

ADOLESCENTS' MATHEMATICS IDENTITIES IN A MATH CIRCLE

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Keywords: Informal education; Affect, emotions, beliefs, and attitudes

Identity can be conceptualized as a function of participation in the various activities of communities of practice (CoPs), which are defined by mutual engagement, a joint enterprise, and a shared repertoire amongst its members (Wenger, 1998). An individual's mathematics identity development, then, is inextricably linked to their participation in the CoPs associated with the contexts in which they learn mathematics (Boaler & Greeno, 2000).

One such context is a Math Circle, a type of out-of-school mathematics program in which adolescents, guided by “mathematically sophisticated leaders, [...] work on interesting problems or topics in mathematics [...] through problem-solving and interactive exploration” (What is a math circle?, n.d.). The participants' participation in the Math Circle CoP is mediated through their participation in various activities of the CoP, where activity is defined as “a socially recognized and institutionally or culturally supported endeavor that usually involves sequencing or combining actions in certain specified ways” (Gee, 2014, p. 95). Therefore, identifying the Math Circle CoP activities is key to understanding (1) how these adolescents participate in the CoP and (2) how their participation affects the development of their mathematics identities.

I interviewed three City Math Circle (CMC) participants who had completed at least three years in CMC programs by Spring 2020. The interview addressed their current and past participation in CMC programs, what occurs in a typical CMC session, and their relationships with mathematics in different environments. I analyzed the transcripts using Gee's (1991; 2014) narrative structure, identified CMC CoP activities and the adolescents' participation therein using social practice analysis (van Leeuwen, 2008), and analyzed their participation in these activities using Wenger's (1998) modes of belonging.

The adolescents' descriptions of the CMC CoP activities were consistent with each other, and most activities involved both mathematical and social interactional components (i.e. program participants gave each other feedback [social interactional] on their problem solutions [mathematical] as part of the “sharing solutions” activity). Participation in such activities tended to be inversely related to how the adolescents participated in the mathematical and social interactional components of activities in other mathematics learning environments. For example, one adolescent who felt that “school mathematics” did not allow for collaboration with peers described the social interactional components of the CMC CoP activities in more depth than the mathematical components, where another who did not feel challenged by “school mathematics” described the mathematical components of the CMC CoP activities in more depth than the social interactional components.

These findings suggest that the development of these adolescents' mathematics identities due to their participation in City Math Circles programs is complementary to the development of their mathematics identities due to participation in other mathematics learning contexts. That is, through their voluntary participation in City Math Circles, an out-of-school mathematics program, these adolescents are developing their (mathematics) identities with agency they are not typically allowed in more institutionalized mathematics learning environments such as school.

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