

FOCUS ON FACULTY RESEARCH

Promoting Numeracy Through a Family Math Night

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Over the past decade, the international (PISA) and national (CMEC Pan-Canadian Assessment), standardized testing results have shown that students in Manitoba have relatively low results in the area of mathematics when compared to the rest of Canada. While the results of these tests must be understood in terms of the complexity of learning and societal factors, they nevertheless have resulted in concern from various stakeholders in the province. Regardless of how much weight we should afford such results, there is always a desire to improve education, especially in the areas of literacy and numeracy.

There are significant connections between numeracy skills and an individual's success in school, career, and everyday life. Therefore, the question that arises is how to better support mathematics education to help students acquire the numeracy skills they need. This acquisition requires understanding and valuing mathematics, but anxiety and fear often accompany the study of mathematics. As a result, finding ways to demystify mathematics, foster appreciation for its value, and change negative attitudes about learning mathematics to positive ones are critical goals for educational improvement.

What Are Family Math Nights?

Family Math Nights, first introduced by Stenmark et al. (1986), "are school-sponsored events in which parents, teachers, and students interact around a mathematics curriculum" (Lopez & Donovan, 2009, p. 220). Although the content and structure of these events often varies, their purpose is typically the same: to have parents, students, and siblings engage in learning about mathematics (and strategies for strengthening mathematics skills at home) in a non-threatening, supportive environment. Family Math Nights share some common characteristics: a carnival-like atmosphere, math games and activities, an invitation to entire families to participate, food and refreshments, school-based venues, and take-home resources for parents to continue using math activities at home (Jacobbe et al., 2012). They provide authentic opportunities for teacher candidates to work with parents, recognize diversity and the need for varied instruction, and better appreciate the important role that parents and informal contexts for learning play in education (Lachance, 2007). Additionally, Family Math Nights can attend to teachers' misconceptions "about the commitment of poor and minority parents to their children's education" and build cooperative teacher-parent relationships based on trust (Jacobbe et al., 2012, p. 1175). As a result, they have tremendous benefit for students, families, school communities, and university communities alike.

A Local Family Math Night Project

This project, funded by a small university/community "Outreach" grant, was devised as a means of reaching out to a school community in order to support numeracy development. Funding allowed us to employ four teacher candidates in the B.Ed. program as assistants in the project. The project team consisted of the university researchers (i.e., the authors), teacher candidates, school division numeracy specialist, and the principal, numeracy coach, and some of the staff at a local school.

The original idea was to create an event with activities conducted by the student assistants; however, a professional mathematics education author and speaker was available, and it was

decided to take advantage of this opportunity. Select students were invited by the school staff and included several immigrant/newcomer families. Criteria for selection of students was determined by the school staff: grades 4-6 students who were experiencing some difficulties in numeracy. In all, about 20 students and their families were invited, with about 80 people in attendance. To help with language issues, Spanish and Mandarin translators were on hand. The evening started with a meal of chili, buns, and dessert provided by the Education Students Society (the Faculty of Education student council). Sharing a meal fostered conversation and a fun, family atmosphere. A childcare service was also made available for younger children so that parents could spend quality time with their older children playing numeracy games.

For the remainder of the evening, the speaker led families through a variety of game-based strategies for learning and practising numeracy skills. The games targeted skills involving logical thinking, basic arithmetic, place value, and comparing and ordering numbers. Typically, the speaker described the rationale for playing games, what skills they developed, the rules for playing each game, and a visual demonstration of game play. Families were encouraged to play the games together, while the teacher candidates, teachers, and faculty researchers in attendance joined in the games and/or circulated to assist with questions. To add to the fun, prizes were given out as each game was debriefed.

At the end of the evening, each family was given a grab bag of pencils, notepads, playing cards, and dice so that some of the games could be played at home. The school also purchased one of the games (available from the presenter's website) for each family to take home and play. At the conclusion of the project, remaining funds from the grant were used to purchase math games and materials for use in the school.

A survey to assess the success of the event was administered to parent attendees at the end of the evening. The survey was provided in three languages – English, Spanish, and Mandarin. In addition, a meeting was held about one week after the event, and research team members shared their observations. A follow up survey, also available in three languages, was administered about two months after the event. At this time, both parents and teachers were surveyed. This survey was meant to find out whether the math evening had any longer term effects or had simply “faded away.” Surveys included both Likert style questions and open-ended questions. The information from the surveys and team observations was collated and analyzed using descriptive statistics and by looking for themes in the qualitative data.

Results and Discussion

The survey that was administered to parents/families at the end of the Family Math Night and had 24 respondents, with just over half being completed in Spanish. The first question, which asked participants about their overall satisfaction, provided favourable feedback: 18 respondents (75%) indicated they were very satisfied with the event (see Figure 1).

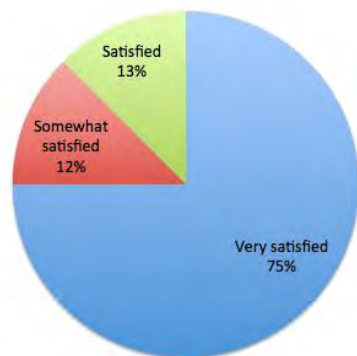


Figure 1. Survey responses to overall satisfaction with the numeracy event.

On the 5-point Likert scale, none of the respondents indicated a score lower than 3 (or satisfied). Similarly, on the remaining 6 questions on the survey, all of which required written responses, nearly all of the comments were positive in nature. Figure 2 provides examples of the comments on the initial survey (administered at the end of the Family Math Night).

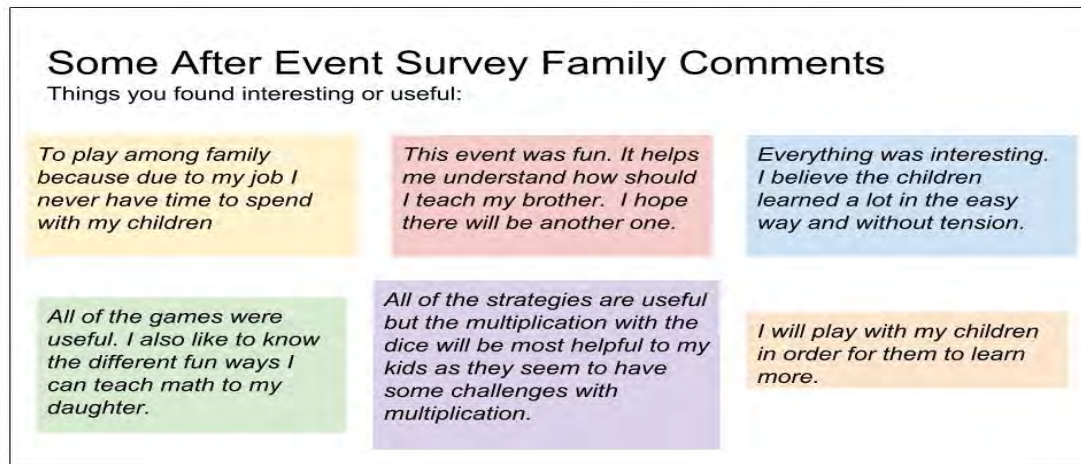


Figure 2. Selected parent comments from the post event survey.

Evident in the families' comments are themes previously described in relation to Family Math Nights. Positive connections with school and mathematics were built in a supportive and fun setting, and parents learned strategies for strengthening mathematics skills at home.

A week or so after the event, the research team gathered to debrief. Reflections about the event were positive, with teachers and teacher candidates noting relationship building, small interactions within families, laughter and engagement. The prizes, supper, childcare, and participation of many staff members were also positive points. The take-home grab bag and games were valuable to encourage continued play at home. A few logistical issues were noted for improvement, such as everyone being clear on what their job was and timing of the event.

About two months after the Math Night, a follow-up survey was distributed to parents/families who had attended the math night; there were ten respondents. In addition to the parent survey, it was decided to survey the teachers who had students involved in the event; there were five respondents. Again, the results were translated as needed and collated.

Figures 3 and 4 are selections of comments from the survey. All respondents, both parent and teacher, found the event a positive one with many wishing to see it occur again. All but one parent reported using the strategies at home with their children. When asked for suggestions for future events, most had none; however, one interesting idea was to find a way to encourage more interaction between families. It was interesting to note that many of the teachers' comments were about the social aspect – the smiles, laughter, and relationship building – which indicates that the benefits of the event extended far beyond the building of numeracy skills.

Comments from parents and teachers on the follow-up survey indicated, again, that connections with families were made in a positive, fun atmosphere. Moreover, both teachers and parents indicated that strategies were potentially being used at home. While teachers' prior perceptions about parental involvement at home were not surveyed, the teachers' comments seemed to indicate that the event had a positive effect on their attitudes and perceptions. This point suggests that Family Math Nights have the potential to foster reciprocal learning, because not only did students and parents learn about the school and mathematics strategies for use at home, but the teachers also learned about family dynamics through an authentic experience that brought families and teachers together.

The Follow Up Survey - some parent responses ...

[The family math night] was a good experience. An evening full of fun, we met more people and we learned new way to practice math.

Yes I would like to attend to another event because helps our children to learn for the future.

It was a good experience for me and my kid. I now know some more new methods to play and have fun with him using math.

Yes, we have used the strategies so our daughter learns more math. Her success has been in the time tables. Also [this] is an opportunity to talk and play with her. A lot of success!

Yes we have been using the strategies frequently to be able to learn how to add subtract, multiply and division.

I would like to see this kind of event offered more often.

Figure 3. Selected parent responses from the follow-up survey.

The Follow Up Survey - some teacher responses ...

Great evening - loved having Jane to "run" the games portion of the night - fun, positive evening for families - connections between home & school .. great!

Some students have said they are playing the games at home - I have played some games with students who were at math night and they remember those games.

I think it was very worthwhile, Even if they don't continue to play these math games at home, they might provide quality family time.

Supper was a good way to get families here - games were great - highlight was definitely seeing the interactions between family members during the games - a positive, fun evening!

It was awesome! Great activities that families got to play and take home forever! Loved seeing families laughing and learning.

Very worthwhile ... I'd love to do it again - I wouldn't change anything!

Figure 4. Selected teacher comments from the follow-up survey.

Following the Family Math Night, some students at the school who did not attend the event expressed that they felt left out after hearing several positive comments about the event. The team decided to organize a math afternoon that would include all grades in the school, from kindergarten to grade 8. Another math education professor from the university (not a part of the research team), was instrumental in getting this follow-up event off the ground. About 30 teacher candidates volunteered to help out. Each group prepared a numeracy game suitable for the grade range they had chosen to work with. Entire classes rotated through three different games throughout the afternoon. As the researchers circulated around the school, we observed students at all levels engaged in math learning and having fun. Since this event did not fall under the scope of the original project, feedback was not gathered; however, from the researchers' perspective, it was evident that it was a successful way to engage the school community and provide a unique experience for many of our pre-service teachers.

The work that teacher candidates did with students, as both members of the research team and as facilitators in the follow-up math afternoon, provided them with authentic opportunities to

work with students, parents, and teachers; and a way for them to think about the need for varied instruction and the role of parents within the school and at home. While the teacher candidates were not surveyed about their experiences because the follow-up math afternoon was not part of the original study design, comments from teacher candidates involved with the research team indicated that the experience did impact the perceptions of teacher candidates about diversity, school-parent relationships, and parental involvement in positive ways.

Conclusion

The local Family Math Night hosted as part of this research project fostered positive relationships between school, university, and community; engaged parents and students in curriculum-based mathematics activities in a supportive, non-threatening, and fun atmosphere; and potentially had a positive effect on teacher perceptions of parental involvement and school-parent partnerships. The emergent school-wide follow-up event provided teacher candidates with opportunities to plan for and engage with students in an authentic way, and opened up dialogue between university and school/division faculty and students in a productive and collaborative manner. The surveys conducted two months after the FMN revealed a lasting effect in terms of families continuing to play the games at home, and a palpable sense of appreciation for connections made between home and school. Family Math Nights have the potential to foster stronger school, university and community partnerships, as well as a greater appreciation for the value of mathematics and numeracy skills at the local level.

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