

***FUTURE PASTS & PRESENT FUTURES: A DIALOGUE WITH UBI, EXTENDING SOCIAL JUSTICE IN OUR POST-ANTHROPOCENE***

**FUTUROS PASSADOS E FUTUROS PRESENTES: UM DIÁLOGO COM UBI, ESTENDENDO A JUSTIÇA SOCIAL NO NOSSO PÓS-ANTROPOCENO**

**FUTUROS PASADOS Y FUTUROS PRESENTES: UN DIÁLOGO CON UBI, EXTENDIENDO LA JUSTICIA SOCIAL EN NUESTRO POST-ANTROPOCENO**

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**ABSTRACT** | In honor of Ubiratan D'Ambrosio and his understanding of Ethnomathematics as a dynamic field concerned with social justice, and his extension of this concern not only to (Mathematics) education but also to the planet as a whole, we attempt a dialogue with his ideas. Considering the continuity of EM and the ways in which pasts and presents affect potential futures, responses to contemporary global crises and the urgency of a better world system, we extend Ubi's interests in dignity and recognition to ask how Ethnomathematics as an ethical stance can be the source of ideas for ME and education in general, a cause to which we believe Ubi would be committed.

**KEYWORDS:** Anthropocene, Ethnomathematics, Coloniality, Mathematics Education, Social Justice.

**RESUMO** | Em honra de Ubiratan D'Ambrosio e da sua compreensão da Etnomatemática como um campo dinâmico preocupado com a justiça social, e da sua extensão desta preocupação não só à educação (Matemática) mas também ao planeta como um todo, tentamos um diálogo com as suas ideias. Considerando a continuidade da EM e as formas como o passado e o presente afetam potenciais futuros, as respostas às crises globais contemporâneas e a urgência de um sistema mundial melhor, estendemos os interesses de Ubi em dignidade e reconhecimento para perguntar como a Etnomatemática como uma postura ética pode ser a fonte de ideias para a EM e a educação em geral, uma causa com a qual acreditamos que Ubi estaria comprometido.

**PALAVRAS-CHAVE:** Antropoceno, Etnomatemática, Colonialidade, Educação Matemática, Justiça Social.

**RESUMEN** | En honor a Ubiratan D'Ambrosio y su comprensión de la Etnomatemática como un campo dinámico preocupado por la justicia social, y su extensión de esta preocupación no sólo a la educación (matemática) sino también al planeta en su conjunto, intentamos un diálogo con sus ideas. Teniendo en cuenta la continuidad de la EM y las formas en que los pasados y los presentes afectan los potenciales futuros, las respuestas a las crisis globales contemporáneas y la urgencia de un sistema mundial mejor, extendemos los intereses de Ubi en la dignidad y el reconocimiento para preguntar cómo la Etnomatemática como postura ética puede ser la fuente de ideas para la EM y la educación en general, una causa con la que creemos que Ubi estaría comprometido.

**PALABRAS CLAVE:** Antropoceno, Etnomatemáticas, Colonialidad, Educación Matemática, Justicia Social.

## 1. AS AN INTRODUCTION

Ubi was as much of a force of inspiration to others as he was original in his thoughts. As a strong resource of ideas for both researchers and educators, especially those who focus on studying mathematics in its broader framework—social, cultural, political—his theory and practice went hand in hand. He opened new ways of understanding and using mathematics while valuing each kind of knowledge as a matter of social justice -- a notion that sometimes implicitly and in general energized his work throughout his life. His sensitivity for equity issues and for improving Mathematics Education (ME), aiming to respond not only to academic needs but also to the current problems of humanity, was channeled through his open mind into a perspective on Ethnomathematics (EM) as a dynamic field untainted by dogmatism.

In this tribute to Ubi, we make connections between his ideas and an important relationship with time perhaps best articulated by T.S. Eliot: in his *Four Quartets*, Elliot describes the continuity of time, noticing that Past time and Present time are perhaps present in the Future time, and even more provocative, Future time is ever present in our past and present. Together: all time is present in every moment of time. We attempt here to link such a view of time with Ubi's generous perception—avoiding a proposal for a dogmatic version of EM. We initiate a dialogue with D' Ambrosio's ideas in order to think and rethink about EM and its role in ME as well as society in general, over time.

Our dialogue with Ubi follows this organization: (a) We begin by locating EM's origins in a retrospective framework that can see its subsequent early applications through Ubi's ideas (our first example of a future embedded in its past): EM influenced ME and enriched the field with sociocultural approaches, (b) Exploring the current situation of ME globally through a lens of EM, we consider how an EM perspective has affected, and/or potentially would have affected ME, and in general, Education, in different trajectories of time; and (c) We try to express our vision of a new world—a world of dignity, recognition, reconciliation and solidarity—identifying current problems of the world that at first glance go beyond ME, and beyond Education, indeed beyond humanity, to meet the demands of posthumanism at the time of Anthropocene (Leinfelder, 2013; Snaza, 2017). Finally, (d) we expand our interpretation of Ubi's ideas to consideration of the post-Anthropocene.

To begin, we reference a call from Ubi, from 1996:

“Although the main concern of this meeting is Mathematics Education, I believe I will be allowed to subordinate my comments to a higher objective: the survival of civilization on Earth with dignity for all. This is not merely jargonizing. The world is threatened, not only by aggressions against nature and the environment. We are equally concerned with increasing violations of human dignity. We face more and more cases of life under fear, hatred and violation of the basic principles upon which civilization rests. Mathematics is present in all the major achievements of civilization. Advances in mathematics are associated with progress. But, paradoxically, mathematics has been the main instrument in weaponry and in economics. I have often referred to mathematics as the imprint of modern society, for good and evil”<sup>1</sup>

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<sup>1</sup> Interview given by Ubi to Ken Ringle, *The Washington Post*, June 11 1996.

If we overlay this insight from Ubi on top of the origins of EM, that so-called achievements of human civilization are at once also the main instruments of that civilization's destruction--indeed not only humanity, but living existence as understood to be present on our planet, we can see how that past is also present in its future, our present.

## 2. THE BEGINNINGS OF ETHNOMATHEMATICS

The development of EM is strongly connected with colonization, the epitome of human-to-human exploitation. European countries through several pretexts have oppressed entire populations outside Europe. Considering themselves as the measure of what it means to be human, European civilization as the 'cultural measure' exposed 'civilization' and abused natural resources by creating dependencies. Desmond Tutu, Archbishop of South Africa and anti-apartheid activist describes in a few words this situation: "When the missionaries came to Africa they had the Bible and we had the land. They said: Let us pray. We closed our eyes. When we opened them, we had the Bible, and they had the land."

EM emerged as a way to repair the consequences of colonization, and is described by some as a combination of responses to education's problems—and, in particular, Mathematics Education's problems--for oppressed people in Latin America, Africa, and other colonies or former colonies (KHAN, 2011; Appelbaum, Stathopoulou, 2020). One of the more extreme expressions of oppression in the framework of colonization was Apartheid; this socio-political system, among others, was a cruel way of uniting processes of distinguishing among people through societal forms of discrimination. Evidence ranges from seemingly inherent social orders to the restriction of access to certain forms and methods of knowledge acquisition (Steyn, 2012). We include Apartheid as our first concrete example in dialogue with Ubi because of the ways that EM was used as a tool for discrimination in that context. EM was intentionally misinterpreted and distorted to manipulate and discriminate people and was a core principle of practices that dictated discriminatory, corresponding teaching practices in respect to students' origins. This directly contradicted the intentions of those who developed EM, including that EM would be a liberating confrontation with Eurocentrism, a tool for dismantling systems of inequality, and would help in the pursuit of social justice with mathematics as a resource. EM as a perspective challenged from the start what were considered both mathematics knowledge and ME, identifying the consequences of colonization.

When D' Ambrosio first referred to EM, it was in combination with a new paradigm for thinking about what we mean by M (mathematics), and what kind of ME be needed if mathematicians and mathematics educators were to take action in moving away from colonialism and its legacies (D'Ambrosio, 1985). This period of early EM included parallel work by other researchers, indicatively: Zaslafsky 1973a, 1973b; Pinxten, van Dooren, & Harvey, 1983; Mellin-Olsen, 1987; Pinxten, van Dooren, & Soberon, 1987; Bishop, 1988a, 1988b; Ascher, 1991; Gerdes, 1988, 1992). In these works, among others, the importance of indigenous knowledge in African, South American, and Asian cultures was demonstrated, despite having been ignored by European studies. The late 1970s and early 1980s witnessed in this way a growing awareness among mathematicians of the societal and cultural aspects of mathematics and mathematics education. Gerdes [Paulus Gerdes (1994) credits Ubi for proposing a more sophisticated, ethnomathematical program as a methodology that tracks and analyzes processes of generation, transmission, diffusion, and institutionalization of (mathematical) knowledge in

diverse cultural systems<sup>2</sup>. By the end of the 1980s, Alan Bishop (1988) described specific cultural dimensions of mathematics through which he could implicitly refer to a political dimension of Mathematics Education, while Stieg Mellin-Olsen (1987) used activity theory to recognize the politics of mathematics education as evidenced by mathematical cultures.

Ubi characterized EM as a *program*, as a collective body of methods, knowledges, self-critique, and commitments; in this way, his voice from the past suggests for us *now*, in this present, an ever-new perspective of understanding the world through M, as well as a way of transforming the world in the direction of equal participation and social justice. His contribution was very crucial in disrupting the presumed (Western) model, which masqueraded as the one and only path of mathematical knowledge and progress. What did EM actually contribute, for whom and in what places? What were/and still are the main challenges that an EM perspective generated? School mathematics worldwide was (and remains) essentially defined as Western/European mathematics, a collection of methods for solving Western/European problems. Non-Western/European mathematics is relegated to “mathematics” – something only recognized if it can be interpreted through a Western/Euro lens “as mathematics” because it resembles what is already accepted as mathematical (Appelbaum, Stathopoulou, 2020). This version of colonialism created an almost total disconnect between school knowledge and home knowledge, manifested as the invisibility/erasure of funds of knowledge brought to school from life experience. Delegitimization of knowledge is a counterpart of exclusion from opportunity and participation in the broader community. Furthermore, we can see this as a local example of the loss to all of humanity created by the epistemicide that (Western/European, or “School”) mathematics promulgates everywhere, by obliterating recognition and dignity for what might be useful as new forms and arts of “mathematics”. The identification of a local tradition as “just as much mathematics as Western European mathematics” is the ultimate example of coloniality, or the legacies of colonialism that perpetuate inequities: something is recognized and legitimized as mathematics if and only if it looks like what the colonizing culture sees as mathematics. Entire realms of mathematical activity are in this way reduced to those attributes that conform to the colonizing epistemological structures, and others are forever lost to humanity. This is especially of concern given the research evidence that local knowledge is “essential for an intuitive and empathic understanding of mathematical ideas and procedures” (Orey & Rosa, 2021).

At the time that EM’s emergence, the consequences of colonization were still fresh and more easily recognizable. What is the current situation? How much has it changed in both rhetoric and practice? Is the world still dichotomized by white Western/European criteria? In the next section of our article, we present our understanding of the contemporary situation, which necessarily embeds a template of thinking about the future in order to express a version of this geopolitical, cultural, and historical moment.

### **3. WHERE ARE WE STANDING TODAY?**

As late as the revised edition of *Against Common Sense*, Kevin Kumashiro could write, “More than any discipline, math is considered by many people to be the least influenced by

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<sup>2</sup> Gerdes spoke about the need for unfrozen indigenous knowledge, ironically falling into the trap of measuring local knowledge through western Mathematics, a trap often evident in the first steps of EM

social factors, and, therefore, to be the most bias-free of all subjects being taught and learned in school. People have told me that race might matter when treating students of color differently in a math classroom, but race has little, if anything, to do with adding and subtracting numbers” (Kumashiro, 2009, p. 111). The fact that about 30 years after the development of EM, and in general, of sociocultural and political approaches regarding ME, Kumashiro formulates that point of view dictates the need of thinking and rethinking about EM and the way it could contribute to challenge the still dominant perception about and around M and ME. He not only echoes the early work in EM of the 1970s and 1980s in the 2000s, but does so in a seemingly more naïve way than that of scholars in that past; for example, Palestinian Munir Fasheh (1982) understood several decades earlier that lived experience of mathematics as far more useful for economic, political, cultural and social purposes than school mathematics, concluding that school mathematics was, if anything, a political tool of oppression for Palestinians more than anything else; despite his successes in school mathematics, it was useless in the face of war and exclusion. Sometimes, it is necessary for the present to reclaim lost knowledge and bring it into its future.

As discussed above, an EM perspective challenged what were considered both mathematics knowledge and ME, identifying the consequences of colonization that, unfortunately, still exist in what would come to be labeled as coloniality/ coloniality of power, following Anibal Quijano (2000). Some decades after the emergence of EM, mathematicians and mathematics educators have this useful term for the lasting consequences of European colonialist practices. The oppression of people, because of race, culture, ethnicity, etc., is in this present come to be called “historical trauma,” and is associated with significant events that encapsulate a long history through group-specific subjugation, such as the Holocaust, slavery, forced relocation and the brutal colonization of Native American/Alaskan Natives (Moore, 2020, p. 42). Historical trauma is exacerbated by the suppression of indigenous customs, traditions, habits, and cultures (Moore, 2020); in these suppression processes, culturally-specific epistemologies are obliterated or submerged by global-economic, institutional, political, and cultural systems of coloniality, and (school) mathematics plays a dominant. Ignorance and/or condemnation of concepts, skills, and other funds of knowledge brought to school by non-dominant-group students is an expression of Cognitive Imperialism, a manipulation that functions to discredit other knowledge systems and values (Battiste, 2005, 2018). Possessing knowledge of how colonization manifested itself into historical trauma and recognizing how historical trauma is passed on from one generation to another is the antecedent to involvement in the crucial work of decolonizing sociopolitical constructs and systems (Cashman, 2020; Moore, 2020).

“Children must be prepared for a future that we cannot envisage. To prepare children to be proficient in obsolete mathematics is to prepare them to the anguish of being marginal in the future, because they possess outdated knowledge. To avoid this anguish is, to me, an important feature of Social Justice.

Social Justice should be understood as a response to satisfying the basic needs for a good life, aiming at freedom and choice, at health and bodily wellbeing, and establishing at good social relations, anchored on security, peace of mind and respect for spiritual experience. We must avoid giving students the illusion that passing the current tests, obtaining good grades, they are prepared for the future. This is fallacious and the denial of Social Justice.” (D’ Ambrosio, 2012, p. 16).

After more than 40 years of EM being in the main scene of ME, the situation has hardly changed. Inequalities in (mathematics) classrooms and society—informing each other—are still present. Astounding inequalities between Western civilization and local knowledges have worked like the boundary point of a geometric locus, bringing to the surface less recognizable inequalities between and within our communities; inequalities as a result of power relations not only separate Western and non-Western societies, but also subgroups and localized communities within the Western world itself. More recent calls for attention to indigenous knowledges as a resource for saving our planet, including both colonizers and colonized peoples (Ratima, et al., 2019) remain untapped, so that the epistemicidal tendencies of coloniality, in this case of school mathematics, can be understood as the “wolf in sheep’s clothing” that brings doom in the form of the promise of productivity and progress. One might cynically describe South African Apartheid and Palestinian subjugation as only the most blatant applications of EM to preserve and reinforce inequities, and wonder if EM is nothing more than yet another tool of coloniality.

Perhaps the term, “Symbolic South,” (de Sousa Santos 2015) best represents the current situation within former colonial powers. This term points to the dominant Western world itself as a dichotomized world. 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). In these geopolitical locations, found in nations who continue to dominate the global economic and political landscape, members of disempowered and disenfranchised 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. Ubi reminded us that his goals, now in dialogue with a future that he likely anticipated, were/are for us:

“(1) The transmission of values rooted in the past, which leads to citizenship, but not docile citizenship; (2) The promotion of the new, for an uncertain future, which means creativity, but not irresponsible creativity.” (D’Ambrosio, 2012, p. 17)

What sorts of mathematics education are components of a general philosophy and practice of mathematics education with such commitments? Ubi proposed a critical stance upon ME that searches for a path to non-docile citizenship, advances values rooted in the past, and promotes a new, uncertain future characterized by responsible creativity (D’Ambrosio, 2012, p.17). Mathematicians and mathematics educators are and will be building this version of ME out of the glorious accomplishments of historical and contemporary mathematics, as well as the rubble and ruins of present-day ME. Contemporary school mathematics worldwide has been generally described as a subject based on a collection of methods for solving Western/European problems, with its acquired skills measured through standardized tests such as PISA and TIMSS (Zhu, 2018). From this perspective, contemporary school mathematics constructs the expectation that it will prepare students for their future lives, even as it paradoxically attempts to cultivate relevance to their present lives. Consequently, the rhetoric of ME projects, or pretends to support, active participation in local communities, social justice, and individual self-actualization. Yet, it is also the case that school mathematics curricula world-wide are more or less the same, hardly respond to local needs, and rarely if ever accommodate local mathematical traditions and epistemologies; instead of seeking the potential of indigenous mathematical traditions, school mathematics tends to serve as a hidden curriculum of

coloniality, denigrating or perpetuating ignorance of forms of mathematics outside of Western/European codification. As Ubi worried throughout his career, 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 the recognition and dignity of local knowledges—at best local practices are noted as interesting “crafts” or forms of spirituality.

Ubi’s broad agenda included the creative aspects of doing mathematics and the ethical implications for the design of curricula. In pursuing these principles, he also offered an antidote to the disconnection between the world in which students live and what happens in mathematics classrooms—a major reason that students give for their negative attitude to mathematics. He showed that this is an issue of equity—of respect for diverse backgrounds that affects all societies, including the mainstream in prosperous countries. There, while middle class kids from well-educated and supportive homes are helped to tolerate the delayed gratification that pervades mathematics education, those from less-advantaged homes are more likely to neglect what is for them a pointless activity. Ubi raised this issue obliquely as well:

“As a consequence of wars, of greedy capitalism and of uncontrollable consumerism, people are killed in a broad sense, either physically or morally, as the termination of life and also as the loss of dignity. I understand violation of Social Justice in this broad conception” (D’Ambrosio, 2012, p. 17)

Here Ubi returns us to the bifurcation that is present not only in formerly colonized lands, but also within the ways that colonizers themselves are victims of their own hubris. We want to consider how school mathematics most generally constructs a false dichotomy as part of coloniality, and as a hegemonic characteristic of our social/cultural/historical/geopolitical moment. The typical comment of alienation that students utter, that their life world and their school mathematics world are separated, is a seemingly universal marker of coloniality. Ubi specifically offers in this present moment, and for our future, a deconstruction of that false dichotomy, and in this way, disrupts the ongoing reconstruction / perpetuation of coloniality.

Mathematics can serve good as well as evil: the power of mathematics is at least double edged. On one hand, great achievements in arts, science, and technology are mathematically based. On the other, mathematics is implicated in technologically caused catastrophes (Atweh, 2007; D’Ambrosio, 2006). Yet this does not mean that mathematics itself is a neutral tool that might be used one way or the other, nor does it mean that the way we teach mathematics leads to “good” applications or “bad”: mathematics, mathematics education, and culture, as mutually determined and evolving, together create what we now call mathematics, what we identify as mathematics education, and what we label as culture, in a mutual cycle of determination.

Ubi stressed that

“... our most urgent concern is to teach mathematics for access and participation, understood in the broad sense of helping humans to attain wellbeing, which comprise the basic components of a good life, freedom and choice, health and bodily wellbeing, good social relations, security, peace of mind, and spiritual experience.” (D’Ambrosio, 2012, p. 16)

Ubi always helped us to expand beyond what seems like a necessary focus on specific and efficient methods of transmitting unquestioned skills and concepts. Sometimes explicitly,

sometimes implicitly, he expanded EM from a single educational issue into broader, world-wide concerns. His views on global issues were consistently informed by the EM perspective. In the same paper in which he connected ME to access, participation, and well-being, (2012, with reference to his Interview given to Ken Ringle, *The Washington Post*, June 11 1996). Ubi addressed at length environmental issues and the need to reconsider mathematics education as a stance upon these existential imperatives: “The world is threatened, not only by aggressions against nature and the environment...”.

He adds a layer of ethics. It is a plea or attempt to recruit people to his social justice cause by making them feel a moral obligation to pursue this. What he urges us to take on as a mission, however obliquely, is the insight that the current status quo does not serve anyone well. The phrasing here seemingly implies that school mathematics serves the mainstream in prosperous countries, indeed that it helps the privileged to maintain their privilege. Yet, of what use is privilege on a planet that cannot sustain any human life anymore? It seems that Ubi wants us to go one step further and realize with him that nobody is well-served by the current version of coloniality=school-mathematics, because of this severing of school mathematics from the life world of all people, and the entire planet. In other words, ME for us, in dialogue with Ubi, is not merely a profession, or collection of practices and theories, methods and procedures, arts and sciences of education focused on mathematics. ME is and will be, always has been in the past, but was not necessarily consistently understood as, an ethical stance one takes upon the world.

#### **4. THE ENVISION OF A FUTURE COMPATIBLE WITH AN EM PERSPECTIVE**

D’ Ambrosio (2012) expressed almost ten years ago his anxiety about the then-new generation’s preparation for their future, saying that children must be prepared for a future that we cannot envisage, and in the same breath suggesting an orientation to social justice:

“Social Justice should be understood as a response to satisfying the basic needs for a good life, aiming at freedom and choice, at health and bodily wellbeing, and establishing at good social relations, anchored on security, peace of mind and respect for spiritual experience.” (D’Ambrosio, 2012, p. 20)

Ubi’s holistic perspective places the obligation upon each mathematics educator to recognize their work as an ethical stance upon the world. Such a stance demands of us that we seek to understand not only (mathematics) education, but that we comprehend previous and potential uses of M as a tool for exploring or identifying our position within our world in general. This stance obligates us to merge our professional efforts with our pursuit of social justice. And this stance requires us to better prepare the new generation for the future mapping of our current reality, while at the same time helping our youth to live in this rapidly changing world now. Ubi gave us some first steps in this direction. However, to become aware of a need would only be a perpetuation of injustice and planetary destruction. What is needed is concrete action in the present as well as anticipation of possible futures. It is increasingly apparent that a focus on human education fails to meet the challenges of our rapidly transforming environment.

During the last century, the human way of life has begun to transgress many of the Earth’s biophysical boundaries in an alarming way. The consequences of this are more dramatic and long-lasting than ever before (Wolff, et al, 2020). Scientists, for example the Nobel Laureate



in Chemistry Crutzen, considered in 2013 that we were moving from the geological epoch of Holocene to that of Anthropocene (Stromberg, 2013); such characterizations are in our contemporary past even as they projected a naïve future. With the term Anthropocene scientists describe the accelerating impact of humans on Earth, as a profound, “global geologic force” (Steffen et al., 2007). We are now several decades beyond what was once named as a period “in which human presence has become an unquestionable force with impacts on climate change, deforestation, and causing ecological disasters with significant global implications” (Guyotte, 2020, p. 771). In our now, post-Anthropocene world, we need to imagine what sorts of ME and M, including integration not only with the sciences but also humanities and arts, can respond and anticipate global crises and a new post-post-Anthropocene ME (Cough, A, 2021). For example, philosophical work on the Anthropocene questions neoliberalism and capitalist production that permeates not only ecological spaces, but the practices of research methodology. Discussion surrounding the practices that drive scientific progress drove us into the Anthropocene, in turn driven by shifting ideologies that crossed disciplinary, political, and ethical boundaries with real, material effects (Guyotte, 2020, p. 770).

Humanity missed its chance to figure out how the epoch of the Anthropocene reality should have affected education, and now we are forever catching up, living a reality of the Anthropocene while the world has moved onto a post future. Caugh (2021) and Åsberg (2017) still use the term, as examples of those still trying this catch-up effort. Caugh (2021) notes that, “The Anthropocene is also contentious because of its humanist and human supremacy focus, and the way it hides troublesome differences between humans (including gender and cultural differences), and the intimate relationships between technology, humans, and other animals.” while Åsberg (2017, p. 198) poses the crucial question: “is nature no longer separable from culture in this age of the Anthropocene?” Quoting Greenwood (2014, p.281), Caugh notes further that “we now live on a bio-physically different planet than the one in which modern civilization developed and in which our common assumptions about education were formed.” Those still trying to cope with the past, the Anthropocene, critically note that access to universal education remains as one of the Sustainable Development Goals for 2030 (United Nations, 2016), the knowledge and values implicit in the current dominant education process remain contentious, and many critique the social reproduction role of education and how they go about achieving this. With this never-ending catch-up a symptom of the post-Anthropocene, what sorts of perspectives on education might we bring into the future?

In education, it seems we need to dialogue not only with Ubi but also with those who are still beginning to cope with their awareness of the Anthropocene. Our present moment is witnessing this delayed interest within curriculum and pedagogy, with scholars writing from disciplines like environmental education (e.g., Kopnina et al, 2020; Kopnina 2014), and others taking on broader concerns of moral responsibility that supersede disciplinary lines (e.g., Leinfelder, 2013). Wallin (2017) posits that the avoidance of a fundamental reconsideration of education in relation to such ecological complexity marks a failure to engage not only with the challenges to human and non-human life intimate to the Anthropocene, but further demonstrates a reluctance to forge a speculative encounter with the real potential of human extinction. (p. 1100) Thinking with posthumanism, Wallin (2014) envisions educational research in both a more-than-human world and a ‘world-without-us’ (p. 1105). Donna Haraway (2018, p. 102) in many ways sums up these positions as follows: “There can be no environmental justice or ecological reworlding without multispecies environmental justice and that means nurturing

and inventing enduring multispecies—human and nonhuman—kindreds”. Teresa Lloro-Bidart (2015, p. 133) identified three overarching conceptual and/or practical shifts that [would have been needed for education] in/for the Anthropocene: interdisciplinarity, transdisciplinarity and cross disciplinarity; community- and/or participatory-based approaches in the natural sciences; and alternative modes of thought, including “mobile lives”, “post-carbon social theory”, Indigenous, ecofeminist/posthumanist and connectivity to oikos perspectives do they mainly serve an outdated vision of an industrial society that is turning rapidly into a complex mix of decline and transformation?”

These romantic gestures to humans as self-aware saviors of their planet cling to the notion that educators can still try to “ensure that all learners are provided with the knowledge and skills to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and of culture’s contribution to sustainable development” (United Nations, 2016, np). Education in the Anthropocene, our most recent past, would have required participatory approaches as people needed to be learning how to work together and how to live with climate change and other, related environmental crises; it would have demanded of ME that it contribute to working across cultures and genders in addressing environmental issues.

## 5. SOME CONCLUDING REMARKS

We are living in the Post-Anthropocene. But we are only now realizing there even *was* an Anthropocene, after it has moved on to a post-Anthropocene era! Mathematics educators were trained by their own experiences and education in the pre-Anthropocene and Anthropocene, not realizing they were trained in a past that was no longer the present. Now they are trying to catch up to the Anthropocene, but it is already in the past. The Anthropocene feels like a future even as it is a past. Ubi D’Ambrosio helped us to recognize these problems 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 feels to us like a natural extension of his work. With D’Ambrosio, we consider how EM is compatible with a world of dignity and recognition, and by extension, not only the recognition of human beings, but with all of our neighbors – animals, plants, rivers and mountains, volcanoes, streams, indeed the entire planet.

In a more naïve past we can find the seeds of an optimistic approach for our new futures. On 18 April 1966, Theodor Adorno read a text on German radio called *Pädagogik nach Auschwitz* (later published as *Erziehung nach Auschwitz*) which begins with a statement whose force has not diminished in the half century since its utterance: “The premier demand upon all education is that Auschwitz not happen again.” (Snaza, 2017). Adorno used Auschwitz as a metonymy, to represent several genocidal and quasi-genocidal projects (including European imperialism and trans-Atlantic slavery) that tended, overwhelmingly, to draw its limit at intra-human violence. Snaza (2017) recently questioned whether other forms of violence might enter the orbit of our ethico-political consideration. Snaza resonates with Kalpana Rahita Seshadri:

“... perhaps it is time we 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” (Snaza, 2017, p.498)

This project of “rethinking and renewing” would be, according to Seshadri, a crucial vector for our efforts “after Auschwitz” extended to our post-Anthropocene destruction of the planet. They write of a *pot-humanist* educational practice not oriented around the particular version of the human violently enforced in and through Western, imperialist modernity. In order to sketch the contours of such an educational response, one that might ensure that the systemic violences synecdochically gathered into the word “Auschwitz” “does not happen again,” these authors reach into that naïve past of Adorno and identify ways to shift our objectives. Snaza quotes Adorno: “Since the possibility of changing the objective – namely, societal and political – conditions is extremely limited today, attempts to work against the repetition of Auschwitz are necessarily restricted to the subjective dimension” (Adorno, 2005, p.192, cited in Snaza, 2017, p.498); such considerations lead Snaza to an educational perspective informed by the collapse of any distinction between the subjective and objective dimensions of the post-Anthropocene,

“By attending to what Adorno here means by ‘subjective’ and ‘objective’ dimensions of the causes of Auschwitz, I draw out the necessity for a posthumanist educational response, one that would, in fact, take it as axiomatic that no such separation between objective and subjective is possible.” (Snaza, 2017, p.498)

Here we are using the work of Snaza and Seshadri as a model for ME. Given that Adorno’s address has become a sort of manifesto for Holocaust education, Snaza proposes 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” (Snaza, p.4). Adorno used the Auschwitz experience metonymical in order to alert us to any kind of oppression on any level, for any reason. Compatible with Ubi’s ethical stance upon the world, we note that coloniality is here to stay, through the post-Anthropocene and beyond.

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)

By “Children,” we now read, “all of our co-inhabitants of our planet and ecosystems.” We call for all mathematics educators to join with the Scholars of Color and “leverage our individual and collective expertise in mathematics education; voice our ideas and concerns related to the field; conceptualize and locate ourselves in anti-oppressive and humane mathematics education agendas; and, share self-care and leadership strategies to sustain and nourish ourselves in this justice struggle” (MESOC, 2018, p. 1).

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