How Educators Can Increase and Improve Family Involvement in Mathematics Homework

Anna Barnes

Abstract: In order to explore the role of parental involvement in mathematics learning, this paper will begin by presenting a profile of a fifth-grade student, here called "Amber," at an urban K-8 public elementary school in Northwest Ohio who was observed during mathematics class throughout the 2017-2018 school year. Amber's academic performance, the role her family plays in her education, and their interactions with educators all are described below. Amber's achievement will be defined through both in-class and homework grades. The amount and quality of assistance she receives from family members during mathematics homework is also discussed, with the goal of determining ways that family involvement in mathematics homework can be improved for this particular student. The goal is to explore the implications and conclusions which can be drawn from this example, with the aim of exploring how family involvement in mathematics homework can be increased and improved.

Scenario

Amber is seemingly attentive during whole-class discussion in my fifth grade mathematics classroom. When a question is posed to the entire class and she is confident in her answer, she raises her hand. Sometimes after raising her hand she puts it down soon after. If I call on her when this occurs, she says she does not know the answer.

After whole-class discussion, I hand out a worksheet and instruct students to complete it independently for a grade. Immediately, Amber raises her hand. She tells me, "I don't get it." I help her think stepwise by asking, "What should we do first to solve this problem?" Amber replies, "I don't know." I tell her to consult the notes she just took. She looks through the unorganized, poorly written notes and slowly figures out how to begin the problem. She asks for clarification and I confirm the first step she has chosen. After walking around the classroom to assist other students, I come back to Amber and find that she is stuck on the second step. She declares again: "I don't get it." I tell her to consult her notes, and the cycle continues.

At the end of class, I give homework out of the textbook, but I know this assignment might be too challenging for some students. The next day, Amber turns in her completed homework and receives an A. In fact, her average homework grade is roughly 90% throughout the year, while her average test grade is approximately 50%.

One of Amber's other teachers reports that Amber receives a great deal of homework help from her mother. However, this teacher and I communicate infrequently with Amber's family. When communication does occur, it is typically initiated by her family seeking advice to help Amber improve her mathematical abilities during the school day. Some of the educators involved in Amber's schooling imply that her family tries

to control too much of what happens in the classroom. Similarly, Amber's family may be over-helping during mathematics homework assignments in an attempt to have more control over Amber's grade.

Throughout the year I wonder – is the type of assistance that Amber is receiving from her family hindering her achievement? Specifically, is Amber's mother providing too much guidance when assisting with these assignments? Additionally, Amber's classmates may be experiencing various amounts and types of homework assistance from their own families, which may be impacting their performance, for better or for worse. The aim of this manuscript is to discuss the importance of family involvement in mathematics homework, the perspectives of educators and families about family involvement, and to explore potential solutions for increasing and improving the quality of family involvement in mathematics homework.

The Importance of Family Involvement in Mathematics Homework

With the varying levels of family involvement in mathematics homework and Amber's situation in mind, I began my research by considering whether mathematics homework could simply be eliminated. I wondered whether it is fair to administer take-home assignments and grade them when students experience differences in familial help. Students like Amber receive a large amount of assistance from family members, while other students experience little to no family involvement. Some students may also experience higher quality help than others, regardless of the amount of help provided by their families. Ultimately, a graded homework assignment might simply reflect the amount of effective family involvement a student receives – not his or her mastery of the subject. Studying this topic further, I found that much research agrees that mathematics homework is essential to the academic success of students, regardless of the impact family involvement has on students' grades. In particular, the research supports the use of effective homework assignments coupled with effective family involvement.

For example Knapp, Landers, and Liang (2016) discovered that when homework was combined with effective family involvement – in this case, fostered by using mini-courses attended collectively by students, families, and teachers – student achievement via standardized test scores increased. Additionally, the mini-courses promoted positive student, teacher, and family interactions, thereby increasing enjoyment for all involved. Further, students who experienced more enjoyment from homework and saw the adults around them doing the same were found to have increased motivation to perform the tasks. The learning that occurred during the mini-courses empowered both students and their families and improved the sense of community surrounding the educational system. This type of homework intervention allowed families to feel better connected with educators because there were more opportunities for cooperative communication between school and home. Increases in student enjoyment, motivation, empowerment, and a sense of community resulted in enhanced academic success and improved standardized test scores,. Students who participated in the mini-courses better met learning objectives and had improved attitudes towards school. Since involving families in mathematics home-

work has the ability to improve both student achievement and attitudes, elimination of these types of assignments is out of the question.

Educator and Family Beliefs About Family Involvement

Although the combination of family involvement and mathematics homework can promote student success, educators often do not effectively apply homework tasks to foster family involvement and meet these goals (Lopez & Donovan, 2009). This may be because many educators believe that some families are simply uninterested or fail to prioritize their children's education (Lopez & Donovan, 2009; Hem, 2017). Following this logic, if families do not demonstrate interest in helping their children, why bother trying to force involvement? Ironically, some of the educators described in the scenario above not only believe that some families do not care about their children's education, but also view Amber's family as being too involved and attempting to control what happens in the classroom. From those educators' perspectives, there seems to be no correct way for a family to be involved. The negative feelings that educators often have about families take a toll on their interactions. Consequently, family involvement in mathematics homework is negatively impacted.

Despite the beliefs of some educators, most families perceive their own involvement in mathematics homework as important. Drummond and Stipek (2004) found that families "rated the importance of helping their child with academic work very high" when interviewed (p. 197). Although not all families place their children's education as the first priority or are completely dedicated to helping with mathematics homework, educators often misjudge families' interest in involvement. This may be due to Drummond and Stipek's (2004) finding that families who do not have adequate resources, mathematical knowledge, or confidence in their mathematical abilities can face "difficulty turning their beliefs into specific behaviors" (p. 210). Even though families wish to be involved, they often do not know how to contribute effectively. As a result, the ways that families are currently involved in mathematics homework are not always beneficial to students.

There is a dissonance between the beliefs of educators and families. In addition to the factors listed above, a lack of communication with the school can further alienate families from providing effective support as their children complete their homework. Some families provide inadequate help or feel they are not qualified to help. It is our job as educators to take the initiative to communicate with families about mathematics homework and bridge the gaps between school and home. We must suggest strategies that will provide more meaning to children's mathematical experiences by effectively collaborating with families.

Solutions for Increasing and Improving Family Involvement

Educators can apply specific techniques and tools to increase and improve the quality of family involvement in mathematics homework. As a starting point to increase the amount of family involvement, simple verbal or written prompts from teachers or students have been successful: families are more likely to get involved in homework when they are explicitly asked to do so (Balli, Demo, & Wedman, 1998; Drummond & Stipek, 2004). Additionally, educators should consider whether

homework tasks invite families in or push them away. Problems that involve specific mathematical procedures unique to a certain class or teacher may be foreign to many families. In these cases, it would be helpful to prompt families not only to help, but also to suggest how to help by providing them with the necessary procedures. Drummond and Stipek (2004) further suggest that educators teach families "the difference between assisting their child in completing work and telling their child the answers" (p. 211), to promote higher quality homework help. This idea is important for parents like Amber's, who may be over-helping with the aim of improving their daughter's grade, but at the cost of Amber's own development of problem-solving skills. Educators can teach families to ask their children probing questions instead of providing answers. If a child says that combining two numbers is necessary to solve a homework problem, a family member may ask, "What is it called when you put two numbers together?" instead of saying, "Yes, so add the numbers." When families tell children what to do mathematically, they do not provide opportunities to children for independent thinking, but they may not understand this unless educators provide them with guidance.

Another method that educators can share with families is to use children's incorrect homework answers as a "lens" for their misconceptions (Lopez & Donovan, 2009). For instance, a teacher may send newsletters home describing the most common errors students made during each unit. An answer of 5 to the problem 2 + (-3) can reveal that a student disregarded the negative sign and simply added the numbers together. Once families have discovered errors in their children's ways of thinking, misunderstandings can be explicitly addressed. In this scenario, a family member may prompt the child with, "Pay attention to the negative sign. What does it tell you to do?" anticipating that his or her child will answer, "Take away," and thus be guided to realize where they had made a mistake.

Educators can propose these suggestions for improving family involvement during "meet the teacher" night, home visits, and parent-teacher conferences (Drummond & Stipek, 2004). Additionally, mathematics clubs, family math nights, and evening family classes are all ways that families can learn both assistive strategies and mathematical content in order to better help their students with homework (Drummond & Stipek, 2004; Knapp et al., 2016; Lawson & Hodge, 2016; Lopez & Donovan, 2009). During any of these times, educators can also specifically ask families what resources they need in order to help students with mathematics homework more effectively (Drummond & Stipek, 2004). Families can also be informed about neighborhood resources such as tutoring centers and libraries for additional support available to them (Drummond & Stipek, 2004; Sad, 2012). Families will be able to provide higher quality help when they are more confident in the material and their own abilities to assist their students.

Conclusion

Some educators believe that involving families in education is important. Others see family involvement as an intrusion into their classrooms. Still others see family involvement as important, but believe that some families are not interested in being involved in their children's education. Moreover, when communication is difficult, typically educators quickly give up on making attempts to collaborate with

family. However, research has shown that families think their own involvement in children's education is important, but that they often lack the appropriate resources to successfully get involved, including relevant mathematical knowledge and confidence in their own mathematical abilities, and therefore may not provide much valuable homework help. The conflicting beliefs of educators and families can be resolved through the application of the evidence-based practices outlined in this paper. Families can learn to apply a variety of assistive strategies, such as asking probing questions and using incorrect answers to learn about students' misconceptions. Educators can supplement mathematics homework and promote more valuable family involvement by prompting family members to help children with mathematics homework; by encouraging families to engage in mathematics activities during meet the teacher night and home visits; by providing families with advice at parent-teacher conferences, mathematics clubs, family math nights, and night classes; by recommending neighborhood resources; and by asking families what additional assistance is needed (Balli et al., 1998; Drummond & Stipek, 2004; Knapp et al., 2016; Lawson & Hodge, 2016; Lopez & Donovan, 2009). Implementing some of these techniques can help ensure that families feel less alienated and have a better understanding of how they can help their children. Communication between school and home will drastically improve as families and educators begin to feel more comfortable with each other.

The evidence-based practices discussed in this paper can be applied as potential solutions to the issues Amber experienced. One problem that Amber faced was that teachers did not frequently communicate with her family. Based on the findings outlined in this paper, a possible solution would be for the school to apply an intervention, such as a family math night, in order to promote communication between Amber, her family, and her teachers. This would provide opportunities for the family and teachers to see each other's perspectives and reach compromises about how to help Amber with her education. Amber's teachers and family members could come to realize through this intervention that they all have her best interests in mind. And of course Amber would not be the only student who benefitted from such an intervention.

The other issue that Amber faced was that she received a great deal of mathematics homework help from her mother, but the quality of that help seemed to have a lot of room for improvement. A conference could be set up so that Amber's mother could learn assistive strategies, such as the use of probing questions, from Amber's teachers. This would allow Amber's mother to ask questions during homework that would eventually lead Amber to the correct answers, but would ensure that the thinking done would be largely Amber's own. In this way, Amber's mother would learn how to better assist her child with mathematics homework instead of giving her the answers. Using these suggested strategies, educators could work with Amber and her family in order to improve the quality of homework help she received, as well as to increase her comfort in school and her academic success.

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About the Autor

Anna Barnes holds a Bachelor of Science in Physics with a minor in Chemistry and a Master of Education in Middle Childhood Mathematics and Science from the University of Toledo. She currently teaches 9th grade Algebra at Woodward High School in Cincinnati, Ohio.