Sketching Community Mathematics: a mapping of informal practices

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Our *Very Local Maths* project (https://verylocalmaths.org.uk) explores how mathematics education might be supported outside formal spaces. We introduce the term *community mathematics*, inspired by the British Community Arts Movement (1960s-1980s), which challenged cultural exclusion and authority by emphasising collaborative creation, participation and cultural democracy. In this project, we ask what community mathematics might mean: what forms it could take, how it could be supported and how it could respond to the exclusions widely documented in school mathematics, particularly for young people in marginalised communities. To explore this, we developed two strands of work. First, we formed a group of young community mathematicians (13-16), running monthly interdisciplinary workshops in a local community centre in Manchester. Second, we carried out a UK-wide festival review mapping platforms where young people engage with mathematics outside of schools. In this communication we present these two strands which offer an initial sketch of community mathematics.

Mathematics: interdisciplinary; community; informal; inclusion

Introduction

Very Local Maths (https://verylocalmaths.org.uk) is a research project based in Manchester that explores how mathematics learning and participation might be reimagined beyond the confines of formal schooling. Extensive research documents how school mathematics often excludes and/or marginalises young people from minoritised and underserved communities (Ladson-Billings, 1997; Watson et al., 2014). These patterns of exclusion persist, in part because school mathematics remains highly compartmentalised, disconnecting learning from creativity, collaboration, and everyday concerns (Singh et al., 2012; Wearmouth, 2008). Our research project is committed to questioning these dynamics and to developing alternatives, exploring how mathematics can be lived, practised, and valued through community life and local experiences.

Inspired by the British community arts movement, we take as a starting point the work of artists and communities who, from the 1960s and 1970s, created art outside established institutions and made creative practice accessible to all (Matarasso, 2018). This movement sought to support cultural democracy and to transform everyday spaces through collective and participatory art. It opened new possibilities for defining culture and broadening participation. Drawing on this inspiration, we have proposed the term "community mathematics" as a speculative concept that resists dominant narratives of mathematics as abstract, exclusive and detached from everyday and community life, and opens space for new, locally rooted mathematical practices.

A significant part of the project has focused on imagining and sketching what community mathematics might mean in the present UK context. While existing research has documented, for example, the mathematics of street vendors, bankers, or nurses, (Nunes et al. 1993, Noss et al., 2007, Noss et al., 2002) far less is known about the forms mathematics can take for young people in the UK in 2025. Throughout the project, we have therefore explored what it might mean to be a community mathematician today, the types of mathematical activity possible in local settings, and where such practices are supported or sustained. Our research has worked to develop a more precise understanding of community mathematics as it emerges with and among young people in contemporary Britain.

To develop a more detailed portrait of community mathematics, our inquiry followed two main strands. First, we formed a group of seven young people aged 13 to 16 at a community centre in south Manchester and worked with them through monthly interdisciplinary workshops to explore different forms of mathematics. Second, we conducted what we have called a 'festival review'(see https://verylocalmaths.org.uk/): a systematic mapping of events and platforms available to young people across the UK in 2025 that promote mathematical and interdisciplinary participation. Together, these two strands have allowed us to sketch an emerging image of community mathematics, which this communication articulates.

The next section presents our work with the group of young community mathematicians at the community centre and develops our working version of community mathematics. The following section turns to our festival review. The communication concludes by reflecting on certain insights that emerged from our work.

Our work with young community mathematicians

Figure 1. Workshop exploring mathematics and photography

We recruited a group of seven young people aged 13 to 16 from a community centre in Moss Side, Manchester. Moss Side is a culturally diverse neighbourhood with a strong history of community organising and local initiatives. Over a period of six months, we met with the group for monthly two-hour workshops, each co-designed in collaboration with local artists as well as graduate and undergraduate mathematics students.

Together, we explored mathematics through a wide range of practices. The workshops moved across disciplines and materials, linking mathematics with photography, poetry, economy, music, and kirigami, and placing a strong emphasis on embodied and creative approaches. Figure 1 presents an image from a workshop led in collaboration with the artist Simone Trumpet (https://www.simonetrumpet.com), where we explored connections between mathematics and her photographic practice. For example, during this session, we explored the "rule of thirds" by experimenting with the positioning of elements within an image, guiding our attention to how composition shapes perception. Each session invited participants to experiment with mathematical ideas as they emerged from artistic processes, everyday experience, and group collaboration. This interdisciplinary structure aimed to open other and new ways of encountering mathematics, making space for forms of mathematical thinking rooted in the specific contexts and interests of the young people involved.

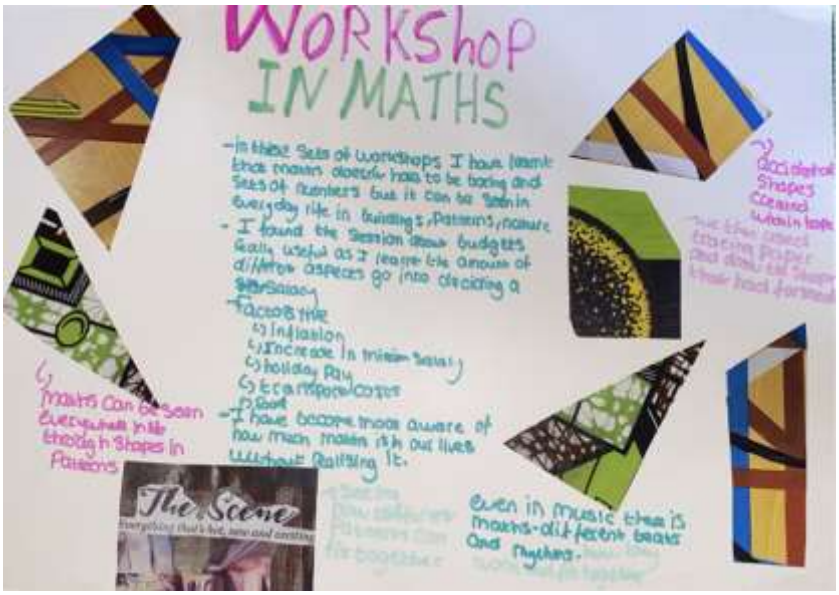

Figure 2. Millie's manifesto

Forming and supporting this group was for us a way to pilot how young people might be meaningfully engaged with mathematics outside school. Throughout the project, the seven young people were included as co-researchers. They were paid to take part in the workshops, to help document the activities, and to reflect with us on the question of what community mathematics might be and how it could be productively defined. In the final two sessions, we introduced a "manifesto" activity that asked each participant to describe the project in their own terms and to create a collage capturing their perspective. Figure 2 shows the manifesto made by Millie, a 16-year-old community mathematician, who assembled her collage from photos taken during the workshops to offer her vision of our experiment.

We read Millie's manifesto alongside our aim of understanding what community mathematics can be. In her account, she describes the workshops as spaces where mathematics appeared in the details of daily life, for example in buildings, patterns, nature, and "even music". She identifies the session on paid labour and budgeting as particularly relevant, noting how the discussion of salaries, inflation, and costs connected mathematical ideas to questions that mattered to the group. Millie's reflections offer a portrait of our initiative as one that invited attention to the

presence of mathematics across different experiences and encouraged participants to become more aware of its place in their own lives.

Through these workshops and the manifesto activity, a first version of community mathematics begins to take shape. What emerges is a form of mathematics that does not belong only to professional mathematicians, but is present in the everyday practices, observations, and decisions of young people. Millie's account, along with those of the other young people involved, reveals a mathematics that they experience, recognise and share as part of their everyday lives. In this sense, our version of community mathematics involves actively recognising and valuing the everyday mathematical thinking and practices that young people already engage in, creating space for these to be seen, shared, and celebrated within their communities.

Festival review

To complement our local work, we carried out a festival review, mapping events and platforms in the UK that offer young people opportunities to experience mathematics outside of school, often in connection with the arts or other disciplines. The full report is available on our website (https://verylocalmaths.org.uk/) and presents both our method and the landscape that emerged from our search.

The mapping relied on systematic online searches using a range of keywords such as "Mathematics festival UK", "Maths club UK", and "Maths and arts 2025" among others. We focused especially on events and platforms that (1) took place in the UK, (2) were open to young people, (3) occurred outside of school time and space, (4) had community orientation, and (5) included an interdisciplinary element. Additional inputs from team members connected to community networks helped refine our search. In total, we identified 44 events and platforms across the UK. This approach brought into view events and platforms that are most visible online, often linked to larger organisations, while smaller grassroots activities likely remain underrepresented. The report acknowledges these limitations and emphasises the importance of local networks, in-person connections, and further research with community-based groups.

Our review highlights 7 main categories of actors shaping community mathematics: university-based public engagement; science or arts festivals with mathematics components; independent maths outreach organisations; artist-led mathematics events; libraries and community learning spaces; museums and heritage centres; and national or international networks. These hubs operate at different scales and often overlap, together forming a varied and evolving field.

Analysis of how these initiatives present themselves online reveals several recurring discourses. Many organisers appeal to wonder, curiosity, and surprise; others emphasise hands-on, sensory, or creative experiences. Overcoming barriers and widening participation is a persistent theme, with attention to building confidence and accessibility. Some events frame mathematics as exceptional or competitive, while others focus on its practical usefulness or economic value. A small number of artist-led initiatives question the boundaries or limits of mathematics itself.

The report highlights interdisciplinarity as a key aspect of many mathematics events and platforms. Visual arts are the most common artistic connection, appearing in workshops and exhibitions focused on geometry, patterns, and spatial exploration. Music, poetry, craft, architecture, performance, and history also feature, though less frequently. These events combine mathematics with creative practices to offer diverse

experiences. The report also notes that while many initiatives celebrate creativity, few explicitly address the creativity inherent in mathematics itself.

For readers interested in further detail, the full report offers a more extensive analysis and documentation of the mapped events. What this festival review brings to our investigation of community mathematics is above all a sense of diversity and complexity. The concept led us to explore a wide range of platforms and approaches that vary in their aims, scales, and forms of participation. The resulting portrait is anything but uniform; it reveals a broad landscape that shapes how young people are invited to participate in mathematics beyond school. This mapping opens several questions for future research, including how young people themselves experience and respond to these initiatives? what forms of collaboration are possible with organisers? and how such efforts might further support meaningful engagement with mathematics in community contexts?

Conclusions

Looking back, the speculative concept of community mathematics has acted less as a fixed definition than as an invitation that set our investigation in motion and shaped the directions we have taken. It led us, first, to look outward and map the events, platforms, and initiatives where mathematics is already active in the lives of young people, often in unexpected ways and outside the familiar boundaries of school. Through this mapping, we encountered a landscape that is plural, lively, and far from uniform. Community mathematics is not a singular practice, but a field shaped by many actors, discourses, and forms of interdisciplinary participation, each with its own possibilities and limits.

At the same time, the concept encouraged us to create something new. By forming a group of young community mathematicians in Moss Side and co-designing interdisciplinary workshops with them, we developed our own situated version of community mathematics. This version embraces recognising and celebrating the mathematical thinking young people already bring to their lives, while creating space for them to actively explore and define what mathematics means to them personally.

This dual process of exploring existing practices and creating new ones has deepened our understanding of the diverse mathematical cultures accessible to young people in the UK. It has highlighted how these cultures are shaped by factors such as available opportunities, visibility within communities, and forms of collaboration, while also revealing significant gaps and areas yet to be explored. Our work points to a dynamic landscape characterised by diversity, ongoing experimentation, and emerging possibilities. For us, community mathematics remains a speculative and generative concept that continues to raise important questions, inspire practical action, and encourage new ways of experiencing and sharing mathematics within community life.

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