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Repositioning Ethnomathematics in European Context as a Matter of Social Justice

Reposicionando las etnomatemáticas en el contexto europeo como una cuestión de justicia social

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Abstract

The aim of this theoretical article is to, on the one hand, highlight the need for rethinking about Ethnomathematics (EM)—considering it as a dynamic field of knowledge and action, and taking into consideration the context in which EM has emerged and developed in counterpoint with current global conditions. On the other hand, this article demonstrates the importance of an EM perspective within the European context; this requires a shift from the experience of colonialism, within which Europe had the central and formative role, toward the more recent phenomenon of coloniality, that is, with the structures, epistemologies, and power relations that maintain societal and cultural hierarchies, in particular, those institutional and social structures that constitute and inform education and mathematics education. Europe, identified as a totality with the exercise of power, has made the recognition of asymmetric power relations within its own geographic boundaries less explicit; this situation has also hampered the development of EM in the European context. The identification within Europe of the Symbolic South (de Sousa Santos, 2015), and the associated forms of epistemicide of (mathematics) knowledge that comes from out-of-mainstream (marginalized) populations within Europe, for example Roma mathematical practices, activated together the efforts reflected in this article. Methods of ethnomathematics, informed by the analysis of the Symbolic South present in European communities and ongoing structures of coloniality that create epistemicide, can respond to issues of inequity and social justice. ME in the European context and in dialogue with non-structural theories can also broaden the typical EM perspective and methods.

Keywords: *ethnomathematics, coloniality, epistemologies of South, epistemicide, abyssal line*

> "The discursive tie between the colonized, the enslaved, the noncitizen, and the animal—all reduced to type, all Others to rational man, an all essential to his bright constitution—is at the heart of racism and flourishes, lethally, in the entrails of humanism" (Haraway, 2018, p. 18).

Resumen

El objetivo de este artículo teórico es por un lado resaltar la necesidad de repensar la EM –considerándola como un campo dinámico de conocimiento y acción, y teniendo en cuenta el contexto en el que las EM han surgido y se han desarrollado en contrapunto con las condiciones globales actuales. Por otro lado este artículo demuestra la importancia de una perspectiva de EM dentro del contexto europeo; esto requiere un cambio desde la experiencia del colonialismo, en el cual Europa tenía el papel central y formativo, hacia el fenómeno más reciente de la colonialidad, es decir, con las estructuras, epistemologías y relaciones de poder que mantienen las jerarquías sociales y culturales, en particular aquellas estructuras institucionales y sociales que constituyen e informan la educación y la educación matemática. Europa, identificada como una totalidad con el ejercicio del poder, ha hecho menos explícito el reconocimiento de las relaciones de poder asimétricas dentro de sus propios límites geográficos; esta situación también ha estorbado el desarrollo de las EM en el contexto europeo. La identificación dentro de Europa del Sur Simbólico (de Sousa Santos, 2015), y las formas asociadas de epistemicidio del conocimiento (matemático) que proviene de poblaciones fuera de la corriente principal (marginadas) dentro de Europa, por ejemplo las prácticas matemáticas de los Romá, activaron conjuntamente los esfuerzos reflejados en este artículo. Métodos de las etnomatemáticas, informados por el análisis del Sur Simbólico presente en las comunidades europeas y las estructuras en curso de la colonialidad que crean epistemicidio, pueden responder a

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cuestiones de inequidad y de justicia social. Las EM en el contexto europeo y en diálogo con teorías no estructurales también pueden ampliar la perspectiva y métodos típicos de las EM.

***Palabras clave**: etnomatemáticas, colonialidad, epistemologías del Sur, epistemicidio.*

1. INTRODUCTION

EM as a field of research emerged in colonies or former colonies, aiming to repair in a way the consequences of colonization (KHAN, 2011; Appelbaum and Stathopoulou, 2020; Stathopoulou and Appelbaum, 2017). In its origin (despite the intention of D'Ambrosio to respond to issues of oppressing regarding mathematics and mathematics education-ME), EM suffered misunderstandings or/and misinterpretations, and was often in some cases coopted as a tool of increasing discrimination. For example, during the period of Apartheid in South Africa, a socio-political system employed EM as one of many ways to distinguish categories of people through social forms of discrimination. This way of applying EM directly contradicted the intentions of those who developed EM. EM aimed to be a liberating confrontation with Eurocentrism: Powell and Frankenstein (1997) described EM as a challenge to Eurocentrism; D' Ambrosio (1985) introduced EM as a new paradigm for thinking about the meaning of M (mathematics), supporting that Mathematics Education (ME), and potentially providing tools for mathematicians and mathematics educators to take action in moving away from colonialism and its legacies. More recently, scholars have advocated for local knowledges as the authorities that can re-appropriate the well-established imposition of Western Mathematics for their own purposes (Appelbaum and Stathopoulou, 2020).

Recognizing EM as so strongly connected to colonialism, and as a response to eurocentrism, how and toward what purposes might this approach find a place in a European framework? What might be the importance of EM for ME and societies in Europe? Considering Ethnomathematics as a dynamic field of knowledge, how could we envision the future of EM itself, not only for Europe but globally, in the spirit of a post-humanism approach?

These are the questions that will be discussed in this paper, with the overall objective of justifying the importance of EM in the European context, avoiding the role that academic mathematics has played in the past as a tool of producing inequalities and exclusions. Such inequalities are present not only between Europe and its former colonies, but within Europe as well, and extend beyond culture and economics through coloniality and the mechanism that produce and reproduce asymmetrical relationships as a matter of new liberalism, affecting the entire planet, not only human beings.

The next section begins with a justification for EM's importance in the European context. The

interest of European researchers and educators is then described, including some indicative examples (an exhaustive review of EM in Europe goes beyond the scope of this article). What follows is a repositioning of EM for the European context and beyond, taking into consideration that we are living in a way that is rapidly changing, that is, in a way that does not even live up to the expectations of modernity. The article closes with concluding remarks regarding a vision of a future for EM and ME.

2. EM AS SELF-CRITIQUE IN A EUROPEAN CONTEXT

Ethnomathematics has been described as originating in resistance to the consequences of colonization, or as a way to repair the consequences of colonization; it is also a response to education's —and especially Mathematics Education's– inadequacies for oppressed people outside Europe. Colonization processes dictated a binary division of people into two main categories: colonizers and colonized, creating a hierarchy of settlers and those subject to the exercise of settler power.

Although colonization is officially relegated to a geopolitical past for much of the world, structures of inequity and hierarchy that preserve forms of power and authority permeate culture, politics, economics, and other global affairs, perpetuating their impact at every micro and macro level of everyday life and politics. These structures collectively make up what is often called 'coloniality' (Quijano, 2000) or the 'colonial matrix of power' (CMP) (Mignolo, 2018, p. 97). Both colonization and coloniality construct a hierarchy of knowledges and practice privileging Western European modes as superior, often going so far as to obliterate the existence of available alternatives. Coloniality produces the ongoing suppression or total erasure of local knowledges, and the totalizing expectation that the colonized learn and assimilate the epistemologies, knowledges, and associated ignorances of the colonizers. In order to function in society and to find a means of basic survival and subsistence, subjects of colonization and now of coloniality had and still have to cross boundaries of culture, knowledge, and modes of thinking, and 'live' in the world views and epistemologies of the colonizers, either by force or simple survival strategy (Appelbaum and Stathopoulou, 2020).

Ethnomathematics has challenged the supremacy of European knowledge as a naturalized, universal collection of truths, enacting what might be described as cognitive imperialism. For one recent example, Battiste (2018) documented the consequences of imposing a Eurocentric knowledge system for indigenous children in Canada. Ignorance of local knowledge, and the ongoing destruction of local knowledge is on a symbolic form of genocide defined by de Sousa Santos (2015) as epistemicide, who notes that unequal exchanges between different cultures

have always implied the 'death' of knowledge in the culture considered as 'inferior'. Bennett (2007) concludes that those knowledges not aligning with the dominant culture, for example, outside of the European framework, will by and large be silenced completely. That knowledge is identified on the other side of an abyssal line, a term inserted by de Sousa Santos (2007) to describe a 'dangerous' dichotomy of people that are 'located' on the one side or the 'other' of the abyssal line, and therefore of abyssal thinking. 'Abyssal thinking' consists of several distinctions/dichotomies that make up a divided world, a world of two separate realms (p. 45): people who have the power to describe, or better to make up the other in their own ways, and the others on the other side of the line. Distinctions are "established through radical lines that divide social reality into two realms, the realm of *this side of the line* and the realm of *the other side of the line*. The division is such that *the other side of the line* vanishes as reality, becomes nonexistent, and is indeed produced as nonexistent" (de Sousa Santos, 2007, p. 45). As Boaventura de Sousa Santos (2015) highlights, to move beyond abyssal thinking and colonial ordering requires a shift in one's epistemological viewpoint and learning, from one side of the line to the other, as well as respect for both equality and difference.

In this article, I propose that the term 'abyssal' line applies not only to (former) colonial societies, and that it is also useful for recognizing an analogous form of coloniality within Europe itself. Marginalized people – Roma, migrants, etc. -- live in Europe, yet can be described as belong to the "Symbolic South," (de Sousa Santos 2015), another term introduced to best represent the current situation within former colonial powers. This term points to the dominant Western world itself as a dichotomized world. In these geopolitical locations, found in nations who continue to dominate the global economic and political landscape, members of disempowered and marginalized communities within otherwise privileged societies experience life in ways analogous to that of former colonial subjects, and continue to accommodate Western/European assumptions and expectations.

This abyssal line manifests itself in education in general, and in mathematics education in particular, suggesting the value of EM for the European context. For supporting this position, let me use, briefly, the example of Roma students in Greece, since I have been involved in the education of Roma children, mostly their experiences with mathematics education, through several contexts for more than 20 years. Roma students often experience the abyssal line, and not only symbolically. The case of a teacher welcoming a prospective teacher into her classroom characteristically documents the literal line: "*at the last desk a Roma student is sitting, he will not bother you, you will not bother him*." The segregation starts from the space arrangement—usually Roma students are sitting at the end of the classroom, far from teacher.

This distance is produced and reproduced, also, by the national and unique curriculum that meets mainstream students' backgrounds, needs and expectations, excluding Roma students from the mathematics classroom in numerous ways, and from education in general, while further restricting their social role (Stathopoulou, 2005).

Following an ethnomathematics perspectives seems applicable to the inequalities that Roma students experience in mathematics classrooms, fostering conditions of social justice, an objective of EM often articulated by D'Ambrosio (2007, 2017) throughout the development of EM. In this spirit, ethnographic research focusing on the connection of mathematics teaching and the learning of Roma students with their cultural context (Stathopoulou, 2005, 2007) documented the impact of taking funds of knowledge into consideration, and at the same time supporting conditions of equal participation. In this research, Roma students not only performed mathematics at a very high level, but also demonstrated more effective than mainstream students on particular mathematics problems, specifically, those problems that made sense to them (Stathopoulou, 2005, 2007, 2017). This contrasted with mainstream students who performed very well with typical algorithms, but commonly either chose a wrong fact or did not reflect on absurd results[2]The Roma students exploited knowledge culturally acquired from their involvement in family activities, inventing their own successful algorithms. An ethnomathematics perspective might celebrate the Roma students' successes and funds of knowledge. However, this is rarely the case in a typical mathematics classroom. What usually happens is ignorance or dispute of their knowledge, considered as inferior by teachers who primarily follow textbooks within a curriculum designed for the mainstream students. The mathematics classroom is as a result a place without the presence of Roma students' voices. Following a top-down curriculum—a common teaching practice—together with the ignorance of the mathematics knowledge children acquire through their involvement in their families' professional activities, further marginalizes these children and their families, positioning them as inferior in terms of both learning and cultural identities (Stathopoulou, 2005). These findings were more recently replicated by research focusing on teachers' conceptions about the formal education of Roma students. Papachristou (2014[3]) found that teachers: (a) do not recognize background knowledges of Roma students; (b) do not exploit Roma students' language orality

[2] In a typical division problem: "*Basilis wanted to help his father to distribute apples in crates, which his father had brought from the vegetable market. All the apples were 372 kg and each crate can hold 20kg. How many crates does he need in order to hold all the apples?* , non Roma students selected multiplication, performing well the typical algorithm and accepting as results 7440 crates.

[3] Papachristou, D. (2014). Literacy practices and orality of Roma students. Master Dissertation. Mytilene, Greece: University of Aegean.

during teaching processes; and (c) maintain stereotypical perceptions of the school process of Roma students and their potential. The dominant discourse regarding Roma students in Greece is similar to the racist discourse for Aboriginals described by Battiste (2018), a discourse that constructs them as incapable and inferior, constantly in need of development, and as employing a language and knowledge with no contemporary significance or value, dictating silence.

The Greek educational system, like most educational systems in European countries (Govaris 2013), is not yet able to effectively respond to a school reality characterized by linguistic and cultural diversity. Thus, the discourse of the applied pedagogies formulates a field characterized by the unequal distribution of opportunities, producing an abyssal line that locates Roma on 'the other side,' a clear expression of coloniality.

In Europe, one might imagine that indigenous groups do not exist, the colonization hasn't been experienced. However, Europe is not characterized by a uniform culture. Populations like Roma, who do not share the mainstream culture, are victims of the Eurocentric perception of mathematics/mathematics education, as much as formerly colonized peoples outside of Europe. So, issues related to the enforcement power of mathematics education are not limited to the non-European territory. Researchers and mathematics educators in Europe have come to recognize these concerns. Some important examples of how European scholars have begun to address them are described in the next section.

2.1 A short review of Ethnomathematics research in Europe

I attempted above to support why and how an EM perspective has and should continue to play a crucial role in mathematics education, and in particular, to enable ME to reach its overall aims in social justice and fighting inequalities—fighting coloniality's practices. An important corpus of research has emerged in recent decades of European scholarship within ME covering different aspects of EM.

In Italy, among other works, Franco Favilli et al. (2003), developed a project following an ethnomathematical theoretical framework to study the needs of mathematics teachers in lower secondary schools as they developed suitable didactic proposals. Extending his main interest in facilitating mathematics teachers' professional development, he has also developed other projects where an EM perspective is implicitly or explicitly present (Favilli and Tintori, 2007). Teacher training that exploits an EM perspective has also been the focus of Albanese and Gavarrete (2015).

Darlinda Moreira (2007) in Portugal, studied mental calculations of Portuguese '[4]gypsy'

[4] The term 'Gypsy' usually is avoided as it has a negative connotation. Here it is used in order to keep the term

children, applying an EM lens to later teacher training in the integration of different kinds of mathematical knowledge into their teaching. In another project (Moreira and Pardal, 2012), she studied the professional practices of stone masons from the perspective of mathematics, aiming to use the results of this study to contribute to the area of adult mathematics education, and to expand knowledge about how mathematics is used in the workplace. Also in Portugal, EM has been applied within professional mathematical practices, for example in the analysis of the mathematics of fisherman (Sousa, et al., 2013), and to the mathematical structures embedded in Northern Portuguese and Galician folk dances, later integrating these ideas in pedagogical practice (Ribeiro et al., 2020).

The EM perspective has also functioned as a posture, affecting ethnomathematical research around the world and in Europe. For example, in Portugal, an interdisciplinary academy research group with two communities—fishing and agricultural—from Costa da Caparica, a city located in the south margin of the Tejo river, developed the Urban Boundaries Project (UBP) (Mesquita, 2016; Mesquita et al., 2014; Pais, & Mesquita, 2013). 'The UBP presents itself as a critical ethnographic movement focused on the development of an emancipatory educative policy through the action of being together in body, brain, and social relations in a social, political, and economic context' (Mesquita, 2016, p. 13; Mesquita, et al., 2014).

Further theoretical considerations of EM centering the European experience demonstrate the influence of EM on the philosophy of mathematics and mathematics education. François & Van Kerkhove (2010) organize these efforts into three categories: the epistemological, the political, and the educational François et al. (2015).

European scholars have further critiqued EM as a dynamic, developing field. For example, Pais (2011) discusses epistemological and philosophical dimensions of ethnomathematics and the corresponding educational implications, and expresses concern about the ways that EM is sometimes incorporated within ME, proposing that '*a deeper theoretical discussion is needed in the majority of the research currently done in ethnomathematics so that well-intentioned actions do not end up having a result opposite to their aims' (209)*.

3. EM AND ME IN DIALOGUE WITH CURRENT SOCIAL AND GLOBAL ISSUES

In this section I outline peculiarities of our societies/world system and the possible reasons for exploring responses to current social and global issues through an EM perspective, including its dialogue with other ideas, perspectives, etc.

D'Ambrosio (2018, p.2) cites the following words of the famous astrophysicist, Lord Martin

used in Portuguese framework

Rees:

> The main threats to sustained human existence now come from people, not from nature. Ecological shocks that irreversibly degrade the biosphere could be triggered by the unsustainable demands of a growing world population. Fast-spreading pandemics would cause havoc in the megacities of the developing world. And political tensions will probably stem from scarcity of resources, aggravated by climate change. Equally worrying are the imponderable downsides of powerful new cyber-, bio-, and nanotechnologies. Indeed, we're entering an era when a few individuals could, via error or terror, trigger societal breakdown (Rees, 2013, in D'Ambrosio, 2018, p.2)

D'Ambrosio (2018, p.3) summarizes the main issues affecting society, attempting to capture current reality, as follows:

• National security, personal security

• Government/politics

• Economics: social and environmental impact

• Relations among nations

• Relations among social classes

• People's welfare

• The preservation of natural and cultural resources

Figueroa Helland, & Lindgren (2016, p. 432), also describe this situation in a similar way: "Today we face a planetary crisis:" Environmental, energy, food, financial, and social reproduction crises are disrupting the world-system. The planetary crisis is considered as the result of a globalizing and hegemonic mode of civilization constituted and underpinned by anthropocentric, androcentric, hetero-patriarchal, Euro/Western-centric, modern/colonial and capitalist systems of power.

What about the challenge to move from away this western/modern model? As Mignolo, (2018, p. x) notices, 'delinking from the Western universal is nonetheless a difficult decolonial task' since the 'universalization of Western universality was part of its imperial project'. Using the term 'colonial matrix of power' (CMP), Mignolo (2018, p. 97) describes a complex structure of management and control composed of domains, levels, and flows, considering colonialitynot as consequences of modernity but as constitutive of it: '*Highlighting global coloniality means that global modernity is only half of the story, the visible'* (99).

Paul Gilroy in his work *Postcolonial Melancholia* (2005) highlighted the need to consider how a deliberate engagement with the twentieth century's histories of suffering might furnish resources for the peaceful accommodation of otherness in relation to fundamental commonality. He suggested that "multicultural ethics and politics could be premised upon an

agonistic, planetary humanism capable of comprehending the universality of our elemental vulnerability to the wrongs we visit upon each other." (p.4). Similarly, Helland, & Lindgren (2016, p. 434) stress that 'Overcoming this crisis requires not only a critique of neoliberal capitalist modernity, but a world-systemic transformation towards ecosufficient lifeways based on indigenous, eco-feminist, and post-human alternatives.' Seshadri (2012, p. 111) proposes that it might be time to "acknowledge that we cannot do anything at all about the appalling ways human beings treat other human beings or animals without rethinking and renewing our norms, presuppositions, platitudes, and morals with regard to life and what is living".

In that Anthropocene epoch[5], which for some has already moved to post-Anthropocene a term (Fagan, 2019; Appelbaum and Stathopoulou, 2021) to describe that maybe is late to face the consequences of human beings' sovereignty over the nature—education and especially ME must respond to many enormous challenges. Education used to have as a primary role the socialization of youth into their local society, with educational institutions passing on the social and cultural values and knowledges of the local group; as a form of social reproduction (Gough, 2021) education served a society that "wants to keep and continue itself by reproducing as it is" (Kurt, 2015, p. 224).

As Greenwood (2014, p.281) notices, "we now live on a bio-physically different planet from the one in which modern civilization developed and in which our common assumptions about education were formed" (Greenwood, 2014, p.281). But this monocentric world order is today exploding, Mignolo (2018, p. 92) notice: "two trajectories emerge in coexistence: one is being called a multipolar world order, and the second is pluriversality as a universal project. The first is a state-led project of dewesternization. The second is the project of the emerging political society of decoloniality" (Mignolo, 2018, p. 92)

Certainly, we can read Ubiratan D'Ambrosio's (2007) essay, "Peace, Social Justice and Ethnomathematics," as one model for pursuing both of the projects that Mignolo identifies and cajoling us to center such pursuits in working for a particular and nuanced world in peace. D'Ambrosio previously discussed ethnomathematics as "the representations of the real that humans construct trying to give explanations of myths and mysteries, that are organized as arts, techniques, theories, systems of knowledge, with the aim of explaining and dealing with facts and phenomena" (D' Ambrosio, 2006, p.17).

Ideology, implicit in dress, housing, titles (…) takes a subtler and damaging turn, with even

[5] The Nobel Laureate in Chemistry Crutzen, considered in 2013 that we were moving from the geological epoch of Holocene to that of Anthropocene

longer and more disrupting effects, when built into the formation of the cadres and intellectual classes of former colonies, which constitute the majority of so-called Third World countries. We should not forget that colonialism grew together in a symbiotic relationship with modern science, in particular with mathematics, and technology (Scott, 2013, p. 243).

EM from its origins established a strong epistemological and cultural critique of any conception of mathematics as universal, neutral, or otherwise separable from culture, history, ideology, and power (Appelbaum ,1995; Pais, 2013; Appelbaum and Stathopoulou, 2015); even in its most reductive mode, the study of local cultures and their indigenous knowledges, which might be challenged as serving colonialist notions of European supremacy, the methods and curious stance of EM can be applied to the study of Westernm European mathematics in analogous ways, helping ME to collect a more critical and nuanced understanding of the history of mathematics as a culturally and politically embedded practice (Appelbaum 1995, Eglash 1999). This is a dramatic shift from mathematics as a celebration of power toward a humbler and perhaps more appropriate perspective on the role of mathematics in creating the very problems that mathematics was central to creating. Rather than fostering a naïve sense of mathematics and mathematical thinking as a treasure of human progress, ME can more directly contribute to a critical sense of the ways that a so-called assumption of neutrality leads to the nightmares that such 'progress' generated; what this means is to become free of the certainty that was for many mathematics teachers the very reason they were attracted to (Western, European) mathematics in the first place, and replace that certainty with an embrace of the uncertainty that mathematics can help to live with (Skovsmose & Niss, 2008).

4. AS AN EPILOGUE: LET'S ENVISION THE FUTURE UNDER AN EM PERSPECTIVE

Western / European civilization has to this day dragged the cart of supposed progress; and it is now one step ahead of the cliff, if not one step after, depended on if we identify our epoch as that of the Anthropocene or the post- Anthropocene. Europe, responsible for the imposition of modernity/of Western thinking and praxis via colonialism and coloniality, and in pursuing other practices that go beyond human beings, has the ethical duty to repair the corresponding consequences, one of which is (Mathematics) Education. Can ME use EM to help people face the consequences of human beings' fanciful sovereignty over nature? The Anthropocentric politics are concretized in the notion of dominion, which allows humans to view animals and the environment as objects given by God for humans to do with as they wish (Smith, 2011), and further identifies the logic of colonialism as the paternalistic civilization of indigenous

peoples. Potentially, the most pressing priority for mathematics education is therefore the deconstruction of the abyssal line, that is, to circumvent or otherwise decentre the Eurocentric binary that is the cause and the result of coloniality's practices, and to directly challenge discourses organized around the other/the former colonial subjects as inferior. If some people are treated by practice and policy as less-than-fully-human, this has consequences for human rights. Such a view is expressed by today' (Snaza et al, 2014, p. 48): challenging the Eurocentric binary "must be of the highest priority in any radical democratic public education." In our technologically oriented world, mathematics plays a crucial role. Because of this, (mathematics) Education as a product/construction of a monocentric world should in this moment at least reconsider how its objectives and practices have served a the spirit and structures of coloniality. The alternative, a decoloniality perspective, makes space for mutual interrogation (Alangui, 2010), and dictates resistance to the arguments of authority perceiving power and knowledge as mutually constituted (Parra, 2018, p. 85). The abuse of power imposed by European/ Western civilization has resulted in a divided world even inside Europe; the marginalization and degradation of the practices and knowledge of indigenous and out-of-mainstream peoples has been, to a large extent, and the same time an arrogant and a questionable rationalization. Furthermore, important elements of Western knowledge—e.g. science, technology, and "rationalism"--have led to the subjugation of nature to catastrophic consequences: the pursuit of nuclear energy, the widespread degradation of the environment, deforestation and destruction. of flora and fauna, genetic engineering, etc. (Enslin, and Horsthemke, 2015).

Within the construct of education as socialization into society, school mathematics worldwide has essentially come to be defined as Western/European mathematics—one more expression of coloniality, a collection of methods for solving Western/European problems; and in the best case, some examples of problems from outside of the dominant culture are used for the purposes of teaching the already-accepted curriculum. The curriculum remains unquestioned. If we reclaim the original challenges to Eurocentrism that characterized Ethnomathematics, we might imagine ways for school mathematics to realize its potential as a tool for social justice and dignity, addressing not only issues of mathematics education in a framework of social justice, but moreover as a tool for fighting those practices of coloniality--in former colonized places but also inside Europe, addressing those issues within Europe analogous to what Santos calls the Symbolic South. As D'Ambrosio worried throughout his career (e.g. D'Ambrosio, 2012), and as Munir Fasheh (1982, 1991) demonstrated in his work as well, the sorts of mathematics that students can demonstrate on tests of school mathematics rarely serve to raise

the recognition of those who live in oppression, and further perpetuate disempowerment of the subjects of coloniality through denying them the recognition and dignity of local knowledges—at best, local practices are noted as interesting "crafts" or forms of spirituality. Ubi and Beatriz D'Ambrosio (2013) helped us to recognize consequences of colonization as well as to bring an essential, critical stance to this context. Linking the commitment to social justice and dignity with the expanded notion of planetary existence seems a natural extension of his work. They stressed that the role of ME should be to improve the world for the benefit of future generations. He projected EM as a theoretical framework dictating a different curriculum, aimed at social justice, and balanced with respect for nature and its resources. More recently, at the 2018 Mathematics Education Scholars of Color conference, Ubi spoke of the need to restore the cultural dignity of children:

> An important component of Mathematics Education is to reaffirm and, in many cases, to restore cultural dignity of children. Much of the contents of current programs are supported by a tradition alien to the children. On the other hand, children are living in a civilization dominated by mathematically based technology and by unprecedented means of information and communication, but schools present an obsolete worldview. (D'Ambrosio, 2018, p. 18)

Aligned with D'Ambrosio, one could suggest that EM is compatible with a world of dignity and recognition, and by extension, not only the recognition of human beings, but with all our neighbors – animals, plants, rivers and mountains, volcanoes, streams, indeed the entire planet. If European nations are to live up to the task of facilitating a planetary shift from exploitation of resources toward a sustainable balance with the rest of nature, then it is in this broad sense essential that ME take this on as its primary framework for curriculum design and development, teacher training, and the assessment of student performance in mathematics.

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