forward to instead of something to dread.</p> <p>Yes</p>

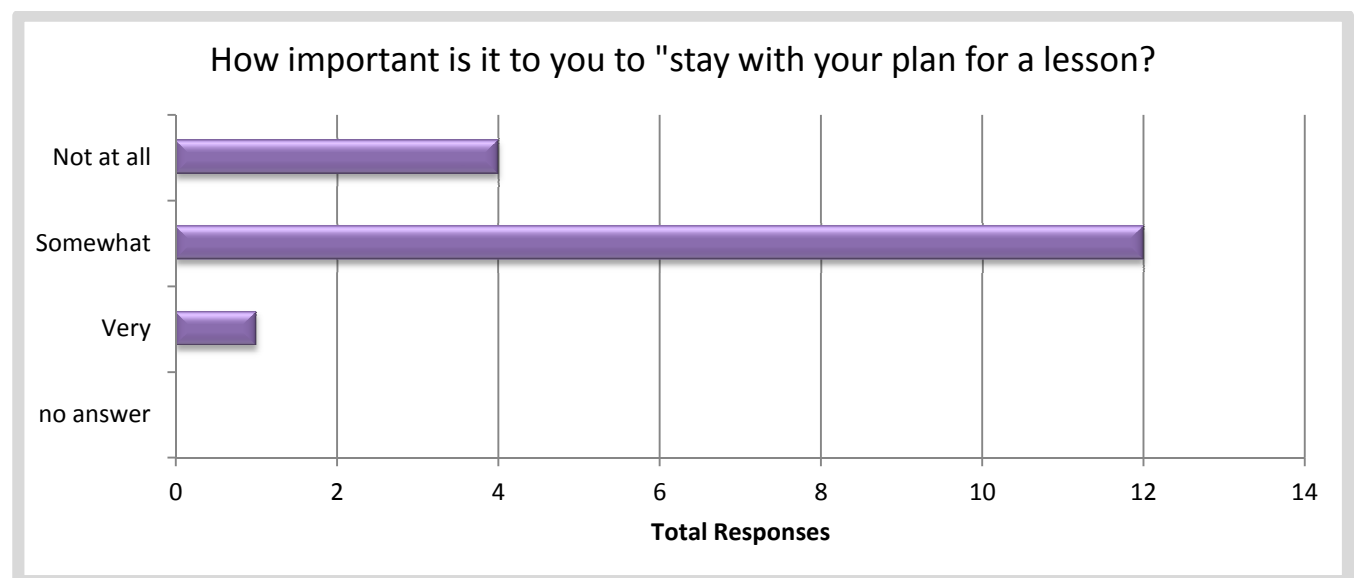


Enjoy Mathematics	Questionnaire Responses
<p><b>Yes (15/17) – 88%</b> continued</p>	<p>Yes, for sure</p> <p>Yes</p> <p>Yes, engagement is key. If students can see where they will use their mathematics that they are learning they will enjoy it and do better.</p> <p>Yes</p> <p>Yes - because when you enjoy something you are more likely to work hard at it. Math is really important for further classes in science and therefore I think that it is important for kids to develop the basic skills which stems from an enjoyment of mathematics.</p> <p>It is important that students enjoy school and lessons and subjects because if they don't then they may find it useless to attend and carry on with further schooling. If they don't enjoy it then they can get lost or left behind in the system, which is not the aim of education. If a student enjoys math in grades 6-8 then they will not go into more advanced math classes with negative attitudes.</p> <p>Yes, it is the most difficult class those grades have to deal with. If it isn't enjoyable then why would they waste their time learning and developing an understanding. When math ended for me I couldn't have been happier. [sic]</p> <p>Yes, it is very important that grade 6-8 students enjoy math.</p> <p>It is important to me that grade 6-8 students enjoy all subjects in school. Mathematics may be the most difficult subject to make fun though, as it's historically been thought of as the most boring I believe.</p>
<p><b>No (1/17) – 6%</b></p>	<p>No more than other subjects</p>
<p><b>Other (1/17) – 6%</b></p>	<p>As educators, we understand the diversity in our learners and their interests. I believe it is important for students to see the relevance of math and be engaged in their learning</p>

6. Of the following areas of focus, what would you say are your TOP 3 considerations when creating a mathematics lesson plan?



7. How important is it to you to “stay with” your plan for a lesson?

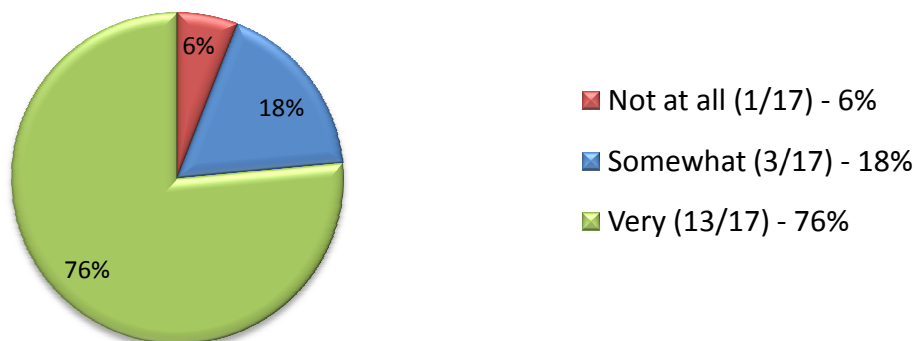


## PART B: Mathematics Specialists

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.

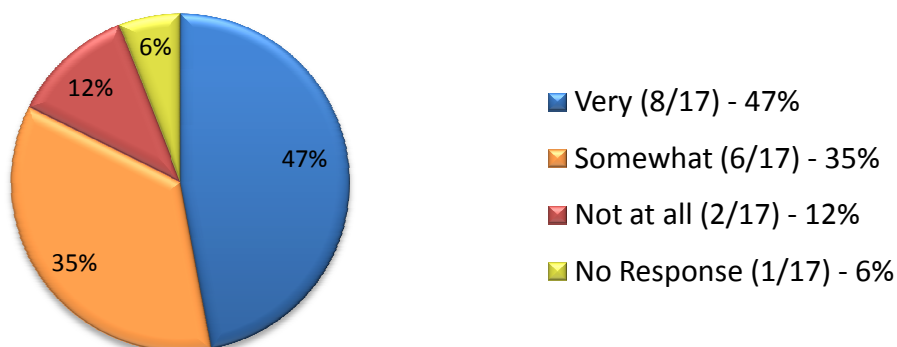
1. How important is it that teachers have a deep understanding of the mathematics they teach?

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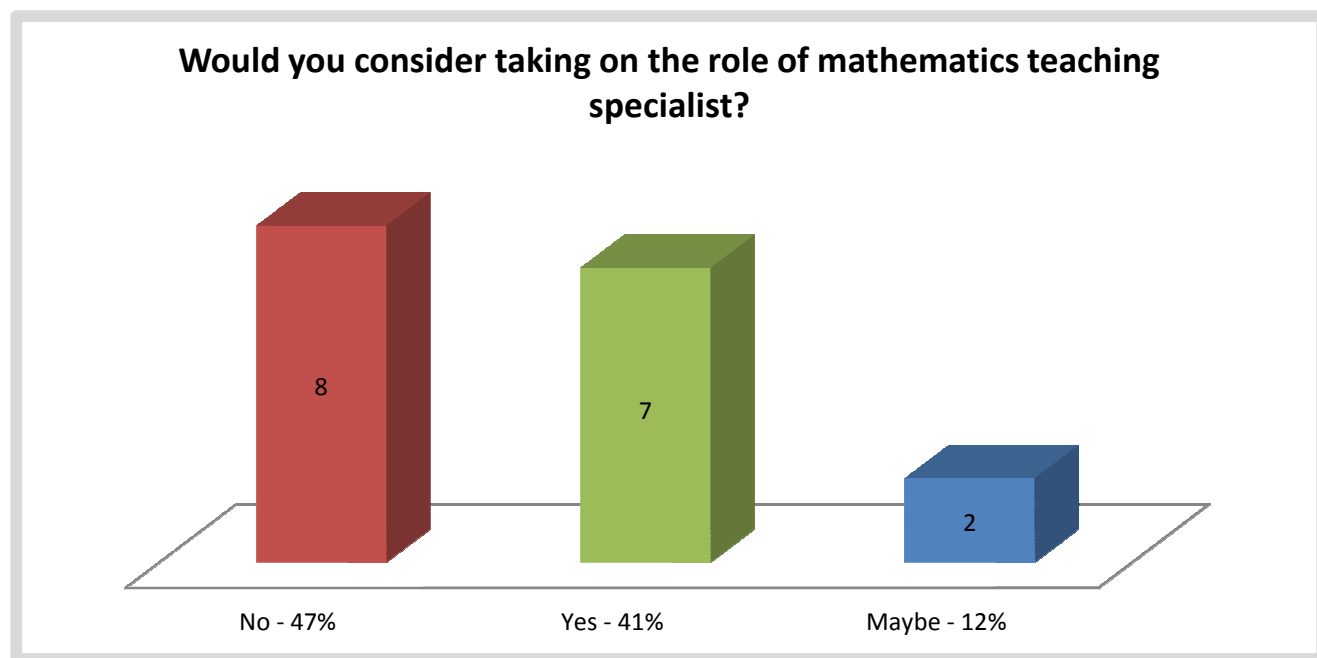


2. How comfortable are you with the mathematics concepts in the grades 6-8 curricula that you will be asked to teach?

**How comfortable are you with the mathematics concepts you are asked to teach?**



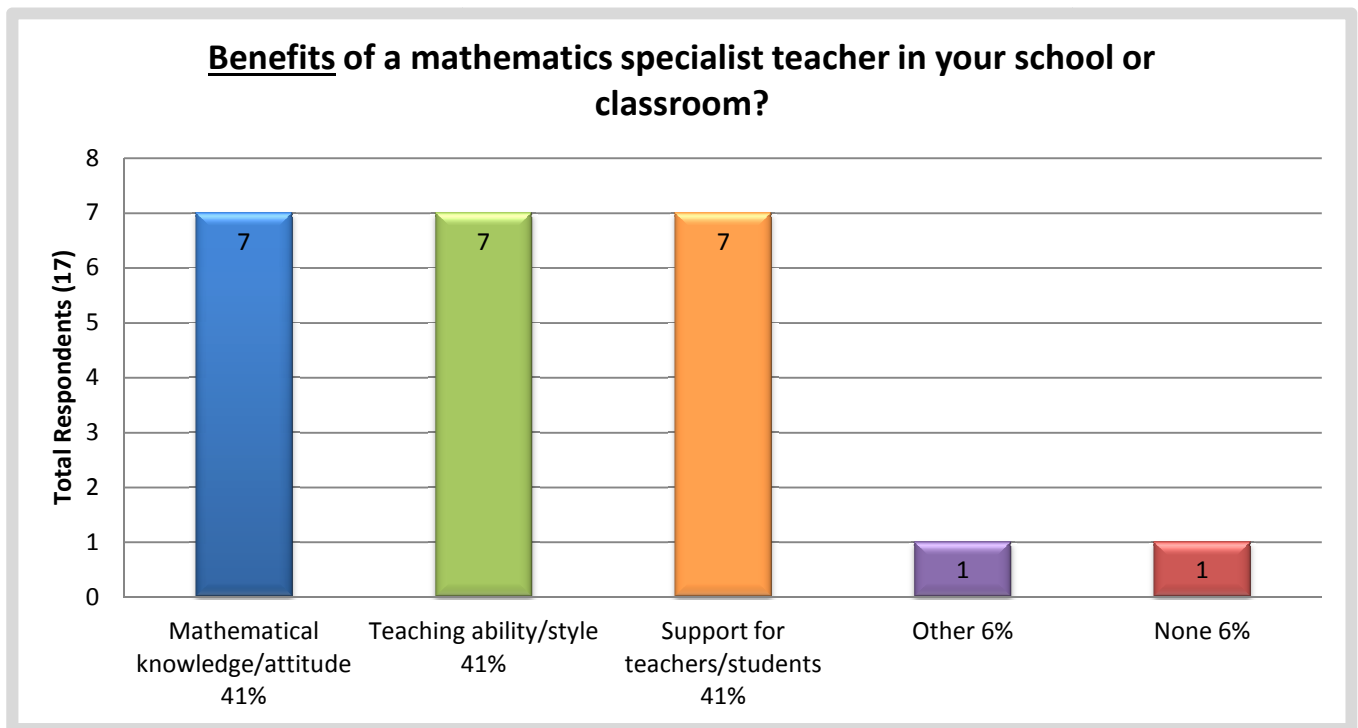
3. Would you consider taking on the role of a mathematics specialist teacher in a school? Why or why not?



Response Types	Questionnaire Responses
<b>No (8/17) – 47%</b>	<p>No. Although I do like teaching math, it is not a subject I desire to specialize in.</p> <p>I am a BEAD student with a background in the social sciences. I feel that I have a strong understanding of math concepts for the middle years but my social science background is much stronger and I would be sad not to be also teaching social studies. I would be willing to teach math for a few classes as long as I could also teach other subjects.</p> <p>No. The new math program is horrendous. It makes teaching difficult and not enjoyable</p> <p>Nope, don't feel comfortable with content</p> <p>No I am not confident enough in different ways of teaching math</p> <p>I wouldn't for selfish reasons of: I enjoy teaching other subjects too which is why I went into Middle Years instead of High School. I feel confident in teaching math and I COULD but I wouldn't because I enjoy a variety and don't want to burn out without that variety.</p>

Response Types	Questionnaire Responses
	<p>I personally wouldn't because I don't feel confident enough in my abilities or understanding of concepts and curriculum.</p> <p>No, math was never my strong suit and I never enjoyed anything about the subject.</p>
<p><b>Yes (7/17) – 41%</b></p>	<p>Yes, because I love math and I would love to inspire others to love it as well.</p> <p>Yes. I like math and I like teaching math.</p> <p>Yes, I enjoy Math and feel that I could be a great resource as a Math specialist.</p> <p>Yes, it would allow me to focus on one subject area.</p> <p>Yes math is my strong skill. I enjoy learning it as well as teaching it. I am very comfortable and confident in my math skills and ability in math.</p> <p>I think that I would in an elementary school setting for the simple reason that I like math and I think that there are a lot of great things you can do with math besides copy notes and complete assignments and I think that many teachers are unaware of these options or simply do not have the time to put together these types of lessons as they can be very time consuming.</p> <p>Yes, if I had the opportunity, I would take it. I play the roles that I need to. In other words, I step up to the plate when challenged.</p>
<p><b>Maybe (2/17) – 12%</b></p>	<p>I don't know that I would. However, this is where I personally started to struggle with mathematics and I want to be able to share the strategies that I have used over the years to get me through mathematics.</p> <p>At this point I am not sure, but likely no. The EMATH class I am taking this semester is the first math related class I have taken in nearly ten years. I am trying to be very open about learning all that I can, despite finding it difficult to wrap my head around the newer concepts about teaching math. I also enjoy the concept of being a multi-discipline teacher and being knowledgeable on many subjects and being able to incorporate them in a variety of ways in the classroom.</p>

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

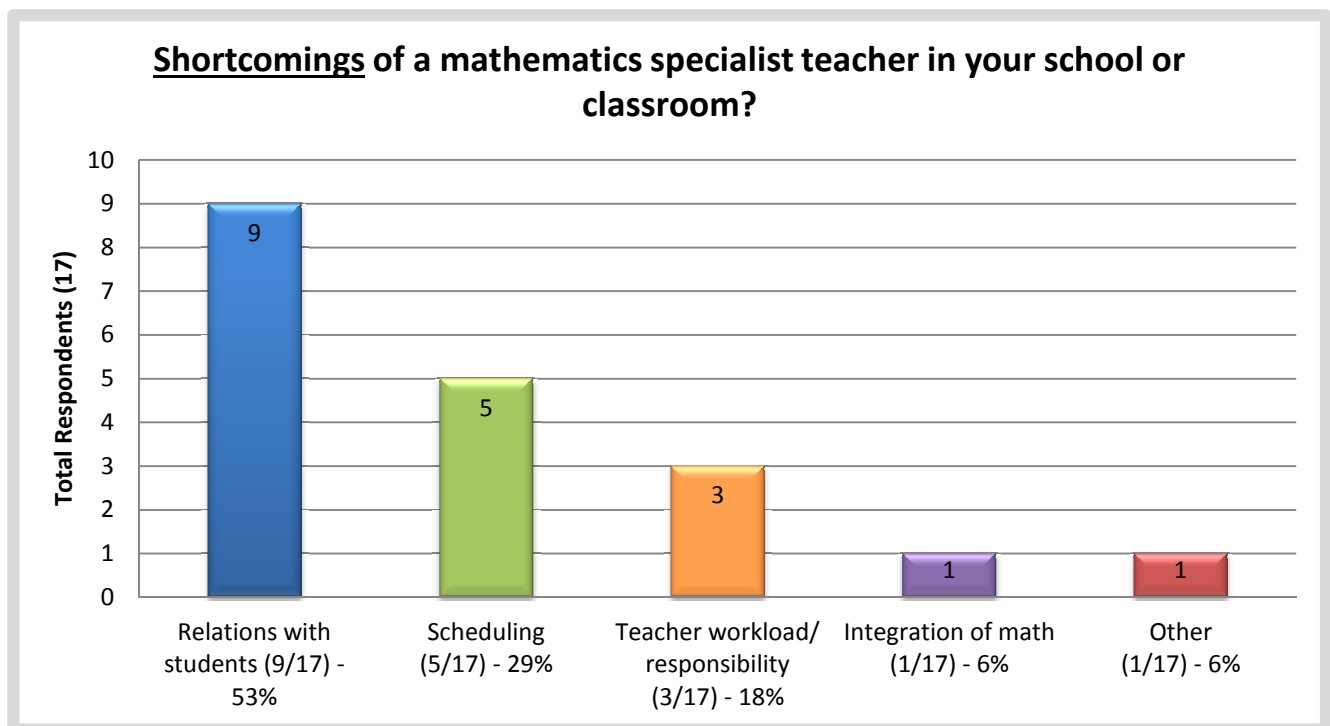


Benefits	Questionnaire Responses
<b>Mathematical knowledge/attitude (7/17) - 41%</b>	<p>Having someone with a deep understanding is important. Not only that but having confidence in the subject.</p> <p>They could focus all their energy on teaching Mathematics. Many people are afraid of teaching Mathematics therefore it would take the pressure off of those teachers and they could provide a better learning environment.</p> <p>They have an in depth understanding of the material</p> <p>This individual may also possess a more sound understanding of mathematical principles and concepts than a classroom teacher might.</p> <p>They would be mathematics focused.</p> <p>Benefits would be further mathematical education beyond a degree plus, an easy going math teacher.</p> <p>Also, this teacher can share knowledge.</p> <p>Someone would be there with a more in depth knowledge of mathematics</p>

Benefits	Questionnaire Responses
<p>Teaching ability/style (7/17) – 41%</p>	<p>I think having resident experts is very advantageous. Not only do experts offer a standard of learning, it also empowers a teacher to exercise a skill they excel at!</p> <p>I think that the students would learn more and have the opportunity to develop math skills.</p> <p>Many of my classmates who are lovely people are just not confident teaching math. I worry about how that might translate into teaching in the classroom. They may be excellent because they have really had to take the time to learn but they may also just not have a deep enough understanding or confidence in themselves to successfully teach their students.</p> <p>Someone who can teach using different strategies</p> <p>A mathematics specialist teacher could definitely introduce multiple ways of doing things in math and also potentially use technology as a more valuable resource in math.</p> <p>Focusing on one subject, like math, can be easier to keep things more organized and to focus on different ways to manipulate where as with 5 or 6 subjects, less attention may be paid to each individual lesson. With only having to focus on one from year to year, keeping the lessons or molding them to work better could be a benefit.</p> <p>It would be beneficial as to have a specialist due to the fact they would know exactly how to teach and what to teach and be able to just know the ins and outs of math.</p>
<p>Support for teachers/students (7/17) – 41%</p>	<p>This would allow more students to succeed in math because they would have someone to turn to if needed.</p> <p>Create confidence, help with questions, can throw ideas back and forth, create a network and a sense of community</p> <p>Students who struggle or excel have another person to help out</p> <p>If a school had a mathematics specialist, they would be able to build on previous skills and know that these previous skills are being taught.</p> <p>The main benefit I think is that someone that is not a strong or comfortable with math can have a go to person to help them find a level of comfort.</p> <p>Students may view the math teacher differently. Possibly students may direct more attention to this teacher because they understand that that teacher is there exactly for a math lesson. Obviously there would be fewer</p>

Benefits	Questionnaire Responses
	<p>math specialists than actual teachers and a demand for them, so job opportunities might pop up often.</p> <p>Someone ... who could assist classroom teachers in ensuring that their lessons are going to provide students with the necessary skills to be successful.</p>
Other (1/17) – 6%	Whether students admit it or not, most like working through and trying to figure out math problems. This enables a teacher to use many different formats when it comes to grouping and classroom management. Math also has right or wrong answers, so marking takes a lot less time than other subjects.
None (1/17) – 6%	None. One is not enough.

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





## Shortcomings

## Questionnaire Responses

### Relations with students and teachers (9/17) – 53%

I think that if a mathematics specialist teacher were to come in and out of the classroom it may lead to a lack of consistency with classroom routines and procedures, depending on the teacher and students.

Conflict with the teacher and students may create a long lasting dislike for math which we are trying to avoid.

Students are singled out that they need more help  
may take over your class, be rude and overbearing

Too many different teachers for elementary school students. Arts Ed. French, math, homeroom, etc.

Their might not be as strong of a relationship between these specialist and the students.

There is a risk that someone who becomes a math specialist has always done well in math and doesn't have sympathy or understanding for students who have to struggle to learn new concepts. They may also have been successful learning math in one way that they may have a hard time using different ways to teach concepts.

I think that if the specialist teacher used a lot of mathematics terminology and did not explain it in a way the students understood, then the students would struggle and in turn not like mathematics.

Perhaps a specialist would not have the rapport/relationship a classroom teacher has...

### Scheduling (5/17) – 29%

The shortcomings is that not all students will have the privilege to be taught by that teacher.

There would not be enough of them and not enough time in the day for them to get around to every classroom and have enough availability to help students learn mathematics to their greatest ability.

may not have enough time to help

One is not enough. So it's pointless.

Shortcomings	Questionnaire Responses
	The students wouldn't have access to a math specialist all the time
Teacher workload/responsibility (3/17) – 18%	<p>There wouldn't be room to venture out into any other subjects. It's not of interest to me whatsoever so I would never have to consider it.</p> <p>A downfall I think could be the development of dependency on one teacher and possibly the burnout of the specialist.</p> <p>You have to know the material much better than other subjects to teach it well. Being able to understand the concepts behind what you are teaching may be time consuming more time consuming, for some people, than in other subjects.</p>
Integration of math (1/17) – 6%	A teacher of math only would not have the same flexibility to teach cross-curricularly.
Other (1/17) – 6%	None.

6. Do you have any additional thoughts or comments to offer on the topic of mathematics teaching and mathematics teaching specialists? Please provide these thoughts and comments below.

6/17 respondents had additional thoughts or comments to offer on the topic of mathematics teaching and mathematics teaching specialists:
I think that elementary and middle years teachers should be at least taking more math classes in University. With the importance placed on numeracy in many schools, pre-service teachers should be learning a lot more so that they go into the field with confidence.
In university they should spend time teaching tips and how teach the content in of the math.
I think that new ways need to be introduced for students to understand, different learning styles need to be acknowledge and attention needs to be paid to each individual so they don't get lost in the lessons, like they did as a young student.

**I believe a mathematics specialist IS THE BEST IDEA EVER -- just cause i do not like math what so ever.**

**All teachers should have some expertise in mathematics.**

**I appreciate the teaching methods that are being explored in current classrooms. I believe that they encourage students to think for themselves, and these skills can be applied to any subject, and to very relevant every day life experiences for students. A math specialist in schools I think would be very helpful. Someone that could act as a math consultant for elementary school teachers, especially in the middle years grades would be beneficial for those teachers who do not truly love math.**