



# Parental Views & Attitudes toward Mathematics and Mathematical Teaching

## *How to get parents on board*

Research to Practice Brief

By: **Chelsea Cleveland**, Graduate Student

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### Overview

If you have helped your son or daughter with their math homework lately, or looked in a current elementary math text book recently, you would notice a lot of changes have occurred in math since the days of rote counting, memorization, and equation based solutions. Students and teachers are focusing more and more on the understanding of mathematical concepts and the processes, building efficient and effective communication, as well as, problem based learning to provide rich, meaningful connections and understanding of material in math class and outside of the classroom.

As vast amounts of knowledge, formulas, and equations, and outright answers can be now easily found at the stroke of a button, the necessity for understanding and applying this knowledge is greater than ever. It is still important to memorize and follow procedure, but then arises the question, "now what?" Remembering math equations is still significant, but having a greater understanding into *why* and *how* math works, and what *could* be done with it, is what is going to make the future significant.

*"Our kids need to know their math facts before they can understand the procedure."*

Being an educator in the mathematics classroom, and a leader in curriculum planning and implementation of mathematics within an educational institution, there are often many parents who display frustration and disappointment into the methods and strategies in which mathematics is now being presented and taught in the classroom. This is an intriguing and interesting phenomenon. One of which could be arguably so, as parents may not be familiar and/or comfortable with new learning concepts or even have poor math experiences themselves. However, and more importantly, this is of great concern to the educational community and the possibility of growth and support for more conceptual learning environments, particularly within the field of mathematics. This negative effect may build a barrier between a need for more application and creation in the classroom and the requirement for the growth of these life long skills to build and reconstruct new ideas.

### Purpose and Intention

So where do we start? As much of a child's learning can be influenced from the home, looking at the parental views and values of mathematics, along with the perception of the "new" math teaching strategies, is the first step. Investigating background information and perceived understanding to then ultimately provide and support conceptual mathematics teaching in a purposeful and meaningful manner. A positive attitude at home could be the influence required toward positive support and guidance through a child's mathematical learning process, throughout school and into adult life.

#### IMPORTANCE OF MATHEMATICS

92%

*Of parents surveyed believe mathematics learning is very important to their child(ren)*

## Research In Action

To delve into understanding the attitudes and views toward mathematics, from a parental lens, participants were required. 36 parents of middle school students were asked to volunteer their time to respond to an on-line survey. Out of the 36 approached, 24 participants agreed to volunteer and provided consent to participate within the study. The 24 parents were each provided a consent form, which outlined the purpose and overview of the research being conducted. This aligned with the procedures and ethical code within the University of Ottawa in conducting research using human subjects.

## Methodology

The research that was to be conducted required willing parents to volunteer to participate and share their views and opinions. The process also required a survey to be created. The survey, which was used, was created through an on-line survey site: *surverymonkey.com*. While setting up the survey, identity and tracking features were turned off, as well as IP address tracking configurations, to ensure safety and possible virtual tracing by third party companies and clients. The survey also protected against numerous or repeated submissions, as pre-generated key codes were e-mailed to participants separately. Parents of a shared household, could both complete the survey on the same computer; however, with only one submission per key code.

- The survey consisted of a total of 20 questions with an opportunity to provide additional feedback or comments to support the research and/or their personal views.
- Questions one through three were demographic based questions pertaining to age, gender, and personal education.
- Questions four through eight inquired about information and views about their own past mathematical experiences, including interest, success/abilities/their own parents' views, and further mathematical education or careers sought by themselves.
- The following 12 questions related to the participants views as a *parent*. Looking at math through a parental lens, with their child(ren) currently learning and understanding

mathematics. This inquiry involved key questions such as; "As a parent, how comfortable are you with understanding the new conceptual model of teaching mathematics in the classroom?" and "How would you rate your child(ren)'s mathematical abilities, using the conceptual approach?"

- For questions that required a more qualitative analysis, a rating scale was provided for participants to rate their understanding/views. A 5 point scale was used for most questions, ranging from 1 being "Not...at all", to 5 being "Very..." A rating of "Neutral" (scale rating 3) was also included.
- The ability to comment was important in the design of the survey, thus open-ended opportunities to comment were available throughout the survey. An overall comment section was provided as "Question 21," which was the only optional question before submission.
- It is important to note that the survey was created in a manner, so that each question required an answer for completion and submission. This was integral to ensure that all questions were answered, with as much of a conscious effort as possible. Thus the importance of offering a "neutral" choice within the rating scale.

## Participants



Background information was included within the survey to gain insight into the participants' own education and mathematics account. This helped to recognize and understand the demographics of the participants. All participants were parents of middle school students, (grades 6-8), within a private school in Ottawa, Ontario.

Of the 24 parent participants, 16 of them were female, and the age range of all participants were from 35 years to 64 years, with the mean average being between 35 - 44 years of age. Personal background education was an important factor to look to see if there was any correlation between the findings and parents personal education. Out of the entire participant sample, 63 % of the participants held a Masters Degree or higher, 29% went on to take mathematics courses within university, and only 25% of all participants identified themselves to be currently in a positive or career within the STEM (Sciences, Technology, Engineering, or Mathematics) field.

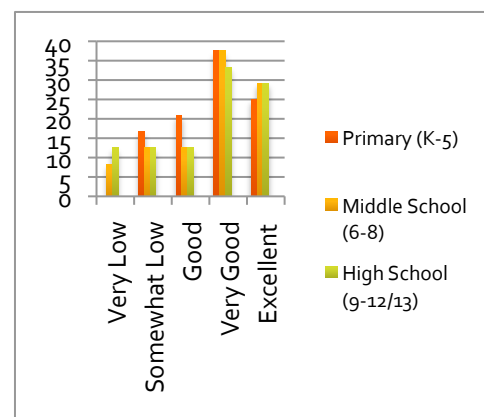


Fig. 1 Parents' mathematical abilities by grade cohort (%)

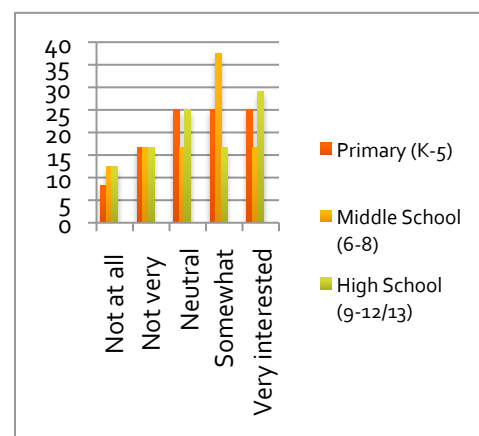


Fig. 2 Parents' mathematical interest by grade cohort (%)

## Analysis

Once all 24 surveys were completed, the survey was formally closed. The data and the results were tabulated using on-line software from *surverymonkey.com* and some were put into secondary charts and graphs to view and display findings in a comparable manner to certain outcomes. After the data was formulated, the results were interpreted and weighted using both a qualitative rating scale, as well as a quantitative comparison into the investigation of where parents' views currently are. Possible next steps to get parents more "on board" with the conceptual approach were determined through the analysis. The implementation of practice into a positive approach for parents, to become more familiar and comfortable with conceptual mathematical learning in today's classroom, was essential from the overall key findings.

### Key Findings

Parents play an important role in their child's academic development, both inside and outside of the classroom. Although mathematics education was stated of very high importance from the participants at 92%, the comfort levels and the level of ability to support a child's mathematical learning at home was a concerned finding. With a mean average of 42%, on both counts equally, the understanding and ability to support their child was "not very comfortable."

SUPPORT: COMFORT LEVEL AND ABILITY

42%

Parents who feel "not very comfortable" to support their child's understanding of mathematics

Surprisingly, when asked about statements shared at home around a negative perception of their own about mathematic abilities, parents *did not* find that any such statement would be more influential or not, as the results were averaged quite equally along the spectrum. (Fig.3) Moreover, 21% of the participants stated that this is "not influential at all." This was extremely interesting in its results, as a positive influence may have the ability change one's views when shared with others.

When looking at the perception of their child's comfort level and their ability in mathematics, another troublesome concern came to light. Using a more conceptual model, parents displayed that their child was more comfortable in his/her abilities and using the approach then they were; however, not to the results or standards in which they would suggest as a parent in terms of importance.

Another key finding of the results came from the final question pertaining to support which the parents feel or are provided by the school or teachers to help support conceptual mathematical learning in the classroom. Although it was encouraging to see that none of the participants felt, "not supported at all," the results display that more can and should be done from a school's standpoint to provide parents with the necessary information to help and support this manner of thinking and learning at home and for their child.

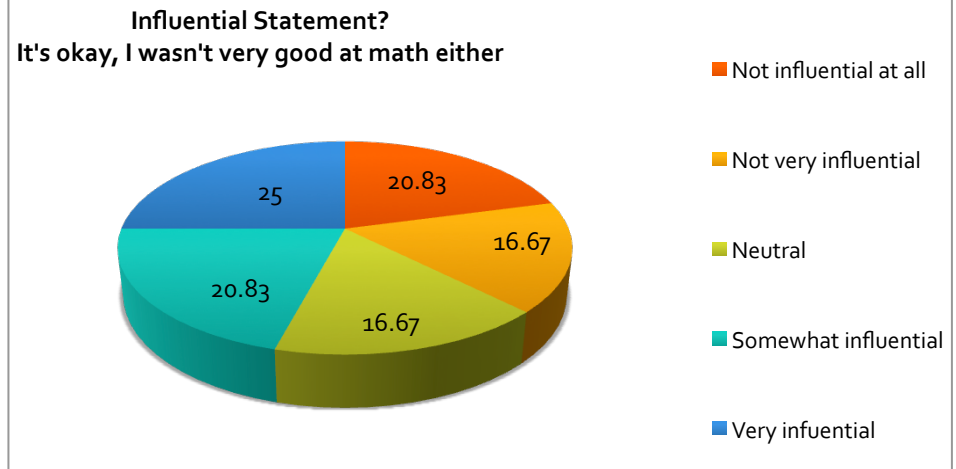


Fig. 3 Percentages of parents who responded to in the possible influence of sharing the statement, "It's okay, I wasn't very good at math either," with their child(ren).

The majority of the participants, 38%, felt "not very supported," which depicts an effect of a possible absence and deficiency of guidance and direction from the school.

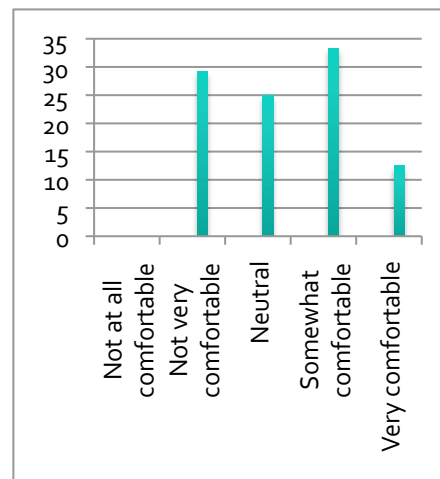


Fig. 4 Parents' view of their son/daughter's current mathematical comfort level using the conceptual model (%)

Moreover, and of extremely high interest, was the correlation between the parents' own comfort and ability levels in mathematics, and that of their son/daughter. (Fig.4 and Fig.5) Comfort levels were more balanced, however noted that the parents did share that their son/daughter's comfort level was higher than his/her own. In addition, and of importance to the school, would be that although parents' described their son/daughter's comfort level as higher than theirs, they shared that their child's mathematical ability was on average "good."

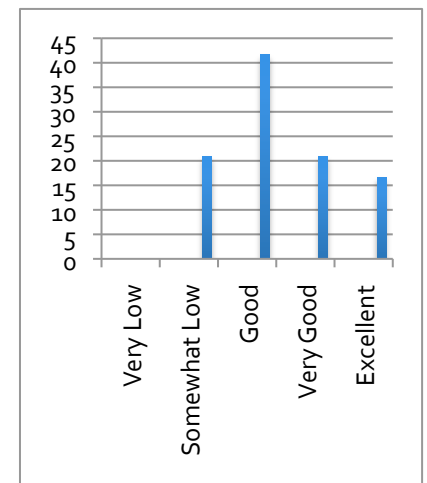


Fig. 5 Parents' view of their son/daughter's current mathematical abilities using the conceptual model (%)

It is highly worth noting that although the survey's results were based on qualitative analysis, that comments that were provided were quite useful in understanding the bigger picture. A few participants opted to provide a comment, which depicted their hesitations into whether conceptual learning is the direction to be going, and that they are not convinced that this has been an improvement or not in mathematical teaching. Also, most parents confided that they are "too scared" or "afraid" of helping and supporting at home, because it tends to cause confusion and misunderstanding between the parent and the child.

*"Truly afraid that I will make it worse for my child, say or explain something incorrectly/make it more confusing. Totally different from how I learned...completely uncomfortable."*

13% - 21%

*Parents who feel very supported or somewhat supported to understand how math is being taught in the classroom*

## Research Going Forward

This research was only a small glimpse into the inquiry of parental attitudes around current mathematical teaching. More research is required to gain a more in-depth look and find more correlation and/or patterns around how parents' influence their child's mathematical thinking, abilities, and confidence.

As this was a "snapshot" into possible further research, there still remained some areas in which would provide a more cohesive and solid analysis. The sample size of participants should be widened, and to also include participants from various school boards, various grades, and from various teachers. This would aid into looking at the "whole picture," from various communities. Also, in concert with this, it is important to note that discrepancies can and do arise, when one is asking to rate a feeling or comfort level on behalf of another. Due to ethical codes, the students were not able to be surveyed, and their parents' provided *their* views on how they see their child(ren). This information can sometimes be skewed, and should be taken note of. Finally, parents can be subjective when responding in terms of their child(ren), sometimes too easy, and sometimes too hard. Parents having more than one child, could also be comparing or seeing insight into abilities or comforts that the research and survey did not ask or separate. This research looked for a common ground; however, eminent that this subjectivity may have occurred within the survey.

## Into Practice

Looking forward and after analysis of the parental views and attitudes toward conceptual learning in the classroom, it is evident that the school, staff, teachers, and faculty may want to implement a plan to build and foster the support of the parents at home, while continuing to build on conceptual practices in the classroom.

Possible suggestions for schools/teachers to foster and build a positive attitude toward conceptual mathematical learning may include:

- Host Parent Math Workshops
- Provide parents with information on how to help and support at home
- Tip sheets to foster math in everyday life
- School to home transitional discussions, where students explain to parents
- Open up an on-line forum where parents can go for questions and support
- Provide information to parents on how to communicate math ideas at home and in real-world situations
- Math Newsletters for parents
- Math Blogs with parent guest sign-ins (to see what their child is doing and how he/she is explaining him/herself)
- Use rote learning and practice as a jumping off point to lead into more higher ended thinking and applications
- Schools to provide workshops and PD opportunities to math staff to understand how to better carry out this model and approach to learning in their classrooms
- Parental volunteers and open door math policies, welcoming parents in the classroom to see the math, "in action."

## In Sum

The model for teaching and learning mathematics has changed over the past 10-15 years. The once tried and true, "drill and kill" procedural method, had now been replaced with a more understanding and conceptual approach, which investigates the *why* and *how* solutions and answers are created. The first step in supporting any cause or initiative is to establish and/or continue to have an open and comfortable partnership. In this case, providing parents with a place to go with questions, feedback and open support. This should begin as early

as possible in the school. When all forces work together, the students truly benefit from the collaboration of the conceptual model based approach. Students feel supported, and recognize that they have a support team at school and at home. Math can be a challenging subject for some students, and with additional support from the school and teachers, parents can begin to feel more comfortable in their abilities to help support their child's mathematical learning at home.

Parents do not display a comfort level with the conceptual based approach and therefore, may not be providing or sharing positive light to mathematical processes and learning at home. This could lead to a negative effect in their child's success and/or the atmosphere of the classroom as a whole.

Parents feel that mathematics is of high importance to their son/daughter's education, however have not "bought in" to the new way of teaching. If this continues, there may be a trickle effect. Students may begin to foster a more negative view into the model, where they may not feel as confident in their abilities to take risks and strive to a higher potential in their mathematical learning and achievement.

School planning and teachers also should take notice, as comfort levels on the conceptual approach were higher than the perceived students' abilities. Closing the gap and providing a balanced math curriculum, with open communication and support from the parents, could be the key element in aligning forces to get parents' support behind a strong math program now and into the future.

*"It would be helpful if parents could be given (or shown) examples so that we can assist with homework/studying. It's not always obvious how to teach a child how to approach a problem."*

## Links and Photo Credits

To preview the original survey (without results) [https://www.surveymonkey.net/s.aspx?PREVIEW\\_MODE=DO\\_NOT\\_USE\\_THIS\\_LINK\\_FOR\\_COLLECTION&sm=w5XvIWI\\_2FhLNkrmz\\_2BmDIhbl21OB\\_K6MD4nKWdUivO7gHw\\_3D](https://www.surveymonkey.net/s.aspx?PREVIEW_MODE=DO_NOT_USE_THIS_LINK_FOR_COLLECTION&sm=w5XvIWI_2FhLNkrmz_2BmDIhbl21OB_K6MD4nKWdUivO7gHw_3D)

iStock photo used on first page was taken from; <http://detroit.cbslocal.com/2011/05/20/fight-back-against-math-anxiety/> on April 6<sup>th</sup>, 2015

All quotes directly from the participants' comments through this research study