Math Walks as a Vehicle for Educators and Students to See Math Around Them

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EXECUTIVE SUMMARY

In this exploratory case study situated at an urban school and community center, participant reactions to informal learning activities centered around math walks are described and analyzed. Site-specific math walks, designed by a multi-organizational team that included educators and children from the learning site, represent a place- and inquiry-based math experience that students, families, and educators experienced through three sets of informal learning activities: an afterschool club, a family STEM night, and summer camps. Data on the nature of student responses to math walk activities and the perceptions of educators to these activities as well as the connections they made to their teaching practice are presented. This study

draws on interest theory, problem-posing in mathematics education, and culture as a critically important aspect of all learning activities.

INTRODUCTION

Informal learning settings like community centers offer important opportunities for students to engage with mathematics in new and meaningful ways. Here, we describe a case study where students and educators utilize "math walks" as a vehicle to foster engagement with mathematical ideas. When students go on math walks, they discover how mathematical principles appear in everyday spaces in art, architecture, nature, and designed objects. Math walks utilize the approach of positioning learners as explorers of a place they are situated in so that they see math that is embedded in familiar places. These walks can also utilize the approach of positioning learners as math walk designers, with the goal of sparking learners' interest in and curiosity for mathematics. We examine the use of math walks during three different informal learning contexts situated at the site of the urban school and community center: a week-long afterschool club, summer camps, and a special school-organized community event.

BACKGROUND

We define mathematics as the "study of patterns and relationships among quantities, numbers, and space" (Committee on Integrated [science, technology, engineering, and mathematics] STEM Education, 2014, p. 14). There is a need for the doing of mathematics to be appreciated as a contextualized activity that is embedded in the places and the lived experiences of individuals (Kliman et al., 2013), which is in striking contrast to growing awareness of science as a sociocultural activity. Designed math walks across various informal learning sites are part of the work done by a local nonprofit in an urban setting that partners with varied youth-serving organizations. These math walks focus on diverse and broad understandings of math concepts as they relate to observable, real-world places and structures, and include both qualitative and quantitative aspects. The goal behind the development of programming at informal learning sites that infuse the math walks developed by the nonprofit is for learners to build expanded definitions of mathematics and