REL Appalachia Ask A REL Response

Family and Community Engagement, Math
May 2020

Question:

What are effective approaches or strategies for promoting community and family engagement in math learning in elementary school? What is the impact of community and family engagement on math outcomes?

Response:

Thank you for your request to our REL Reference Desk regarding evidence-based information about effective approaches or strategies to promote community and family engagement in math learning. Ask A REL is a collaborative reference desk service provided by the 10 Regional Educational Laboratories (RELs) that, by design, functions much in the same way as a technical reference library. Ask A REL provides references, referrals, and brief responses in the form of citations in response to questions about available education research.

Following an established REL Appalachia research protocol, we searched for peer-reviewed articles and other research reports on family and community engagement in math learning. We focused on identifying resources that specifically addressed the impact of community and family engagement in math learning on students' math outcomes. The sources included ERIC and other federally funded databases and organizations, research institutions, academic research databases, and general Internet search engines. For more details, please see the methods section at the end of this document.

The research team did not evaluate the quality of the resources provided in this response; we offer them only for your reference. Also, the search included the most commonly used research databases and search engines to produce the references presented here, but the references are not necessarily comprehensive, and other relevant references and resources may exist. References are listed in alphabetical order, not necessarily in order of relevance.

References

Berkowitz, T., Schaeffer, M. W., Maloney, E. A., Peterson, L., Gregor, C., Levine, S. C., & Beilock, S. L. (2015). Math at home adds up to achievement in school. *Science*, *350*(6257), 196–198. Retrieved from https://www.semanticscholar.org/paper/Math-at-home-adds-up-to-achievement-in-school.-Berkowitz-Schaeffer/1ee0fd92b83e4032bae05006b695a83be9485c2f

From the abstract: "With a randomized field experiment of 587 first-graders, we tested an educational intervention designed to promote interactions between children and parents relating to math. We predicted that increasing math activities at home would increase children's math achievement at school. We tested this prediction by having children engage in math story time with their parents. The intervention, short numerical story problems delivered through an iPad app, significantly increased children's math achievement across the school year compared to a reading (control) group, especially for children whose parents are habitually anxious about math. Brief, high-quality parent-child interactions about math at home help break the intergenerational cycle of low math achievement."

Harris, B., Petersen, D., & Wulsin, C. S. (2017). *Issue Brief: Integrating mathematical thinking into family engagement programs.* Princeton, NJ: Mathematica Policy Research. Retrieved from https://eric.ed.gov/? id=ED587424

From the abstract: "The brief explains how exposing young children to early math concepts supports their development of reasoning and problem solving skills and later success in and out of school. It describes the unique ways each of five family engagement programs funded by the Heising-Simons Foundation developed, tested, and integrated early math learning into their usual activities. The brief lays out seven practical tips that emerged from the grantees' experiences that can guide practitioners and other stakeholders who are interested in integrating early math into their own family engagement programs, and sheds light on issues that programs may want to keep in mind while doing so. Key findings: (1) The grantees that were funded by the Heising-Simons Foundation developed and implemented a rich array of early math projects in a variety of settings. Their efforts show that despite the challenges faced by practitioners and the families they serve, there is room to integrate mathematical thinking and activities across a range of family engagement programs; and (2) Seven tips were gleaned from their experiences: (1) build on successful family engagement approaches and ensure staff buy-in; (2) focus on developmentally appropriate math concepts; (3) tailor early math projects to a caregiver's language and culture; (4) offer practitioners opportunities for professional development; (5) provide families with early math activities they can use in their everyday lives; (6) help families overcome their anxiety about math; and (7) use data for learning and improvement."

Henderson, A. T., & Mapp, K. L. (2002). *A new wave of evidence. The impact of school, family, and community connections on student achievement.* Austin, TX: National Center for Family & Community Connections with Schools, Southwest Educational Development Laboratory. Retrieved from https://eric.ed.gov/?id=ED474521

From the abstract: "Noting that the evidence of families influence on their children's school achievement is consistent, positive, and convincing, this report examines research on parent and community involvement and its impact on student achievement. Following an introduction, the first section of the report describes the methods used for selecting the studies; describes what the studies cover; provides a table showing the studies by topic area, by age and grade level, and by design type; and discusses limitations of the studies. The second section of the report synthesizes the studies' findings. This section also provides some pertinent definitions; lists recommendations to help educators put findings to practical use;

and presents research findings related to three areas: (1) impact of parent and community involvement on student achievement; (2) effective strategies to connect schools, families, and community; and (3) parent and community organizing efforts to improve schools. The third section provides summaries of the 51 studies, conducted between 1993 and 2002, described in this report. The report finds that there is strong and steadily growing evidence that families can improve their children's academic performance in school and have a major impact on attendance and behavior. Children at risk of failure or poor performance can profit from the extra support that engaged families and communities provide. All students, but especially those in middle and high school, would benefit if schools supported parents in helping children at home and in guiding their educational career. The report's appendix provides a short history of the research in this field over the past 30 years."

Ishimaru, A. M., Barajas-López, F., & Bang, M. (2015). Centering family knowledge to develop children's empowered mathematics identities. *Journal of Family Diversity in Education, 1*(4), 1–21. Retrieved from https://education.uw.edu/sites/default/files/660/Bang%20%5BIshimaru%2C%20Barajas-Lopez%2C%20Bang%5D.2015.pdf

From the abstract: "Researchers and educational leaders have long debated the appropriate roles and forms of family engagement in education. Although, in recent years, scholars have sought to understand how racially and linguistically diverse communities should participate in their children's education, the field has struggled to recognize and engage families' expertise and disrupt the dynamics of inequity that shape disengagement. In this article, we highlight recent understandings regarding the development of disciplinary identities and cultural practices in learning to offer new approaches to the field of family engagement for conceptualizing the untapped potential of nondominant family knowledge and cultural practices in learning settings. By highlighting examples from mathematics learning that center families as legitimate sources of knowledge, we suggest avenues for engaging diverse family leadership in co-designing equitable learning environments that foster students' empowering disciplinary identities and learning."

Mistretta, R. M. (2017). Conversations with family members about math. *School Community Journal*, *27*(1), 181–200. Retrieved from https://eric.ed.gov/?id=EJ1146479

From the abstract: "This article focuses readers' attention on how teachers communicate with families about math, what teachers specifically communicate about, and why the need to communicate with families exists in the first place. Findings from conversations about math facilitated by 72 teachers with 225 families of public and nonpublic elementary, middle, and high school students are reported to demonstrate how dialogue between teachers and families can support meaningful home-school interactions. Implications for teacher preparation programs and professional development initiatives are discussed, and recommendations for future research paths offered. In addition, prompts are included for readers' own reflection on using conversation as a form of practitioner inquiry for knowing and supporting families with math."

Sheldon, S. B., & Epstein, J. L. (2005). Involvement counts: Family and community partnerships and mathematics achievement. *The Journal of Educational Research*, *98*(4), 196–207.

Abstract retrieved from https://eric.ed.gov/?id=EJ698782; full text available at https://www.researchgate.net/publication/238047588_Involvement_Counts_Family_and_Community_Partnerships_and_Mathematics_Achievement

From the abstract: "National and international studies have made student performance in mathematics a high priority in schools. Using longitudinal data from elementary and secondary schools, the authors examined the connections between specific family and community involvement activities and student achievement in mathematics at the school level. After the authors controlled for prior levels of mathematics achievement, analyses indicated that effective implementation of practices that encouraged families to support their children's mathematics learning at home was associated with higher percentages of students who scored at or above proficiency on standardized mathematics achievement tests. Findings suggest that subject-specific practices of school, family, and community partnerships may help educators improve students' mathematics skills and achievement."

Van Voorhis, F. L., Maier, M. F., Epstein, J. L., & Lloyd, C. M. (2013). *The impact of family involvement on the education of children ages 3 to 8: A focus on literacy and math achievement outcomes and social-emotional skills.* New York: MDRC. Retrieved from https://eric.ed.gov/?id=ED545474

From the abstract: "This report summarizes research conducted primarily over the past 10 years on how families' involvement in children's learning and development through activities at home and at school affects the literacy, mathematics, and social-emotional skills of children ages 3 to 8. A total of 95 studies of family involvement are reviewed. These include both descriptive, nonintervention studies of the actions families take at home and at school, and intervention studies of practices that guide families to conduct activities that strengthen young children's literacy and math learning. The family involvement research studies are divided into four categories: (1) Learning activities at home, including those that parents engage in to promote their child's literacy and/or math skills outside school; (2) Family involvement at school, including the actions and interactions that families have while in the school building; (3) School outreach to engage families, including the strategies that schools and teachers use to engage families and make them feel welcome; and (4) Supportive parenting activities, including the nature and quality of the parent-child relationship and home environment, rule-setting, and caring behaviors. Key Findings include: (1) Family involvement is important for young children's literacy and math skills. The majority of studies, including some randomized control trials (RCTs), demonstrate this positive link. A few studies show positive relations with social-emotional skills. The weakest association was between family involvement at school and children's outcomes. (2) Parents from diverse backgrounds, when given direction, can become more engaged with their children. When parents are more engaged, children tend to do better. (3) This review also provides recommendations for additional lines of inquiry and implications to guide next steps in both research and practice."

Additional Ask A REL Responses to Consult

Ask a REL Midwest at American Institutes for Research. (2018). *Family and community engagement in education.* Retrieved from https://ies.ed.gov/ncee/edlabs/regions/midwest/askarel/2018/family-community-engagement.aspx

Ask a REL Northeast & Islands at Education Development Center. (2019). *What is the research on family engagement strategies that have been shown to be effective in high-need communities?* Retrieved from https://ies.ed.gov/ncee/edlabs/regions/northeast/AskAREL/Response/36

Ask a REL Northwest at Education Northwest. (2019). *Strength-based family engagement.* Retrieved from https://ies.ed.gov/ncee/edlabs/regions/northwest/askarel/family-engagement.asp

Ask a REL Mid-Atlantic at Mathematica. (2018). *What does recent research and/or studies on strategies for family engagement say?* Retrieved from https://ies.ed.gov/ncee/edlabs/regions/midatlantic/askarel_30.asp

Ask a REL Mid-Atlantic at Mathematica. (2019). *What are best practices for community engagement?* Retrieved from https://ies.ed.gov/ncee/edlabs/regions/midatlantic/askarel_119.asp

Additional Organizations to Consult

Family and Community Engagement, U.S. Department of Education: https://www.ed.gov/parent-and-family-engagement

From the website: "The Family Engagement Team is an interoffice group dedicated to strengthening the voice of families, by bringing focus to the needs of students so as to allow every student to reach full potential…Check out the resources on this webpage supporting the framework for building greater support and capacity in schools, homes and communities, so ALL students have the chance to succeed. Get ideas for how to bring your passion, talents, and energy to help students and to make your neighborhood schools stronger."

Global Family Research Project: https://globalfrp.org/

From the website: "Global Family Research Project is an independent, entrepreneurial nonprofit organization that supports effective engagement practices and policies so that all children find success in and out of school."

- Formula for Success: Engaging Families in Early Math Learning: https://globalfrp.org/content/download/83/561/file/Early+Math+FINE.pdf

The National Center for Family and Community Connections in Schools:
https://www.sedl.org/connections/

From the website: "The Center links people with research-based information and resources that they can use to effectively connect schools, families, and communities. It emphasizes connections that directly impact student achievement in reading and mathematics, as well as connections that contribute to the students' overall success in school and in life."

Methods

Keywords and Search Strings

The following keywords and search strings were used to search the reference databases and other sources:

- (family or community or parent) AND math AND (engag* OR involv* OR inclu*)
- (family or community or parent) AND math AND (engag* OR involv* OR inclu*) AND (outcome OR impact OR effect)

Databases and Resources

We searched ERIC, a free online library of more than 1.6 million citations of education research sponsored by the Institute of Education Sciences (IES), for relevant resources. Additionally, we searched the academic database ProQuest, Google Scholar, and the commercial search engine Google.

Reference Search and Selection Criteria

In reviewing resources, Reference Desk researchers consider—among other things—these four factors:

- Date of the publication: Searches cover information available within the last 10 years, except in the case of nationally known seminal resources.
- Reference sources: IES, nationally funded, and certain other vetted sources known for strict attention to research protocols receive highest priority. Applicable resources must be publicly available online and in English.
- Methodology: The following methodological priorities/considerations guide the review and selection of the references: (a) study types—randomized controlled trials, quasi experiments, surveys, descriptive data analyses, literature reviews, policy briefs, etc., generally in this order; (b) target population, samples (representativeness of the target population, sample size, volunteered or randomly selected), study duration, etc.; (c) limitations, generalizability of the findings and conclusions, etc.
- Existing knowledge base: Vetted resources (e.g., peer-reviewed research journals) are the primary focus, but the research base is occasionally slim or nonexistent. In those cases, the best resources available may include, for example, reports, white papers, guides, reviews in non-peer-reviewed journals, newspaper articles, interviews with content specialists, and organization websites.

Resources included in this document were last accessed on May 7, 2020. URLs, descriptions, and content included here were current at that time.

This memorandum is one in a series of quick-turnaround responses to specific questions posed by education stakeholders in the Appalachia region (Kentucky, Tennessee, Virginia, and West Virginia), which is served by the Regional Educational Laboratory Appalachia (REL AP) at SRI International. This Ask A REL response was developed by REL AP under Contract ED-IES-17-C-0004 from the U.S. Department of Education, Institute of Education Sciences, administered by SRI International. The content does not necessarily reflect the views or policies of IES or the U.S. Department of Education, nor does mention of trade names, commercial products, or organizations imply endorsement by the U.S. government.