

## **De/mathematising the political: Bringing feminist de/post-coloniality to mathematics education**

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**Abstract.** Various interpretations have been given over to the term 'mathematising' in relation to a variety of social thematic contexts in mathematics education. By way of theoretical intervention, we offer the beginnings of a feminist de/postcolonial commentary in response to such social, cultural and political programmes of work, while recognising the important contributions they have made to advancing complex political approaches to mathematics education as praxi. These social thematic approaches have promoted alternative ways of envisioning mathematical activity. Our critique is as much a celebration of these programmes of work that have offered diverse conversations about what it means to de/mathematise, as it is a way of moving these conversations forward in newer, alternative politico-epistemological directions. We argue that feminist de/postcoloniality offers opportunities to centralise ethical, democratic and (geo)political considerations in de/mathematisation activities and events, while bringing concerns about social and economic development, culture, gender, and global (in)justices to bear on mathematics education arguments. We suggest that feminist de/postcoloniality provides theoretical concepts by which we can speak of ontological and epistemic considerations politically in mathematics education.

### **1. Introduction**

Much has been said on the nature of mathematising and demathematising and their necessary underpinnings beyond a conception of 'horizontal and vertical mathematisation' (Gellert & Jablonka, 2007). A need for critically engaging the concept is advocated in the CIEAEM 69 conference theme announcement. We are taking as parallel working definitions of mathematising: first, a process that renders a set of activities increasingly mathematical; as well as, second, the increased political influence of the voice of mathematics and mathematics education (and STEM) in the social domain. Dialectically, demathematising would have the dual reverse effect of diminishing the mathematical effect or qualities in a set of activities, and/or its political diminishment. These multiple, dialectical understandings are constantly at play in the way in which they concomitantly and often contradictorily inform each other. An example of this may be mathematics and mathematics education's increasing technological and economic utilitarianism under global neoliberal governance (Swanson, 2010), which has the dual effect of entrenching its perceived importance while in servitude to specific technoscientific and economic agendas.

In this paper, we attempt to move beyond current understandings of what it means to mathematise in relation to varied social thematic contexts at the service of mathematics education. These social thematic contexts span from realistic mathematics education, to real world activity, critical mathematics education (CME), Ethnomathematics, arts or craft based mathematics, playful contexts, media-based materials, pseudo-contexts based on word problems, and related themes. By way of theoretical intervention, we offer an entree to feminist de/postcoloniality in response to such programmes of work, recognising the important contributions they have made to advancing complex didactic and socio-political approaches to mathematics education as praxis in relation to society, and the way in which they have promoted alternative ways of envisioning mathematical activity. They have encouraged us to think beyond the confines of school, classroom and curriculum as containers of knowledge and knowledge circulation, ways that envision mathematical pedagogy as praxis that relates to people and their histories of the present in complex societies.

Nevertheless, we provide some distinction from these programmes of work by attempting to move these conversations forward in newer, alternative politico-epistemological directions, ones which more centrally consider feminist and de/postcolonial perspectives.

While socio-political projects are still relatively recent in mathematics education (Ernest, Sriraman & Ernest, 2016), there is a need to explore how a feminist de/postcoloniality might offer opportunities to centre ethical, democratic and (geo)political considerations in de/mathematisation activities and events, while bringing concerns about social and economic development, culture, gender, and global or local (in)justices to bear on arguments in relation to mathematics and mathematics education discourses. We suggest that feminist de/postcoloniality may usefully provide theoretical concepts that enable us to speak of ontological and epistemic considerations *politically* in mathematics education in 'glocal' contexts.

## **2. Mathematising, demathematising and 'the political'**

From the time of Galileo who argued that the book of nature is written in the language of mathematics, to Freudenthal who coined the word 'mathematising', a dominant conception of mathematics as the 'Queen of the Sciences' has pervaded discourses in the public domain, and these inheritances largely remain in educational contexts where mathematics is taught. Pervasively, in the school setting, 'pseudo' contexts of real-life have often served as exemplars of mathematising as if providing a straight-forward entry to 'the real'. In the many educational and social contexts, mathematics often has been divined as revealer of Truth. Its reification within Enlightenment discourses has perpetuated such dominance (Swanson, 2005) thus giving rise to critical conversations about the potential benefits and dangers of de/mathematising within society in the context of a world structured according to socio-economic, epistemic, embodied and political hierarchies and widespread inequalities of every form (Ernest, Sriraman & Ernest, 2016).

The need to open up diverse meanings and spaces for conversations about the nature of de/mathematising has become ever more urgent in the face of the perpetuation of a widespread singular logic structured around a hyper-pragmatic, economically-informed 'reality' and pervasive neoliberal 'common sense'. In this light, we argue that there is a need to see de/mathematising as a broad processual, interactive and evocative space where discourse, power, and 'the body' come to influence ecologies of knowing and being by way of coming to know the world through mathematics (Swanson, 2013a; Chronaki, 2009, 2010). Mathematising is therefore unavoidably political, and cannot escape such influences and positionings through a call to objectivity and the lure of certainty (Swanson, 2005). In another sense, mathematising often works like religion as a moral axis (Chronaki, 2005).

De/mathematising's necessarily political nature is a condition we purposively embrace rather than attempt to render as neutral, which we argue acts as a political positioning in itself. Forefronting the acknowledgement that mathematising activities are informed by relations of power and cultural-historiographical investments, it is in the understanding of this purposive political act that we bring feminist de/postcolonial perspectives to bear on such conversations. We are not following an expected paradigm of academic engagement by offering 'solutions', but rather attempting to grapple with complexity in problematising the myriad of issues at hand and in opening up alternative conversations about what it means to mathematise and its many effects in contemporary society in this political moment. The effects of de/mathematising social activities can be traced to some degree through the effects of power in which mathematics education discourses and practices cohere, constructing particular 'regimes of truth' (Foucault, 1980), through the evocative power of context (Bernstein, 2000) and in embodied ways. Yet, the ethical implications of power dynamics are often left unattended in the literature, with some attention being given to Levinasian perspectives for example (Maheux, Swanson & Khan, 2012).

## **3. Ethics of mathematising and democracy**

Considering ethics in terms of rights and democracy, many areas of theoretical interest to mathematising as social processes often see the advocacy of mathematics as an automatic good, albeit that the manner and nature of mathematising and pedagogy count. Within these terms, the effects on people's lives and ecology are understated. Here, much advocacy of mathematising from these perspectives leaves fundamental assumptions unquestioned and unquestionable. A critical relationship with democracy for mathematics

education (Skovsmose and Valero, 2001) involves an active (re)direction of its intents and purposes. What is seldom asked, however, is the question of whether choosing *not* to participate in experiences of mathematics education or its (re)direction were itself also a critical relationship with mathematics education.

Seldom is the view held that the refusal and disobedience to the evocative power of mathematics is also a democratic action. Swanson & Appelbaum (2012b) argue that mathematics education for democracy and development must take seriously specific acts of refusal that directly confront the construction of inequality common in most development contexts. They argue that globalisation and development discourses, via citizenship and nationalism, construct oppressive relationships with learners and mathematics education. Such relationships are coercive and based on assumptions of the inherent goodness of learning mathematics and of mathematising as a virtue or the right to mathematics education is one and the same as the expectation to do so, for the person and/or society's own good. Seldom is the action of refusal to participate in mathematising activities understood in the light of a refusal to participate in mathematics education's colonising and/or globalising neo-liberal gaze. Bringing Jacques Rancière's (2009) notion of 'radical equality' to mathematics education theory helps to advance the ethical and emancipatory position of intentional disregard for ideological narratives such as the ones produced by mathematics education discourses. Consequently, by reconsidering the assumptions behind mathematics education, one can reframe refusal, disengagement, disobedience or resistance not as deficit or failure but as a critical position of radical equality in relation to arguments on mathematising, access and choice.

#### **4. Feminist de/postcoloniality and mathematics education**

The origins of postcolonial studies in the field of science and technology, as Harding explains (1998), can be traced back to the 1940s when a West Indian historian looked at how the immense profits from Caribbean plantations had played such a crucial role in making European industrialisation possible. This early investigation revealed how the British had intentionally destroyed the Indian textile industry in order to create a market for imported British textiles. Postcolonial studies have helped to reveal that imperial control has driven the politics of scientific knowledge historically, likewise postcolonial scholars have undermined the assumption of a single universally-valid scientific and technological tradition by offering evidence of alternate, localised ways of knowing scientifically. Furthermore, they have documented how the modern European 'utopia' of a perfectly coherent account of nature's regularity and order is beginning to take on the character of 'tragedy of the commons' (Lloyd, 1833; Hardin, 1968).

Throughout the years, the categories of 'woman' or 'black' have become the subject of an extensive literature mainly through the accounts of travelers, missionaries and colonial officials. Andrea Cornwall (2005), in her review of postcolonial feminist studies in Africa during the last three decades, explains that efforts to 'read' women range from studies that tend to define women as invisible, weak, and powerless to studies that challenge stereotypical assumptions about women's ability to participate in economics, mathematics and politics. Such representations are often firmly— but tacitly—located in a Western feminist perspective and evoke contradictory images, while their relevance and utility have been increasingly questioned by activists and academics. Postcolonial feminisms differ from the liberal, radical or socialist feminisms as they focus mainly on conceiving gendered and power relations within global political, economic and social programmes. They interrogate the assumption that the liberal pursuit of progress, development and colonialism are distinct and dominant projects. Thus, the question is how the distinctive concerns of postcolonial feminisms call for distinctive approaches to questions of science and technology, and call for a revisiting of children and adults' relation to mathematising via a feminist de/postcolonial lens.

While anticolonial has been touted as having some relevance to mathematics education discourses, there has been little attention given to postcolonial and decolonial thinking in the ways in which it offers a critique of mathematical knowledge and mathematising, informed by colonial relations and the politics of knowledge. Increasing neo-liberalisation of institutions and the global modernisation agenda has set the terms of global economic and social participation, by increasing the monitoring and regulation of individuals, groups and targeted communities. Such measures serve to perpetuate the global neo-colonial project.

The current conception of development, framed as 'economic progress' within the neo-colonial project, has excluded a range of other possible meanings and ways of engagement (Swanson & Appelbaum, 2012). This has been the experience of mathematics education in its increasing standardisation across the globe in assessment regimes, curricula, and pedagogy. This 'standardisation' has been invested in power, suppressing the cultural and localised ways of knowing in majority world contexts or global South via 'development' agendas, while installing the values, codes and epistemic relations of the minority world or global North 'as universal'. Development as a concept presumes a *need* for development on the part of the targeted communities. In this sense, any development programme situates the communities that are ostensibly aided as 'lacking' and in need of assistance. At the same time, political discourses within developing countries often frame the needs of their (often black and/or female) citizens in terms of deficit and economic lack (Swanson & Appelbaum, 2012), blaming their citizens for their own and the country's economic 'failures' (Swanson, 2013b) for which national school mathematics results become the weapon.

Considering the global social imaginary of the current neoliberal world, it may be timely to bring some de/postcolonial theoretical concepts to bear on mathematics education in global development contexts in providing a geo-political focus that more centrally considers the role of the nation-state, the geo-political imaginaries of empire and the broader neocolonial/neoliberal global(ising) condition in respect of mathematics education in global context. Some post/decolonial ideas valuable to critiques and conversations in mathematics education are enscribed around such foci as (for example): centre-periphery discourses, loss and exile, disavowal and dispossession, epistemic violence, epistemic suppression, epistemic racism, abyssal thinking, representation and voice in geo-political context, othering and exoticism, global social and ecological injustices, discourses on dominance and the subaltern, benevolence and salvationist discourses, global/local asymmetrical relations, cultural imperialism; and the problem of 'dividing the world' (East/West; South/North; developing/developed; margins/centre; majority world/minority world) (Swanson, 2010, 2013a). These, and others, offer opportunities to provide frames of reference with which to converse with mathematics education from wider geo-political and global justice-oriented perspectives (Chronaki, 2008; Swanson, 2013a, 2013b).

## **5. Conclusion**

Mathematising and demathematising have been given some attention in relation to social processes of mathematics education via such work programmes as ethnomathematics, critical mathematics education, and realistic mathematics. They have done much to underscore an interpretation of mathematics as being invested in cultural, historical, economic and social norms and values. Critical mathematics education in particular has pushed the conversation forward in considering mathematics in its broader political enterprise, but the theoretical concepts borne from feminist de/postcolonial thought situate conversations on mathematics education in terms of contestations between global political imaginaries, while bringing into play the epistemic and ontological implications of such political considerations. Feminist de/postcolonial thought begins to reverse the symbolic violence of Northern-emanating discourses within the mathematics education field, by introducing the thought of theorists, such as Spivak, Mignolo, and Quijani, that hail from the global South. It opens up the opportunity to consider global ethics and democracy in relation to mathematising activities and discourses. As such, it also brings in the sphere of the geo-political while attending to the local or individual level, (i.e. the glocal), in considering culture, gender, socio-economics and class, amongst other difference discourses, in historical and political contexts and their investments in global social relations of power.

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