Community mathematics: reworking mathematical participation and inclusion beyond school

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This paper reflects on 'community mathematics' as a way of attending to forms of mathematical participation that take shape beyond formal schooling and carry transformative potential for how mathematics is recognised and valued. A substantial body of research has documented persistent inequalities in school mathematics, affecting not only attainment but also students' socio-emotional relationships to the subject (Black, Mendick, & Solomon, 2009). These inequalities are closely tied to broader social divisions of gender, race, class, language, and institutional notions of ability, through the privileging of particular experiences and forms of competence, especially among young people from historically marginalised communities (Ladson-Billings, 1997; Watson et al., 2014). These patterns are reflected across European education systems, where PISA 2022 documents large and persistent gaps in mathematics performance associated with students' socio-economic background (OECD, 2023). This points to an exclusionary mathematical landscape in which access to mathematics is shaped by enduring social and institutional hierarchies.

The idea of 'community mathematics' has begun to take shape through our recent work (Mégrourèche, Black, & Herington, 2025). It is informed by research examining mathematical activity in informal environments such as homes, museums, and interactive exhibitions (Black et al., 2016; Kelton & Nemirovsky, 2023), highlighting how informal settings can rework conventional boundaries of inclusion. Developed in response to enduring representation of mathematics as an elite pursuit, the notion draws inspiration from the British community arts movement, which sought to democratise cultural production by embedding creative practices within local communities and affirming the value of diverse cultural expressions developed outside mainstream institutions (Matarasso, 2018). In this light, community mathematics redirects attention to how mathematical participation can be supported and celebrated beyond formal schooling, becoming visible in initiatives that support young people's

engagement with mathematics through creative, collective and interdisciplinary practices.

The paper asks what does community mathematics look like in practice? And what forms of mathematical possibility and participation do such practices open? Conceptually, the analyses of community mathematics presented in this paper are supported by work in mathematics education that has contributed to expanded understandings of mathematics, drawing attention to its embodied, material, aesthetic, and affective dimensions (de Freitas & Sinclair, 2014; Sinclair, 2018). This body of work opens an important conceptual space for recognising and celebrating forms of mathematical engagement that do not align with dominant school norms.

Empirically, the paper draws on the Very Local Maths project (https://verylocalmaths.org.uk/) developed in collaboration with a community center in Manchester. The project involved collaborating with a group of seven young people aged 13-16, many of whom had SEND and experienced disrupted school trajectories. Over seven months, we co-developed and facilitated six interdisciplinary workshops exploring mathematics with practices such as music, poetry or origami. Using video-based micro-ethnographic analysis (Lebaron, 2012), the paper examines two selected episodes from these workshops to assemble a situated portrait of community mathematics. The first centres on a session in which young people each produced an origami creation, followed by a collective discussion about how much they might price one another's pieces. The second follows a young person designing a net to construct a cube, where inventive and materially situated forms of measurement appear alongside childhood memories. The analysis attends to bodily and material dimensions of interaction.

The paper engages debates on inclusion in mathematics education by using our concept of community mathematics to interrogate how mathematical participation can be recognised and sustained beyond formal schooling. By grounding this analysis in fine-grained empirical detail, it contributes to reframing inclusion not as a sole question of access to mainstream forms of mathematics,

but as a situated process through which mathematical possibilities themselves are questioned and reworked.

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