

Working with primary teachers in England on mathematics teaching for citizenship: critical and philosophical approaches.

ADAMS, Gill <<http://orcid.org/0000-0003-2088-8708>>, POVEY, Hilary <<http://orcid.org/0000-0002-8524-0550>> and DEMISSIE, Fufy <<http://orcid.org/0000-0003-2325-4313>>

Available from Sheffield Hallam University Research Archive (SHURA) at:

<https://shura.shu.ac.uk/34891/>

This document is the Accepted Version [AM]

Citation:

ADAMS, Gill, POVEY, Hilary and DEMISSIE, Fufy (2025). Working with primary teachers in England on mathematics teaching for citizenship: critical and philosophical approaches. In: CHRONAKI, Anna and YOLCU, Ayşe, (eds.) Troubling Notions of Global Citizenship and Diversity in Mathematics Education. Routledge Research in Education . London, Routledge, 261-279. [Book Section]

Copyright and re-use policy

See <http://shura.shu.ac.uk/information.html>

Working with primary teachers in England on mathematics teaching for citizenship: critical and philosophical approaches

Gill Adams, Hilary Povey and Fufy Demissie

Abstract

In mathematics education research to date, there has been limited focus on the potential of philosophical frameworks to engage teachers in critical explorations of their teaching of mathematics. In this chapter, we examine the potential of such philosophical approaches in schools in England, considering affordances and limitations in relation to teachers' learning with respect to mathematics learning and teaching for social justice. These environments are places where controlling judgements on teacher performance are rife. The chapter springs out of an attempt to support teachers to engage critically with mathematics learning and teaching in schools through the vehicle of a European project, PiCaM (*Project in Citizenship and Mathematics*) which aimed to address issues of citizenship and globalisation through the teaching of mathematics. Through the development of curriculum resources for 10-12-year olds and their teachers, it sought to contribute to combating discrimination, segregation, and racism, validating the cultural history, and supporting the education of all, including disadvantaged groups and migrant children. The project materials are founded upon inclusive, participatory, and innovative pedagogies with the novel inclusion of philosophical approaches to learning mathematics. Here we consider the impact of PiCaM on participating teachers and student teachers, using philosophical approaches ourselves to reflect critically on our work.

Keywords: critical thinking, mathematics teaching, inclusive pedagogies, philosophical approaches

Working with primary teachers in England on mathematics teaching for citizenship: critical and philosophical approaches

Introduction

In mathematics education research to date, there has been limited focus on the potential of philosophical frameworks to engage primary teachers in critical explorations of their teaching of mathematics. In this chapter, we examine the potential of such philosophical approaches, considering affordances and limitations in relation to teachers' learning with respect to mathematics learning and teaching for social justice through the context of our experiences of one project, the *Project in Citizenship and Mathematics* (PiCaM). In the performative¹ school environments prevalent in England, control of the teacher is "pervasive...dictating not only the curriculum, the structure of a lesson, the approach to teaching a particular concept, but also the focus of an individual teacher's learning and even the clothing they must wear" (Adams & Povey 2018, p. 211). We ask: What spaces might philosophical approaches provide access to and what do glimpses into these spaces *do* to teachers? In particular, we ask what affordances such approaches may offer to primary teachers in their teaching of mathematics, even as they are subject to ever increasing scrutiny of their performance through their students' attainment in national tests (Troman, 2008).

We write at a time of intensifying globalisation, characterised by a rapid shift of power and control from public to "a tiny and un-elected private sector" (Neyland, 2007, p. 116). Here, in the face of globalising scientific management of education, opportunities for teachers to 'debate about and co-construct a mathematics curriculum (Neyland, 2007, p. 115) have

¹ Performativity is "a technology, a culture and a mode of regulation that employs judgements, comparisons and displays as a means of incentive, control, attrition and change" (Ball, 2003, p. 216). In the English school system this performative environment impacts on teachers' professional identities, with hierarchical observations and inspections becoming "for some teachers, the everyday conditions which mould their professional identities and sense of purpose" (Hall and Noyes, 2009, p. 855). See also Adams & Povey (2018).

largely been replaced by an imposed curriculum where diversity has been eradicated. For Neyland, this mathematics curriculum acts as a blueprint that “leaves teachers illiterate” (2007, p. 124). To counter this, Neyland calls for a curriculum that is “locally emergent and complex” (p. 124). More broadly, we note Ernest’s arguments for critical mathematics education, one which “aims to empower learners as individuals and citizens-in-society, by developing mathematical confidence and power [...]; and to foster critical awareness and democratic citizenship via mathematics” (Ernest, 2007, p. 34). Our goal in PiCaM was to work against the disembodiment of knowledge and practice, emphasising their situatedness in particular locales and creating spaces for alternative curricula possibilities.

We begin with an extended introduction to PiCaM, setting out the project aims, describing how collaboration between the project partners facilitated an examination of local, national and global contexts and outlining the focus on global citizenship in selected project resources. We then explore philosophical approaches in education linking these to a discussion of social justice. Next, we describe the approach we deployed in this chapter to facilitate critical reflections on our involvement in PiCaM, particularly our attempts to work with these philosophical approaches. In our reflections, individual and in dialogue, we consider what educational arrangements *do* to teachers, the spaces that such philosophical approaches may construct and our roles in supporting teachers to engage critically with/against performative school contexts. We conclude by considering the value of both ruminating and of action in critical mathematics education.

The Project in Citizenship and Mathematics (PiCaM)

The chapter springs out of an attempt to support teachers to engage critically with mathematics learning and teaching in schools through the vehicle of a European project, PiCaM, co-funded through the ERASMUS Programme of the European Union (Project

number 2017-1-UK01-KA201-036675). The project aimed to engage with issues of citizenship and globalisation through the teaching of mathematics. (We regard citizenship as a highly contestable concept which we have discussed and critiqued elsewhere including the hegemonic role of the concept of European citizenship which is usually what is being invoked when global citizenship is being discussed (Povey, Demissie & Adams, 2019 and Povey & Adams, 2021). Suffice it here to say that we reject the imperative to foster neoliberal citizenship seeking instead to support the development of critical, socially engaged citizenship). Through the development of curriculum resources for 10-12-year-olds and their teachers, it sought to contribute to combating discrimination, segregation, and racism, validating the cultural history, and supporting the education of all, including disadvantaged groups and migrant children. The project materials are founded upon inclusive, participatory, and innovative pedagogies with the novel inclusion of philosophical approaches to learning mathematics in order to develop social, civic and intercultural knowledge, skills and understanding and critical thinking.

Project partners included educators from a range of settings including the voluntary sector, universities and a mathematics “museum”. Five European countries were involved: England, Germany, Greece, Portugal, and Romania. The similarities and differences in education systems and traditions in partner countries provided valuable starting points for discussion and development of project approaches and materials. This is evident, for example, in the way that several activities begin from the local, exploring aspects of children’s lives, and move to explore these in other countries and contexts, enabling alternative perspectives to be discussed and validated. From conceptual and methodological principles (which remained contested and the source of unresolved tensions throughout the project), partners collaborated on seven resources for the classroom, together with materials to support initial teacher

education, teacher professional development and eTwinning². (See <http://www.citizenship-and-mathematics.eu/>.) These principles and resources were informed by the EarthCARE global justice framework (<https://blogs.ubc.ca/earthcare/>), with its six complementary approaches to justice including, for example, cognitive justice, which focuses attention on “identifying and interrupting the harmful effects of a monoculture of thought” (EarthCARE, 2017), and relational justice which aims towards equitable power relations. The framework, developed in response to the challenges posed by increasing globalisation, aims to deepen understanding of the complex processes of social change, facilitate deep reflection and analysis and aid the exploration of alternative futures.

In some cases, the classroom resources have a specific focus connected to citizenship. For example, *Mapping the world* is concerned with map making and aims to prompt an exploration of the history of European colonisation, the measurement of the earth, the construction of national boundaries and the potential maps hold for misrepresentation; and *Global crisis and local solidarity* interrogates and critiques contemporary hegemonic ways of understanding money and debt and the unproblematic uses of mathematics, invoking the notion of the common good. Others take as their focus inclusive and participatory pedagogies. For example, *Playing and making mathematical games and crafts* creates spaces, inside and outside the school context, for children to come together, to collaborate and share experiences amongst themselves and with others, acknowledging the complexity of living together and building solidarity; and *Mathematical bodies* explores mathematics as embodied and playful and experienced together, building a learning group where everybody matters and everyone has an equal role to play. In many cases, the resources contain prompts for using a philosophical approach and it is this aspect of the project which is the focus of this chapter.

² eTwinning is the European Commission’s teaching and learning platform, designed to support communication and collaboration between teachers and schools across Europe.

The curriculum materials in PiCaM were designed to challenge some of the existing barriers to a critical engagement with mathematics, at a time of increasing globalisation. The activities focused on significant concepts such as migration, culture and history, and the pedagogy was underpinned by critical, caring, collaborative and creative thinking (Society for Advancing Philosophical inquiry and Reflection in Education, SAPERE, 2010). The introductory activities emphasised participation and collaboration. Although on first glance, the links between approaches to learning mathematics and philosophical approaches in the classroom may not be obvious, many of the habits of mind (Povey, 2017) necessary for critical engagement with mathematics are reflected in the intended outcomes of the philosophical approach we adopted. These habits include asking yourself questions, being resilient and being flexible.

Given the challenges of the performative school environment (as described above), we wanted to explore whether philosophical approaches could facilitate teachers' critical engagement with their teaching of mathematics. We found that working on activities together and using a philosophical methodology, either at the Development Education Centre or the University, was significantly different from the work that teachers typically did in schools. Beyond the policy boundaries, teachers were able to explore mathematics in different ways and engage in critical questioning, including questions related to the nature of knowledge and how we come to know what we know. The possibility of intervening, of disrupting existing practices and of teacher author/ity (Povey, 1997) was recognised. Back in school, some teachers even found spaces to work differently with children suggesting that the philosophical approach had supported teacher learning:

The training has been really good. All of the activities that we tried out, the resources are great, I've really enjoyed in terms of history and the view of maths across the world, I've learned a lot... (T1)

it has made me think about other lessons I teach in terms of the global aspect of it ... opened my mind to different views and different experiences and also children working together, ... children can work with anyone and get good results (T2)

This last comment reflects the conditions of mathematics classrooms in England, where children have typically been grouped by prior attainment and experience almost all of their mathematics in these predefined groupings (Marks, 2014). In the next section we discuss the philosophical approaches in education and locate these within PiCaM.

Philosophical approaches in education

Over the last few decades, philosophical approaches in education have been gaining currency.

For us, in common with various other researchers (Bowyer, Amos & Stevens, 2020;

Winstanley, 2018; Daniel & Auriac, 2011), such approaches encompass:

- an emphasis on thinking;
- an understanding of thinking as creative;
- a focus on inquiry;
- a willingness to work with unfinishedness, unknowing and uncertainty; and
- emphasis on community.

Our intention, that philosophical approaches be used in emancipatory ways, requires

“[putting] habitual ways of being and doing into question” (Bowyer *et al.*, 2020, p. 51) and

finding again the position of a child whose ways of being are not yet filled with settled

categories and fixed interpretations of the world (Biesta, 2011). Equally, we seek out

philosophy’s potential to make us uncertain, unsettled and hesitant so we do not know for

sure but have an orientation towards not-knowing (Biesta, 2011). Philosophy has the potential

to hone a disposition towards critical thinking where “the individual takes nothing for granted

and constantly questions and enquiries” (Benade, 2014, p. 1254 quoted in Bowyer *et al.*,

2020, p. 43). Drawing further on the work of Bowyer and her colleagues, we note that a

philosophical approach can undermine structures of power because of the recognition given

to uncertainty and the possibility of not-knowing but only if it constantly subjects itself to critical scrutiny especially in the way that students from the margins are positioned.

The PiCaM project proposal made specific reference to a particular approach – *Philosophy for Children* (P4C) – so we begin by discussing this. P4C is an inquiry-based dialogic pedagogy that is underpinned by the 4Cs: creative, caring, collaborative and critical thinking (SAPERRE, 2010). P4C originated in the US where it was based on philosophical novels written by Lipman (for example, *Pixie*, downloadable at [Pixie \(novel\) by Matthew Lipman \(montclair.edu\)](http://montclair.edu)). Outside the US, practitioners have begun to use a wide -range of stimuli, such as film clips, picture books and art works in place of the original novels (SAPERRE, 2010). P4C was developed by Lipman and Sharp to support students to develop their reasoning skills (Lipman & Sharp, 1978). Lipman states that “the pedagogy of the ‘community of inquiry’ should be the methodology for the teaching of critical thinking” (Lipman, 2003, p. 3), advocating an approach to develop reasoning, judgement and evaluation skills in schools to support the development of thinking skills. This “exciting, unpredictable and authentic pedagogy” can be particularly productive in work with student teachers, as they begin “to nurture the skills and dispositions of democratic citizenship” (Demissie, 2020, p. 76).

The rationale for choosing P4C as the philosophical framework for the project was largely pragmatic. The second UK partner in the PiCaM project, the Development Education Centre South Yorkshire (DECSY) promote a global learning perspective in the curriculum and are experienced in training teachers in P4C (<https://www.decsy.org.uk/project/p4c/>). In addition, P4C is a key research and practice interest for one of us (Fufy), leading to P4C approaches being embedded in an undergraduate teacher education course (Demissie, 2020). At the PiCaM project planning stage it appeared to us that there was considerable potential in

adopting P4C as a means to address questions of global citizenship in the mathematics curriculum. As mathematics educators and researchers with a commitment to a more just social world, we (Hilary and Gill) found resonance in the emphasis on critical questioning, learner agency, a collaborative, creative and caring community in P4C. There are clear links to social justice perspectives on teaching mathematics where classrooms can be seen as learning communities (for example, Skovsmose, 1994; Boaler, 1997; Povey, 2017). In such classrooms, learning is seen not as acquisition but rather as participation.

As mathematics education researchers, Atweh and Keitel (2007) note that defining social justice is problematic. They summarise theorisations of social justice, noting that a market model, based on “free competition and de-regulation” (p. 98), is highly influential in education systems and processes, valorising individual effort whilst neglecting the effect of social structures and relations. Distributive models attempt to address inequalities in education through the allocation of additional resources but fail to engage critically with curricula and pedagogical approaches, nor do they address the historical roots of inequalities. Problematising both these models, Atweh and Keitel draw on Gewirtz’s (1998) relational understanding of social justice, one that facilitates an exploration of power and societal relations, and on Fraser’s (1995) arguments for cultural recognition. Atweh and Keitel (2007) choose to work with Young’s (1990) signs of injustice, using these “markers of social injustice to raise some issues of social justice” (p. 100). In our examination of philosophical approaches, these signs (for example, exploitation and cultural imperialism) serve to illustrate possibilities and risks.

When running introductory PiCaM sessions with teachers, a key element was engaging them in philosophical activity based on the P4C approach. Participants are usually seated in a circle, creating a space in which everyone can be seen. Ground rules for discussion are

formulated or reviewed with the group, after which the facilitator introduces a stimulus. In the P4C process (Oxfam, 2007, p. 1), this stimulus, an image, object, text or video clip, serves as a prompt for philosophical thinking and questioning. Participants generate questions inspired by the stimulus material then democratically decide which question to explore together. When using P4C with learners, teachers/facilitators work with a group over time with the intention that discussions become deeper and participants develop skills of inquiry, working together collaboratively and constructively to explore questions that are important to them. Throughout, facilitators take an active role, with an emphasis on the 4Cs: to create and maintain a caring and collaborative ethos and to model critical and creative thinking in action as the group explore the chosen question (SAPER, 2010).

Whilst P4C³ had much to offer PiCaM in terms of helping the project explore a less didactic, more dialogical way of working with children and teachers, we came to realise that thinking about thinking was, in itself, unlikely to be enough for us to address the project's transformative intentions (Kohan, 2014). In our critique we drew on the work of Biesta (2011, 2017) and Kohan (2018), both of whom support doing philosophy with children and are sympathetic to the aims and practices of P4C. However, both also recognise that P4C is not “as transformative, as revolutionary and as radical, *as it is desirable for it to be to make any difference* in these neo-capitalistic, global times— not, at least, in the usual form its educational theory and practice takes” (Kohan, 2014, p. 46, original emphasis).

Biesta believes that doing philosophy with children (and we would say adults too) is particularly helpful in enabling them to ask questions - questions about the world and questions about their own role and position within it. However, he argues, the positioning of the inquirer needs to be not just that of “the I who asks questions, who makes sense, who

³ This and the next two paragraphs draw on Povey, Demissie & Adams, 2019.

seeks to understand” but also as one who is “being put in question and through this is being called into the world ... in the world but not in the centre of the world” (2017, p. 434). He believes that most schooling in neoliberal societies is no longer providing education but rather has been reduced to offering *learnification*, that is, intelligent adaptation to one's existing environment where children “learn” in a way not dissimilar from robotic vacuum cleaners.

Kohan makes a number of critiques of the way P4C is usually practised. Crucially for us, he notes that P4C does not take up ideological issues about the nature of societies. Although it can contribute to an education for citizenship, providing tools that all participants in democracy need if they are to be(come) tolerant, responsible, pluralistic citizens, it does so without considering that the democratic contexts children and citizens encounter might be unfair and unjust. He, like Biesta, is concerned about P4C's emphasis on rationality which he sees as a way of formatting people to become more capable of an intelligent adaptation to the labour market. He contrasts this with thinking as framed within critical approaches to teaching and learning: “while P4C considers critical thinking as a set of reasoning skills, critical pedagogy goes beyond this, meaning that critical thinking puts into question the unfairness of the *status quo*” (p. 620).

Philosophy with Children (PwC) developed by Murris (Haynes & Murris, 2011) from Lipman's work, seeks to address some of these critiques of P4C. The terminology emphasises that practitioners do philosophy *with* rather than *for* participants and their approach “expresses the democratic and collaborative nature of the practice” (Haynes & Murris, 2011, p. 300). Drawing on their experience of supporting student teachers to develop philosophical practice, Haynes and Murris identify recurring themes including preparing for the unexpected in teaching, a shift in perspective on progression (*non-linear progression*), the

difficulty in asking philosophical questions, ownership of questions and epistemological and moral relativism (2011, pp. 291-297). These themes reflect principles privileged in our own pedagogical approaches to mathematics education, where “active, engaged, meaning-making pedagogies promote learning; encourage the development of authoritative, confident learners; and provide opportunities to increase social justice within the mathematics classroom” (Povey, 2017, p. 13).

Critical explorations: reflections on working with teachers

In this section we justify our approach to engaging critically with our work on PiCaM. Biesta (2017) asks what educational arrangements ‘do’ to children and young people - here we explore what they *do* to teachers through four critical reflections on PiCaM’s attempt to work with philosophical approaches in mathematics learning and teaching.

We deploy critical reflection as a thinking tool to aid our critique of existing structures and discourses and to question power relationships, considering alternative perspectives and working towards more informed actions. Although critical reflection is frequently used in education, particularly in relation to professional practice, it remains a contested concept. Significantly, it goes beyond reflection, and reflective practice, to question power relationships. It is important to note that “from a critical theory perspective critical reflection focuses not on how to work more effectively or productively within an existing system, but on calling the foundations and imperatives of the system itself into question, assessing their morality, and considering alternatives” (Brookfield, 2009, p. 296). Critical theory is grounded in three assumptions about the world: that we live in unequal societies where racism, economic inequalities and other forms of discrimination are an everyday reality; that the reproduction of these unequal structures is rendered normal and inevitable through the

dominant ideology; and that critical theory works to understand this situation in order to change it.

Like Brookfield, we see critical reflection as ideology critique, exploring how “ideology lives within us, pervading our emotional responses” (Brookfield, 2009, p. 300). We make two moves here as we begin this work, first working with our individual reflections and, secondly, through a more structured critical collaboration which draws on the principles of P4C. This collaborative work brings alternative perspectives to our inquiry, enabling us to reflect on the power that we exercise through our positions as educators.

Individual reflections on attempts to promote philosophical approaches with teachers

Mapping questions - Gill (1)

In the project workshops we worked with teachers and student teachers to explore the activities and approaches to citizenship and mathematics. One activity that struck me as particularly powerful was the study of world maps mentioned above which aimed to prompt an exploration of the history of European colonisation, the measurement of the earth, the construction of national boundaries and the potential maps held for misrepresentation. One task focuses on how maps are derived from the globe, exploring similarities and differences between representations; another examines a variety of world maps, considering size, location and shape of continents and countries, encouraging discussion of how maps change our perception of the world. In these tasks, the globe and various map projections acted as stimuli for inquiry, with teachers generating questions in response.

Working with teachers on this activity, several responses caught my attention. First, the availability of globes (and printed maps) to see and manipulate appeared both novel and

significant, not only to teachers' understanding of the tasks but in prompting reflections on their own classroom environments (the teachers) or school mathematics experience (the student teachers). They wondered why there were no globes in their classrooms – or at least, no 3-dimensional models. Globes and printed maps have been replaced by images on screen, which although manipulable, provide an altered perspective of the world and raise intended questions about what we know and how we come to know and how this shapes knowledge and experience. Second, the existence of alternative representations of the world map drew considerable surprise from the majority of participants with just one of the student teachers demonstrating prior knowledge of these and an understanding of the ways in which such maps might mislead. If “the world map” (typically taken to be a Mercator projection) was just one possible construction, what else was in question? This challenge of engaging critically with the taken for granted is one project goal. Thirdly, the exploration of the globe in small groups, followed by the initial prompts: What questions can we ask about what we can see? and Which questions can we use mathematics to explore? appeared to enable a rapid community building to take place, making space for sharing, for questioning, for understanding. Everyone had a contribution to make related to their own story and this seemed to give them confidence to wonder, to imagine alternatives. Many of the questions were open, philosophical questions of significance to participants, prompting further enquiry. Finally, and perhaps most importantly, the activity provided an alternative perspective on colonisation, an important reminder of some of the ways in which we live with the legacy and prompting reflections on practice.

Uncovering assumptions and generating spaces to think - Hilary

In the initial PiCaM workshops with teachers and student teachers which were led by Fufy and Gill, the participants were asked at the beginning “What is the world like today? What words might you use to describe it?” The teachers and student teachers were then asked to

consider the knowledge and skills they wanted the young people they taught to have to survive and thrive in this world. This scene setting and invitation to become aware of and to focus on issues of our position in our world and on the fundamental purposes of education that Gill and Fufy provided surprised me (Hilary) and caused me to reflect on the presuppositions I brought with me to work with teachers.

I came of age as a teacher in the 1970s in the Inner London Education Authority in an era of maximum equality in Britain (Dorling, 2018, p. 166) and, I conjecture, maximum teacher autonomy. Although far from perfect, the Authority funded its education system well and supported a wide range of innovative projects intended to contribute to social justice including in mathematics education (Povey & Adams, 2018; <https://smilemaths.wordpress.com/>). Teachers were expected to be, and largely were, aware of the politics of education and used to voice a commitment to working towards a more fair and just education system. Based on experience, when working with mathematics teachers in that era I took for granted that they would have already had the opportunity to articulate and discuss the sorts of issues that Fufy and Gill were raising. I carried forward this attitude into the vastly different era within which PiCaM was operating and on two separate occasions had such disappointing sessions with teachers that I considered giving up.

I decided to try the same approach as Gill and Fufy and found that teachers were thirsty for such philosophical reflecting and that it opened up a space where they could articulate real opposition to the *status quo* and therefore could see the point of working with materials like PiCaM. They shared a sense of a divided, unequal world with a planet under threat. Typical responses to the first question included words like in danger, unfair, in conflict, dying ... This is not a vocabulary we usually use in the context of mathematics education. By asking the teachers to consider the knowledge and skills they wanted the young people they taught to

have to survive and thrive in this world, participants were positioned as agentic, able to act to strive for a better future. Peter Applebaum (2018) suggests the philosophical strategy of exploring the effects of adopting such non-mainstream language in order to change ‘how we see and think and ‘be’’ (p. 54). Working in this way allowed us, me and the teachers, to confront, though not in an easy way to cure, “the invisible ignorances that structure our worlds of possibility” (p. 69), that is, those accepted ways of seeing, thinking and being that limit our understanding of how things might become.

Troubling role and responsibilities - Gill (2)

Reflecting on the observations and recollections I made in considering world maps raised questions about my role in relation to the activities and to the teachers. I began teaching in the mid-1980s and although I have not taught in schools for 15 years, as a teacher educator and academic I have an awareness of teachers’ lives. My mathematics classroom was home to a range of activities, approaches and resources. Policy and practice have shifted considerably in the intervening years since I left school teaching, the performative culture leading to a marked reduction in teacher autonomy. I am troubled by the challenges I anticipate teachers facing as they return to school to try to work with the PiCaM materials with their classes. How might they justify these activities and approaches in the face of existing school structures? What was my role in helping them to create spaces for the expansive questions generated by the activities and by the children? How do I “nourish a sense of hope” (Giroux, 2020, p. 226)? Despite these concerns, it seemed that the PiCaM activities and the pedagogical approaches upon which they were founded offered the possibility of a shift, not only in the way that mathematics was taught but in the way that the subject was understood. The philosophical approaches enabled, even demanded, a critical questioning that provided opportunities for children and teachers to rekindle childhood habits of asking why. They unsettled, deliberately. That was the point. Yet even as I felt my responsibility to provide the

teachers and beginning teachers I work with “the freedom, security, time and space to take risks and ask important questions” (Birmingham 2004, p. 322), I was aware of the risks they might take in daring to be different in a conforming culture.

Alternative perspectives - Fufy

Reflections on a project workshop with teachers in Greece, designed to introduce them to the P4C approach, provided me with an alternative perspective. In Greece, due to the recent economic crisis, teachers' contexts have been characterised by job insecurity, pay cuts and reduced budgets. A head teacher's role is mainly administrative, teachers have the lightest teaching load in the OECD, and more significantly, there are no national student assessments (OECD, 2018). In contrast, teachers in England have much better job security and schools are generally better funded. However, in England, education is highly regulated and controlled, governed by a neo-liberal political agenda: student assessment drives the schools' agenda, and high stakes school inspections blight teachers' professional lives and influence what is taught.

During the P4C enquiries, for example, I found that teachers in England were less forthcoming in sharing their ideas and somewhat reluctant to challenge and question each other. Moreover, the pressures to accommodate curriculum demands impacted on levels of teacher involvement in the project: “...they (the activities) didn't fit directly into anything we were supposed to be teaching as part of the curriculum. There were things that had to be” (T1). On the other hand, Greek teachers' questions were more philosophical and they were more willing to ask questions of themselves and of each other, resulting in discussions that were deeper and more contested.

A philosophical dialogue

These individual reflections, highlighting contrasting responses and attitudes, became the stimulus or provocation for our own philosophical inquiry into what the educational arrangements do to teachers and why. We worked collaboratively, raising and clarifying several questions of which we ended up discussing two. We began with: *What are the most important teacher skills and dispositions for critical engagement with mathematics?* Later, we found ourselves discussing *Why should it be that caring / caring thinking links to social justice? What sort of caring / caring thinking, if any, supports a deeply transformative agenda?*

Extracts from the inquiry serve both to illustrate the philosophical approach and to share our reflections. In the extract below we explore the problematic nature of teacher dispositions and readiness for critical engagement with mathematics.

Fufy: What are the most important skills and dispositions a critical engagement with their teaching of mathematics requires from teachers?

Hilary: My problem with dispositions is that when people use that word, I think mostly they are thinking of something pretty stable, ... I don't think that the Greek teachers were in any essentialist way, different kinds of people. Maybe they were, maybe teaching in Greece is so different, it attracts a completely different set of people into the profession. Disposition would need to be slightly problematised to make it clear that disposition isn't something that is essential.

Gill: I think we need to be clear how we are using those terms...

Fufy: Are all dispositions fluid and changeable? For example, Dewey says that open mindedness is a basic disposition that is necessary for reflection [...] Would there be some dispositions, such as open mindedness, that are not as fluid and flexible?

Hilary: [...] Maybe I overstated the case slightly? I suppose what I meant was that if people were exposed to a climate of open mindedness - if we are in a world where most teachers think they can't say what they think most of the time in their professional environment that clearly is not an environment that fosters any kind of open mindedness or creativity.

The question began with an assumption that dispositions and traits are innate or culturally specific (for example in the Greek teachers). But, by the end we considered the role of context - individuals may be “naturally” open-minded (whatever that might mean), but the political and social context will profoundly affect how they behave. The dispositions are not necessarily innate or particular to the Greek teachers (despite their impressive cultural heritage in philosophy) but, in general, the educational arrangements in England and teachers' own roles within them suppress teachers' philosophical thinking.

The discussion flowed into thinking about thinking and thinking about action.

Fufy: What we are saying is that these terms themselves need to be unpicked, what do we mean by caring thinking – and like you say, is it inherently transformative, these particular ways of being? Because you can be caring, can't you, and not actually question somebody.

Gill: And it links to the need for action – so caring thinking, to support a transformative agenda, does that need to lead to some kind of action, whether that is a recommitment to actions that were already ongoing or something very different?

Fufy: I suppose that could be one of the limitations of doing philosophical approaches using this kind of methodology, you can just do the thinking and not the doing. Just talk about it, think about it but actually stop short of doing something about it. It gives you the sense of you doing something but actually you are not.

Gill: ...it does transform practice in the group but I think what we are asking is whether it goes beyond that.

Fufy: I always find that a really interesting question, is it enough, talking?
...

Hilary: There is a school of thought, and I think it is a position that I have a lot of sympathy with though I don't in the end I agree with it, which says that we are all too busy doing things and not thinking enough, that our instant response is to say "oh I've got to do something" [...] just think. Thinking in itself is incredibly important. We do all need to think and think hard and think more.

Gill: And maybe that is enough ...it is the practice itself of working together, thinking together, engaging with other people's perspectives, listening, taking a position and then being prepared to shift that position when you've heard other perspectives, isn't that enough?

Fufy: I think it is pretty valuable actually. Because I was talking to some of my students who did [the P4C] project with me ... so can we say that doing mathematics in this way helped some of the teachers to engage critically with their ideas of teaching mathematics, with the role of mathematics in society ... I don't know.

Gill: I felt we had some glimmers of that.

In their examination of global citizenship education, Pais and Costa (2020) see two conflicting discourses of critical democracy and neoliberalism as providing us with “rationales for action, thus keeping us occupied” (p. 11) whilst frustrating any deeper analysis and prospect of change. Instead, they propose contemplation: “we strongly believe that sometimes the best way to act is to stop “acting” [...] and ruminate” (p. 12). We wonder, though, the extent to which such time to ruminate is available to school teachers in the same way that it may be to those of us working in higher education. School life in England is dominated by “regulated time” (Povey *et al.*, 2019, p. 2) where time is segmented and commodified with students and teachers “working against the clock”.

The possibilities of a philosophical approach

To what extent can the philosophical approaches to mathematics teaching and learning adopted in PiCaM be(come) “a space for challenging pre-conceptions and implicit conceptions of social justice” (Skovsmose, 2018, p. 41)? As we reflected on our experiences of working with teachers and beginning teachers, we noticed glimpses, moments, where teachers, stimulated by the project materials and approaches, asked questions about their own practices and school environments. At the same time, teachers reported tensions between the project approaches and the structures of schooling, struggling to align the two. This is

unsurprising in the education policy context in England, where philosophical approaches can be viewed as a “counter-cultural practice” (O’Riordan, 2016, p. 654), at odds with national policy expectations. This might be more obvious in mathematics, arguably one of the subjects where teachers are most under scrutiny with accountability measures experienced acutely (Ball *et al.*, 2012). The tensions are evident in O’Riordan’s study as teachers reveal the disconnect between their intrinsic values and the expectations they experience in the performative school culture. As Jane, one of the teachers notes: “[P4C] made me think I could be the type of teacher I’d always wanted to be ... sometimes I think you can get bogged down with all these [...] strategies and fulfilling requirements and doing all that.” (O’Riordan, 2016, p. 655).

In O’Riordan’s qualitative study of primary teachers trained in the use of P4C, teachers reported that P4C aided them to “move further towards their ideal vision of teaching” (2016, p. 654); but it also revealed that P4C did not become established in many schools. How do these teachers, and those we worked with on the PiCaM project, sustain such a movement in the face of the accountability agenda? It seems unlikely that any answer will be found without a wholesale rejection of neoliberal thinking in education; echoing Andreotti and colleagues (2018), it will not be neoliberalism that fixes the problems that neoliberalism has created.

One contribution that the project has made is to open up spaces for teachers to stop and think. We mentioned above the regulated time which dominates teachers’ lives. The philosophical space provided the teachers with a glimpse of the alternative timescape “expansive time” (Povey *et al.*, 2019, p. 2). This timescape enables rumination, a lingering over tasks; a timescape where “describing and explaining and then discussing your work, conjecturing, visualising, getting stuck and keeping going, being willing to defend and justify your

conclusions, changing your mind, conversing – all deeply mathematical practices – become possible” (Povey *et al.*, 2019, p. 6). The materials and pedagogical approaches deployed in the teacher workshops provided a stimulus for critical reflection in the way they prompted participants to engage with the world beyond their classrooms. At the same time, participants were encouraged to reflect on their own positions both in relation to others and to the ideas under discussion. This, rather than any measurable impact, encourages us. Also significant, although perhaps at odds with some of the research on effective teacher professional learning, was removing teachers from their usual workplace environment. Such an act of displacement can shift thinking. Finally, participants were able to make time and space to ask questions of themselves and of each other, time and space routinely denied them by performativity’s demands for endless meticulous attention to trifling minutiae, “a political anatomy of detail” (Foucault, 1979, p. 139). The glimmers of hope that such interactions may provide, reminding teachers, as in O’Riordan’s (2016) study, of their vision of the kind of teacher they would like to be, of why they wanted to be teachers, may be sufficient to sustain.

Authoritarian regimes and threats to liberal democracies around the world have resulted in the diminished capacity of education to “educate young people and others to be reflective, critical and socially engaged agents” (Giroux, 2020, p. 220). Critical pedagogy proposes that “education is a form of political intervention in the world and that it is capable of creating the possibilities for social transformation” (Giroux, 2020, p. 222). In England and perhaps elsewhere, spaces for teachers to explore such pedagogical approaches are limited and initial teacher education itself is subject to control (McIntyre, Youens & Stevenson, 2019; Furlong, McNamara, Campbell, Howson & Lewis, 2008). For teachers to support students “to move from moral purpose through purposeful action” (Giroux, 2020, p. 223) we argue that they need opportunities to experience critical pedagogy themselves. A pedagogy founded on philosophical approaches is a “disruptive” pedagogy (Demissie, 2020), in the case of our

project, deliberately so. Such pedagogy “profoundly questions the power balance in schools, the status of knowledge” (Haynes and Murriss, 2011, p. 290) and enables philosophical questions that have the potential to “alter what counts as valuable in education” (ibid). The project did not intend simply to initiate teachers (and their students) into issues of citizenship but to do so in a critical manner stimulating “doubts, questions and self-corrections” (Daniel & Auriac, 2011, p. 422). The philosophical thinking involved is a *praxis* and implies “a dialectical relationship between reflection and action” (p. 422).

Thus, the philosophical approach of the project was to encompass both thinking and action, “aimed at improving how we live together” (Bowyer *et al.*, 2020, p. 54). Being together, as well as being a theme picked up explicitly in some of the materials, is fundamental to this approach. The philosophy is intersubjective in that it implies “an open dialogue within a community of peers” (Daniel & Auriac, 2011, p. 422), in this case fellow teachers, in a horizontal rather than hierarchical relationship (p. 422). In this space, the thinking was grounded in being together and we saw glimpses during the workshops with teachers of the space becoming emancipatory as “other ways of being – other lives – [came] into view” (Bowyer *et al.*, 2020, p. 56).

Conclusion

reconceptualising what it might mean to be a citizen, highlighting the constraints of performative school environments at the same time as it enabled participants to glimpse possibilities for critical, socially engaged citizenship. Our reflections focussed on individual and collective questions of thinking and acting. In sharing these, our aim is to open up a conversation, inviting teachers, beginning teachers and others to consider the possibilities that philosophical approaches may offer to challenge thinking about mathematics education and to contribute to knowledge of how educators might continue to act in local contexts and how

they too might engage in wider conversations about both mathematics and citizenship. For Giroux, educators must “do more than create the conditions for critical thinking and nourishing a sense of hope in their students” (2020, p. 226); they must take on the role of public intellectuals, addressing wider public audiences and sharing their ideas, part of our goal in this chapter. Pausing and ruminating is productive, enabling a re-examination, in collaboration, of purpose and possible action. Our reflections highlight the spaces to which philosophical approaches might provide primary teachers access, particularly as they work collaboratively to explore the possibilities and challenges of working in this way in mathematics. Creating spaces for collaborative critical reflection is particularly Philosophical approaches are growing in popularity in primary education, exposing tensions between the values and practices embraced in these approaches and the **policy** context, particularly in schools in England. In this chapter, we have considered how creating spaces for philosophical work with teachers and beginning teachers may facilitate a **critical** engagement with school mathematics and provide an alternative to an examination of the processes of **globalisation**, an opportunity to “think **globally**” (Skovsmose, 2007. p. 7) about **justice** and equality. Working with the PiCaM approaches and **materials** opened up spaces for important for teachers in neoliberal times, as responses from PiCaM participants have demonstrated. Such spaces can be created in the work that educators do in support of teacher professional learning.

References

- Adams, G. & Povey, H. (2018). 'Now there's everything to stop you': Teacher autonomy in performative times. In M. Jurdak. & R. Vithal (Eds.), *Sociopolitical dimensions of mathematics education: From the margin to mainstream* (pp. 209-230). ICME-13 Monographs Springer.
- Appelbaum, P. (2018). How to be a political change mathematics education activist. In M. Jurdak & R. Vithal (Eds.), *Sociopolitical dimensions of mathematics education: From the margin to mainstream* (pp. 53-73). ICME-13 Monographs Springer.
- Atweh, B., & Keitel, C. (2007). Social injustice and (in)ternational collaborations in mathematics education. In B. Atweh, A. Calabrese Barton, M.C. Borba, N. Gough, C. Keitel, C. Vistro-Yu & R. Vithal (Eds.), *Internationalisation and Globalisation in Mathematics and Science Education* (pp. 95-111). Springer.
- Ball, S., Maguire, M., Braun, A., Perryman, J., & Hoskins, K. (2012). Assessment technologies in schools: 'Deliverology' and the 'play of dominations'. *Research Papers in Education*, 27(5), 513-533. <https://doi.org/10.1080/02671522.2010.550012>
- Barwell, R. (2013). The mathematical formatting of climate change: Critical mathematics education and post-normal science. *Research in Mathematics Education*, 15(1), 1-16. <https://doi.org/10.1080/14794802.2012.756633>
- Biesta, G. (2017). Touching the soul? Exploring an alternative outlook for philosophical work with children and young people. *Childhood and Philosophy*, 13(28), 415-452.
- Biesta, G. (2011). Philosophy, exposure, and children: How to resist the instrumentalization of philosophy in education. *Journal of Philosophy of Education*, 45(2), 305-319.

- Birmingham, C. (2004). Phronesis: A model for pedagogical reflection. *Journal of Teacher Education*, 55(4), 313-324. <https://doi.org/10.1177/0022487104266725>
- Boaler, J. (1997). *Experiencing school mathematics: Teaching styles, sex and setting*. Open University Press.
- Bowyer, L., Amos, C., & Stevens, D. (2020). What is 'philosophy'? Understandings of philosophy circulating in the literature on the teaching and learning of philosophy in schools. *Journal of Philosophy in Schools*, 7(1), 38-67.
- Brookfield, S. (2009). The concept of critical reflection: Promises and contradictions. *European Journal of Social Work*, 12(3), 293-304.
<https://doi.org/10.1080/13691450902945215>
- Daniel, M. F., & Auriac, E. (2011). Philosophy, critical thinking and philosophy for children. *Educational Philosophy and Theory*, 43(5), 415-435
- Demissie, F. (2020). The philosophy for children pedagogy in a university-based initial teacher education course: A case study of a 'disruptive' pedagogy, *FORUM*, 62(1), 69-78. <https://doi.org/10.15730/forum.2020.62.1.69>
- Dorling, D. (2018). *Peak inequality: Britain's ticking time bomb*. Polity Press.
- EarthCARE. (nd). Framework. <https://blogs.ubc.ca/earthcare/framework/>
- Ernest, P. (2007). Epistemological Issues in the Internationalization and Globalization of Mathematics Education. In B. Atweh, A. Calabrese Barton, M.C. Borba, N. Gough, C. Keitel-Kreidt, C., Vistro-Yu, C., Vithal, R. (Eds.), *Internationalisation and Globalisation in Mathematics and Science Education* (pp. 19-38). Springer.
- Foucault, M. (1979). *Discipline and punish: The birth of the prison*. Penguin.

- Furlong, J., McNamara, O., Campbell, A., Howson, J., & Lewis, S. (2008). Partnership, policy and politics: Initial teacher education in England under new labour. *Teachers and Teaching: Politics and Policy in Teacher Education: International Perspectives*, 14(4), 307-318. <https://doi.org/10.1080/13540600802037728>
- Giroux, H. A. (2020). *On critical pedagogy*. (2nd ed.). Bloomsbury Academic.
- Haynes, J., & Murris, K. (2011). The provocation of an epistemological shift in teacher education through philosophy with children. *Journal of Philosophy of Education*, 45(2), 285. <https://doi.org/10.1111/j.1467-9752.2011.00799.x>
- Hall, C. and Noyes, A. (2009). New regimes of truth: The impact of performative school self evaluation systems on teachers' professional identities. *Teaching and Teacher Education*, 25(6), 850-856. <https://doi.org/10.1016/j.tate.2009.01.008>
- Kohan, W. (2018). Paulo Freire and philosophy for children: A critical dialogue. *Studies in Philosophy and Education*, 37(6), 615-629. <https://doi.org/10.1007/s11217-018-9613-8>
- Kohan, W. (2014). *Philosophy and childhood: Critical perspectives and affirmative practices*. Palgrave Macmillan.
- Lipman, M. (2003). *Thinking in education*. Cambridge University Press.
- Lipman, M. & Sharp, A. (1978). Some educational presuppositions of philosophy for children. *Oxford Review of Education*, 4(1).
- Maass, K., Doorman, L. M., Jonker, V. H., & Wijers, M. M. (2019). Promoting active citizenship in mathematics teaching. *ZDM: The International Journal on Mathematics Education*, 51(6), 991–1003. <https://doi.org/10.1007/s11858-019-01048-6>

- Marks, R. (2014). Educational triage and ability-grouping in primary mathematics: a case-study of the impacts on low-attaining pupils. *Research in Mathematics Education*, 16(1), 38-53. <https://doi.org/10.1080/14794802.2013.874095>
- McIntyre, J., Youens, B., & Stevenson, H. (2019). Silenced voices: The disappearance of the university and the student teacher in teacher education policy discourse in England. *Research Papers in Education*, 34(2), 153-168. <https://doi.org/10.1080/02671522.2017.1402084>
- Neyland, J. (2007). Globalisation, Ethics and Mathematics Education. In B. Atweh, A. Calabrese Barton, M. C. Borba, N. Gough, C. Keitel, C. Vistro-Yu & R. Vithal (Eds.), *Internationalisation and Globalisation in Mathematics and Science Education* (pp. 113-128). Springer.
- OECD. (2018). *Education for a Bright Future in Greece: The Greek education system in context*. <https://doi.org/10.1787/9789264298750-3-en>
- O'Riordan, N. J. (2016). Swimming against the tide: Philosophy for children as counter-cultural practice. *Education 3-13*, 44(6), 648-660. <https://doi.org/10.1080/03004279.2014.991415>
- Oxfam/SAPERRE (2007). *Philosophy for Children Teachers Guide*. <https://www.oxfam.org.uk/education/resources/philosophy-for-children>
- Pais, A., & Costa, M. (2017). An ideology critique of global citizenship education. *Critical Studies in Education*, 61(1), 1-16. <https://doi.org/10.1080/17508487.2017.1318772>
- Povey, H. (2017). *Engaging (with) mathematics and learning to teach: An integrated approach to mathematics preservice education*. WTM.

- Povey, H. (1997). Beginning mathematics teachers' ways of knowing: the link with working for emancipatory change. *Curriculum Studies*, 5(3), 329-342.
- Povey, H. & Adams, G. (2021). Disordering mathematics, citizenship and socio-political research in mathematics education amongst the "rubble of words" Research in Mathematics Education, 23(3), 306-322.
<https://doi.org/10.1080/14794802.2021.1994452>
- Povey, H. & Adams, G. (2018). Possibilities for mathematics education? Aphoristic fragments from the past. *The Mathematics Enthusiast (TME)*. 15(1), 159-177. Available at: <https://scholarworks.umt.edu/tme/vol15/iss1/10>
- Povey, H., Boylan, M., & Adams, G. (2019). Regulated time and expansive time in primary school mathematics. *Pedagogy, Culture & Society*, 1-18.
<https://doi.org/10.1080/14681366.2019.1692059>
- Povey, H., Demissie, F. & Adams, G. (2019). Workshop report: What are the affordances and limitations of the Philosophy for Children (P4C) pedagogy for teaching and learning mathematics? Proceedings of BSRLM Day Conference, Milton Keynes, March, 2019.
<https://bsrlm.org.uk/wp-content/uploads/2019/07/BSRLM-CP-39-1-08.pdf>
- SAPERE (Society for Advancing Philosophical inquiry and Reflection in Education) (2010). *Handbook to accompany the level 1 course*. (3rd ed.). SAPERE.
- Skovsmose, O. (2018). Critical constructivism: Interpreting mathematics education for social justice. *For the Learning of Mathematics*, 38(1), 38-43.
- Skovsmose, O. (2007). Mathematical Literacy and Globalisation. In B. Atweh., A. Calabrese Barton, M.C. Borba, N. Gough, C. Keitel-Kreidt, C. Vistro-Yu, R. Vithal, (Eds.),

Internationalisation and Globalisation in Mathematics and Science Education (pp. 3-18). Springer.

Skovsmose, O. (1994). *Towards a philosophy of critical mathematical education*. Kluwer.

Troman, G. (2008). Primary teacher identity, commitment and career in performative school cultures. *British Educational Research Journal*, 34(5), 619-633.

<https://doi.org/10.1080/01411920802223925>

Winstanley, C., 2018. Deep thinking and high ceilings: Using philosophy to challenge ‘more able’ pupils. *Journal of Philosophy in Schools*, 5(1), pp. 111–133.

<https://doi.org/10.21913/jps.v5i1.1488>