
▲ PARENTS: THE LOGICAL LINK FOR SUPPORTING CHILDREN'S MATHEMATICAL UNDERSTANDING (PART 1)

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"Wouldn't it be lovely if we could just teach our students and not have to deal with their parents?!"

(Litton, 1998, p. 2)

How many of us have heard similar comments in our staff rooms? Are these simply the comments of uncaring, disgruntled teachers? In some cases, perhaps they are, but more likely they are the cries of frustration from dedicated educators. It is clear that while parents can be one of the best sources of support for teachers, they can also create stress and anxiety for all involved (Seefeldt, 1985). Most parents, like most teachers, only seek the best in terms of learning experiences for their children; however, parents and teachers sometimes have opposing views regarding what these experiences should be and how they should be carried out. The challenge for educators is to find positive ways to inform and involve parents in all aspects of education. This article will explore some factors that appear to be constructive in gaining parents' support, and it will offer suggestions for increasing parents' confidence in, and understanding of, a subject that many of them disliked and failed to grasp during their own schooling.

Research from the past twenty years has provided ample evidence that it is important for parents to be involved in their children's education (Chavkin, 1993; Epstein, 1994; Ford, Follmer & Litz, 1998; Henderson, 1988; Onslow, 1992; Sattes, 1985). This is especially true of mathematics, since there are many family-oriented activities that increase both parents' and children's understanding of the many patterns and relationships that are the foundation of mathematical knowledge. Some examples include: math games and activities that can be played at home, on the way to school, or during a trip in

the car; bed-time stories that foster enjoyment for both literature and mathematics; and, puzzles and mental math challenges that can be discussed during supper time. These types of activities demonstrate that mathematics can be shared and enjoyed by the whole family rather than being viewed as a subject that has to be completed painfully and in isolation.

A recent international study of 32 countries by the Organization for Economic Cooperation and Development (OECD) found that parents play a significant role in their children's education (OECD, 2000). The study confirmed the results of earlier research, finding that parents, who talk with their children and provide environments that stimulate thinking, are likely to positively influence the outcome of the children's education in reading, mathematics, and science. While some families already engage in the types of activities advocated in the report, there are many parents who are unaware of the strategies that help facilitate children's mathematics development, and therefore they look to the school system for support. Unfortunately, a recent report from the Education Quality and Accountability Office (EQAO) indicates that fewer than twenty percent of elementary schools in Ontario offer family sessions for mathematics, and that over the past four years these numbers are declining (EQAO, 2000/2001, p. 102).

The notion of involving families in their children's mathematics education is not new. Family Math originated at the University of California, Berkeley, in the early 1980's and has spread worldwide. During the late 1980's and 1990's, there have been several Family Math programs in Ontario. The evidence suggests, however, that most teachers and principals have failed to capitalize on the resources that became available (e.g., *Family Math* by Stenmark, Thompson & Cossey, 1986). Perhaps now is an ideal opportunity to re-examine how we might involve parents in their children's mathematics education. Parents we have encountered want to help their children, but do not know how. Not only are topics like probability, statistics, and patterning new for many parents, but also the way we now teach mathematics is also foreign to them. If we want parents to be our partners in their children's education, then we have to be prepared to reveal why it is a disservice for their children to complete twelve years of schooling to be little better than a \$5 calculator. Basic skills are important, and we encourage parents to play many games with their children to advance the learning of these skills. However, children do not fail mathematics in high school because they do

not know their basic skills. Students fail high school mathematics because they do not *understand* the structures of arithmetic, and consequently fail to understand generalized arithmetic (basic algebra). Otherwise, why doesn't the use of calculators on high school tests lead to greater success?

For the past two years, members of the Esso Family Math Centre¹, at the University of Western Ontario, have been creating resources, and building on established ideas from other institutions. Staff from the Centre train volunteers to work in community settings with at-risk parents and their children in an effort to improve attitudes toward mathematics, and increase parents' involvement in their children's mathematics education. Several local schools, particularly those schools situated in high-needs areas, are now using these same resources. It is our belief that more important than the materials we use is the environment that is established by the Family Math facilitators in these communities. Many of the factors we have found to be beneficial in helping parents and their children work together can likely be duplicated in school settings so as to foster a community of sharing, understanding, and cooperation. Once parents understand why we are now teaching mathematics the way we do, and they begin to make sense of it for themselves (often for the first time), then they generally become enthusiastic partners in the education of their children. It is our responsibility to help parents understand and appreciate why we use games and manipulatives rather than the worksheets so many of them remember as *real math*. Parents also have to become convinced that talking with (rather than to) their children is important, and why listening to their children will often tell them a great deal about their children's understanding of mathematics. Next, some of the strategies that we have found useful when working with parents are provided². In the September 2002 issue of the *Ontario Mathematics Gazette*, we will discuss and share some of our resources.

The Importance of Community Building

Many parents, and some of the children, feel uncomfortable when they enter an educational setting in

¹ The Esso Family Math Centre is supported by the Imperial Oil Charitable Foundation, and the Maurice Price Foundation. The Centre also has productive partnerships with Investing in Children (London), Texas Instruments, and Fanshawe College.

² The Esso Family Math Project has two programs - one for families who have children in JK, SK, and Grade 1, and one for families who have children in Grades 2-5. The strategies discussed in this article were found to be worthwhile in both programs.

the evening. Some parents remember negative experiences from their own school days, and several recall having had difficulty understanding mathematics. It is important for parents and their children to feel that they are in a safe and relaxed environment where they can make errors, learn from these errors, make sense of the mathematics they are learning, and grow as a family by having fun and gaining knowledge together. Building a community is a crucial part of the Esso Family Math Project. We want parents and their children to feel comfortable and to ask questions when they do not understand.

We have found that having dinner together at the beginning of each evening facilitates this community building. One of our initial concerns was keeping families with young children too late in the evening, and because many parents work outside the home, it is difficult for them to get home, cook dinner, and be at Family Math by 6:00 pm. We overcame this problem by having an inexpensive, but nutritious meal (approximately \$2.50 - \$3.00 per person), at 5:30 pm. Since we work in community centres, volunteers at the centres sometimes prepare the meals. However, another very satisfactory route for us has been to have a local high school cooking class prepare soup and sandwiches. A serendipitous result of having these dinners together is the community building that has occurred. Parents, children, and Family Math facilitators eat together and chat with one another in an informal setting prior to starting the Family Math activities. We always have an introductory math activity (usually concerning estimation) for parents and children to complete on their arrival at the site, as well as a discussion regarding home challenges from the previous week. While math talk is initiated by these activities, the discussions are often non-mathematical with parents and children discussing their personal lives with the Family Math facilitators. We believe that it is these discussions that have enabled the community building to occur over a short span of time. As well, the informal discussions have allowed parents to feel relaxed and confident enough to ask questions before, during, and after Family Math sessions.

The Importance of Developing Good Parenting Skills

Helping parents expand their parenting skills is an important component of the Esso Family Math Project. Parents may lack the knowledge to assist their children's development or understand their mathematical thinking. It is important for Family Math facilitators to model

positive parenting skills, demonstrating worthwhile strategies to help parents relate to their children. Facilitators must model these skills without acting in a prescriptive manner, or appearing to be judgmental of a parent's present behaviour. We have found that playing the Family Math games with the families to be the best form of modelling. Parents must learn how to invite their children to share their thinking, encouraging them to communicate their understanding (or lack of it) in a secure and stress-free environment. Becoming a good listener is hard, and takes time and patience. Parents need to practice waiting for their child to think through a problem, and they should not be critical of an incorrect answer, or excessive in their praise of a correct one. Incorrect answers, however, need to be corrected in a positive fashion. When a family enjoys learning a challenging topic together, while respecting each other's thought processes, everyone benefits.

Finding and Training Enough Volunteers

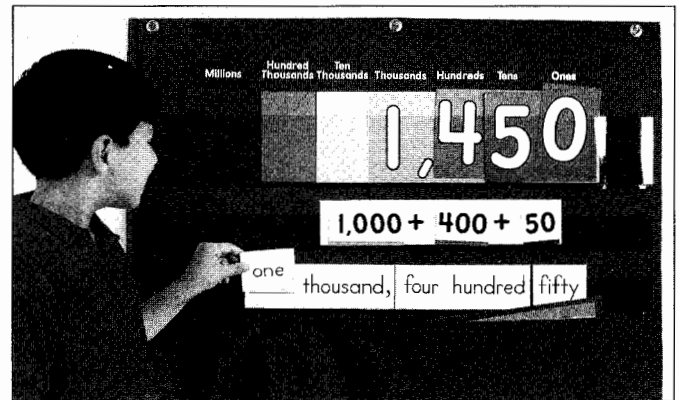
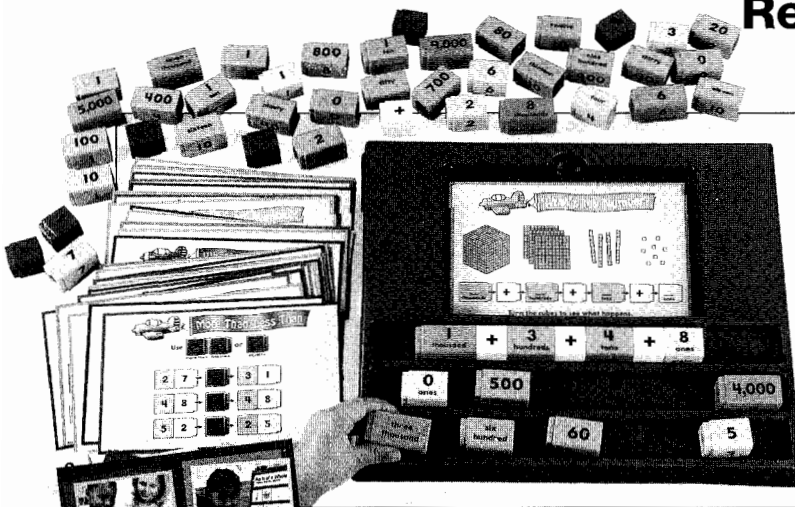
A viable Family Math group consists of approximately ten families. A family unit has an average of three

members, e.g., two parents and a child, or one parent and two children, and thirty is a large enough group to manage. For each group, we like to have one experienced teacher leader and four or five volunteer facilitators. This ratio provides one facilitator for every two families. The teacher leader guides the program at each site, but the volunteer facilitators usually take turns introducing new activities, thereby increasing the pool of knowledgeable leaders for future years.

Ten hours of training is provided for everyone working in an instructional capacity at an Esso Family Math site. The training assists volunteers in understanding both the mathematics and the philosophy associated with Family Math. We offer the training to student teachers at the faculty, as well as to students taking early childhood programs at Fanshawe Community College, on the condition that they volunteer time at one of the sites. Not only has this process provided us with a large number of volunteers, the training and experience provides new teachers with the necessary abilities to help organize Family Math sessions in their own schools and early childhood centres upon graduation. Perhaps even more important, it facilitates the development of skills needed

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to work effectively with parents. In the future, especially when moving to sites outside the city, high school students considering a career in education might be utilized in a similar manner (volunteering their forty hours of community service that the Ministry of Education and Training in Ontario demands). Teachers who have recently retired, but want to continue some volunteer work, also find working in Family Math communities rewarding, and are a valuable resource group that understands sound parenting skills.

Where's the Math?

Many of our parents remember math as the tedious task of completing large numbers of worksheets, with answers that were either right or wrong. Naturally, they often cannot understand the mathematical value of playing a game, going on a math walk, using manipulatives, exploring patterns on a calculator, reading a math related story, or singing a math related song to their child. It is our responsibility to reveal the mathematics to the parents, and not use games and activities that fail to include good mathematical examples.

For each evening's activities, the *Esso Family Math Resource Guide* has a section titled, *Where's the Math?* The mathematical benefits gained from playing each game, doing each activity, or reading each story, is explained, and the teacher leader can use this information when talking to the parents during the last ten minutes of an evening (at this time, the other Family Math facilitators review the *Home Challenges* with the children, or replay a game the children perhaps did not fully understand earlier or simply want to play a second time). We also remind parents that practice at home during the week (replaying some of the activities completed during the Family Math session and completing the *Home Challenges* provided each week) is an important component for improving their children's skills and developing a positive attitude towards mathematics. Some weeks we even ask parents and/or children to complete a questionnaire to inform us of the activities they enjoyed, found challenging, or were difficult to understand. The feedback is used to improve the program.

To provide a link to the Ontario Mathematics Curriculum, we usually list two expectations from the Ontario Ministry's list of overall/specific expectations in the *Resource Guide*. One expectation is taken from the youngest applicable grade level of the program, and the other is from the oldest applicable grade level. We include

this information for teacher leaders so that they can demonstrate to parents how the Family Math activities are part of, and not just supplemental to, their children's school program. Once parents understand the benefits of what they are doing, they usually become supporters of the program rather than antagonistic towards what many previously thought of as *play*. We provide examples that illustrate how productive play assists understanding – for parents as well as their children³. Some of these activities will be discussed and shared in the second part of this article that will appear in the September 2002 issue of the *Ontario Mathematics Gazette*.

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³For further information, go to the *Esso Family Math* web site at <http://www.edu.uwo.ca/essofamilymath>.