

**Initial report from the project in citizenship and mathematics (PICAM): moral and political dilemmas**

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**Published version**

POVEY, Hilary, ADAMS, Gill, DEMISSIE, Fufy and CHRONAKI, Anna (2019). Initial report from the project in citizenship and mathematics (PICAM): moral and political dilemmas. Proceedings of the Tenth International Mathematics Education and Society Conference.

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# INITIAL REPORT FROM THE PROJECT IN CITIZENSHIP AND MATHEMATICS (PICAM): MORAL AND POLITICAL DILEMMAS

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*Abstract: This is an initial report from the PiCaM project reflecting some of the partners' concerns. We aim to raise within the MES community troubling questions about the nature of such projects - engulfed in EU discourses of citizenship and school learning in response to globality - whilst nevertheless seeking to find a way of acting in the world and trying to find, however limited and partial, an answer to the question: "what is to be done?" We are aware that equally troubling questions could be raised about the notions of mathematics itself and of mathematics education but these are not the focus of this report.*

## INTRODUCTION AND PURPOSE

PiCaM (<http://www.citizenship-and-mathematics.eu/>) is co-funded through the ERASMUS + Programme of the European Union (Project number 2017-1-UK01-KA201-036675) and therefore was initially framed in response to the discourse of an EU call for action on global learning. However, it involves six partners<sup>i</sup> and at least some of us are committed to a mathematics education that challenges neo-liberal assumptions about citizenship and problematises the concept of global learning. In presenting this report at MES alongside some of the curriculum artefacts the project has begun to produce, we seek critical feedback on designing a curriculum unit under such a call from a mathematics education community whose shared values make sense to us.

*Under what circumstances, if any, is such an application for funding, and the inevitable compromises involved, justified?*

We take the designing of curriculum artefacts for teachers to be in itself problematic inasmuch as they may be conceived of as unchangeable or as being the subject of an other's specific intentionality.

*How, if at all, is it possible for them rather to be conceived as openings to create spaces for interaction or spaces for dialogicality or even as creative experimentations that allow teachers and children from the margins to tell their own stories?*

*If so, what ethical dilemmas remain?*

## THE PICAM PROPOSAL

We begin by quoting the introduction to the proposal which outlines its intentions:

PiCaM is designed to embed critical global learning in the teaching of mathematics in school for young people aged 10-12 years. Using the core curriculum as a vehicle,

materials will be devised and tested that embed global learning content and participatory approaches in the teaching of mathematics. Attention will be paid to both mathematics and global learning curriculum content with the learning mediated through appropriate and inclusive pedagogies, supporting an innovative, participatory, integrated approach to developing social, civic and intercultural competences and critical thinking... The project will connect up teachers and children across the partnership allowing for networking and the exchange of ideas and understanding.

*Is it possible to frame global learning and social, civic and intercultural competences in ways that support an emancipatory project for both teachers and children?*

*In what ways can school-based pedagogies ever become aware of their inclusive and exclusive potentials?*

Although we recognise that citizenship is a slippery, dangerous and contested concept, we invoked it from the beginning and referred to notions of citizenship that extend beyond the nation state but nevertheless bought into the European project:

...in recent patterns of cross-border migration into Europe, children have escaped poverty and war and now face the long struggle of adapting to life in a new country. Children in host countries also need adaptive skills to face the challenges and seize the opportunities that increased globalisation entails. Critical global learning supports the understanding of ourselves as citizens, both world-wide and, in particular, as citizens of Europe. There is a need to build social cohesion on the basis of shared values of inclusivity and equity for all.

*Has the phrase "citizens-of-the-world" been colonised beyond redemption?*

*What characteristics cluster around the notion we are trying to invoke of critical citizenship in contemporary times and places of globality?*

## **PICAM MATHEMATICS CURRICULUM MATERIALS**

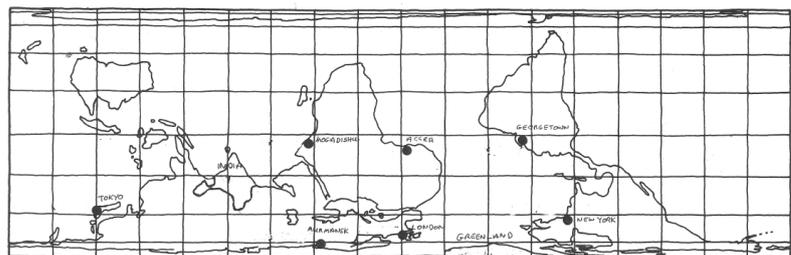
In this section, we give very brief descriptions of the draft curriculum materials produced thus far, each connected to an image that seems to say something about the activity.

*What role can curriculum materials have in a pedagogy genuinely focused on the needs of children and teachers?*

*If we move from the situated and local to more general curricula artefacts and pedagogic interventions, how do we move beyond reproducing the same cultural, linguistic, gendered, raced and ethnic stereotypes?*

### **Mapping our world with mathematics**

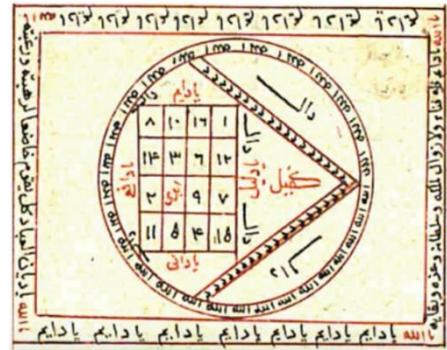
The intention is to help learners understand that the taken-for-granted way we see the world is shaped by



historical forces - relationships of domination and dominium and the experience of colonialism. Concerned with the mathematics of map making it questions north/south, Eurocentrism and the construction of the nation state.

**Fair and square: magic, Vedic and Latin squares**

Through exploring magic, Latin and Vedic squares, learners are encouraged to develop a pluralistic and historically informed cultural perspective on mathematics, to think of pattern and balance as ways of making sense of the world and to understand themselves as enquirers who pose problems and who work with others to develop their thinking.



**Global crisis and local solidarity: debt versus money as commons**

Contemporary hegemonic ways of understanding money and debt are interrogated and critiqued. The role of mathematics in promoting neo-liberal values is considered as are the ways in which unproblematised uses of mathematics have contributed to the global crisis. The notion of commons as shared resources in which each stakeholder has an equal interest is explored and the TEM local currency in Volos, Greece is studied in order to attempt to understand how these reframe goods, services and relations.



**Designing the world around me: mathematics and cultural inspiration in design**

Drawing on a range of cultural heritages with a particular emphasis on the role of Islamic art, the role of mathematics in design is considered. How symbols can operate to express values is explored and encouragement of and respect for the learning community fostered. Ideas of difference and connectedness are investigated. Throughout there are opportunities for exploring how symbolic representations are underpinned by ideas and beliefs



**Playing and making: Creating spaces for becoming together**

This activity creates spaces, inside and outside the school context, for children to collaborate and share experiences amongst themselves and with others through playing mathematical games or making mathematical crafts. The game or the craft becomes a way to access the complexity of living together in the urban landscape; and the *mathematics*



of the game or the craft becomes a way of signifying connections between words, bodies and algorithms.

## Mathematical bodies

This activity is rather different from the others in that the material does not have any content linked specifically with global education. Its function is solely related to pedagogical considerations. Here mathematics is explored as embodied and playful and experienced together. The activity is designed to build a learning group where everybody matters and everyone has an equal role to play. It offers an embodied experience of some simple mathematics



Further resources are at the initial planning stage: an exploration of time, currently focused on understanding the solar (Gregorian) and lunar (Hijri) calendars but having the potential to interrogate the contemporary understandings of time and their source in industrialisation; material related to land use and growth which raise ecological considerations; and gender oppression in ancient and contemporary societies explored through two narratives, one of Hypatia the Alexandrian mathematician and the other of the black women working for NASA in the early 1960s.



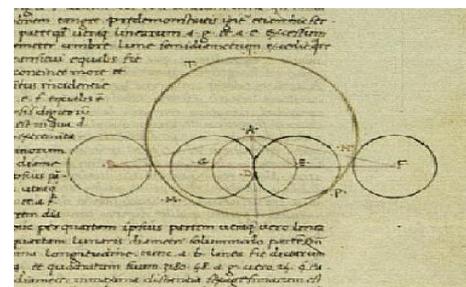
*Do any of these topics have the potential to fulfil the (somewhat utopian) aims of the authors?*

*Can we conceive of them as having a life of their own in the hands of teachers and children producing unpredictable openings for encountering the multiple other?*



*How do images operate to reinforce or destabilise understandings?*

*Or, how do they trouble (or not) dominant views of mathematics, critical mathematics education and citizenship or globality?*



<sup>i</sup> The full list of participants at the time of writing is: Sheffield Hallam University, United Kingdom: Hilary Povey, Gill Adams, Fufy Demissie; Aga Khan Foundation, Portugal: Alexandra Marques, Pascal Paulus, Salima Gulamali; The Development Education Centre (South Yorkshire), United Kingdom: Rob Unwin; Mathematikum, Germany: Albrecht Beutelspacher, Jana Bremer, Rosina Weber; University of Bucharest, Romania: Olimpius Istrate, Anca Petrescu, Laura Ciolan, Cristian Bucur, Anca Popovici; University of Thessaly, Greece: Anna Chronaki, Eleni Kondaxi, Efi Manioti.