Mathematics Education as Dystopia: A Future Beyond

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Synopsis

We argue that scholars and practitioners of mathematics education need to find new directions through recognition of its dystopic characteristics, and embrace these characteristics as both the source of challenges and method of response. This contrasts with the generally utopic approach of most scholarship in the field. We offer critical ethnomathematics education as a model, since it has its own origins in lingering dystopic legacies. A perpetual hopelessness and disempowerment is one implicit curriculum of contemporary mathematics education, where the mathematics one learns might help to describe things, yet hardly assists in transforming the reification of power and agency in society. Embracing dystopia rather than trying to circumvent it generates new questions and pathways.

Keywords: mathematics education; dystopia; critical ethnomathematics

1. An introduction

We begin this essay with the recognition that school mathematics does not necessarily prepare society to respond to the most pressing crises of our epoch: severe weather and climate change, refugees from war and climate change, human trafficking and global economic injustice, etc. In early 2019, the world seemed unprepared for the COVID-19 pandemic, whether individually or via social policy. In particular, the situation created by the pandemic transformed many aspects of social reality globally [47], as well as school reality [11, 49], spreading fear and insecurity, and making people feel unprotected. In general, we live in a time of acceleration [58], with precarious scenarios of evolution; yet the daily experience of the COVID-19 pandemic, in and out of school, leapfrogged doomsday pronouncements away from mythology or Revelation, and into a visceral idea of the end of the world. The focus on the pandemic can also be understood as a primarily "first world problem," in the sense that there were and continue to be far more urgent crises outside of the highly industrialized nations, in what is sometimes referred to as the "global south." This aspect of crises helps us to think simultaneously about whether school mathematics prepares humanity for anticipating and responding to global crises, and at the same time whether it enables humanity to recognize the legacies of colonialism that influence what is even appreciated as a crisis in the first place.

In what follows, we apply strategies from critical ethnomathematics education for understanding parallel concerns of equity (opportunity and outcome) and curricular content choices. We do this because critical ethnomathematics has already demonstrated techniques for educators to theorize paradoxes of global crisis. Critical ethnomathematics education makes sense of mathematics education, both for preparing people to anticipate and respond to global crises, and for practicing pedagogies that address seemingly insurmountable, "dystopic," crises in our environment, geopolitics, and the future of our planet as ever-present yet necessary and possible to learn to live with.

2. Social and political mathematics education as context

Ole Skovsmose [64] proposes three types of relationships between mathematics and crises: Mathematics can (a) picture a crisis, (b) constitute a crisis, or (c) format a crisis. Are there parallels for mathematics *education*? Even as numerous mathematics educators would agree that significant cultural, historical, and political knowledge is needed to make sense of complex global issues

(e.g., population movements of refugees and migrants [53, 71], climate change [6, 7], species extinction [56], local community problems [24, 29], typical school curricula worldwide comprise primarily formal, decontextualized (academic) mathematics, a manifestation of Western thought, Cartesian logic and 'rationality' rooted in a logic of domination and human-centric thinking, sometimes termed a logic of domination [70]. In this conception, purpose lies in generalizability, wide applicability to decontextualized concepts/methods, and in structures that manipulate variables across specific cases. This bird's-eye view of human experience and deeply rooted cultural patterns undergirded by Western assumptions of domination over nature are increasingly recognized as creating interrelated challenges of climate change, extreme weather, food production, and species extinction, demanding new directions of relation centred in social justice and alter-global social movements [5, 70]. Persistent dichotomies (such as the one imagined between the people of Western culture(s) and Others) project one of the pair as the epitome of progress (despite its ignorance of other knowledge traditions and practices): mathematics education is seen in this way as a tool of power, oblivious of its failings [22]. Educational experiences curate forms of knowledge and exclusion, function as processes of normalization and epistemicide [51], and structure the identification of differences across teacher, student, family, and community cultures.

The catastrophic COVID-19 emergency demonstrated these processes of normalization and epistemicide more clearly than pre-COVID mathematics in some geopolitical areas of the world simply because it placed ongoing learning and teaching practices in a new context. Initial discussions — from politicians, media, medical experts, educators — often amplified feelings of confusion and disempowerment. Some well-intending mathematics educators seized on the "teachable moment." Remote education simplifies some aspects of instruction, complicates others. Some mathematicians and mathematics teachers used the virus to make mathematical concepts and skills accessible (see for example [68]). An unprecedented number of blogs, websites, news articles, Tik-Tok videos, Instagram feeds, etc., used visual representations and analogies to explain exponential growth (see for example [38]) or the nature of meaningful evidence, model mathematical inquiry, or demonstrate the importance of mathematics in the study of a global pandemic. That is, we lived through parallel experiences: for school mathematics, the questions mostly became, in some industrialized nations, a matter of how teaching would be continued through distance learning, rather than a moment of curricular reconsideration. For public pedagogy, this was an explosive moment of graphs, metaphors, and a contestation of knowledge, demonstrating the superiority

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of social media over school in making mathematics relevant. Although public pedagogues successfully provided resources, and although there are many ways in which they created examples of how mathematics can help the public understand their situation, feel informed and witness themselves as in control of knowledge, we ask whether this was nothing more than a shifting of focus from school to popular culture of a more insipid and disempowering form of education, constructing a dystopian version of knowledge and knowing. We claim most of our many resources on using mathematics to solve real-world problems are caught in the trap of social and cultural reproduction, despite their claims to a certain overarching 'natural goodness' [69]. COVID-19 is an example: the majority of school and public pedagogy mathematical lessons focused on mathematical models of the behaviour of the epidemic, and not on a broader framework for interpreting the models of the world, or our experience of it (regarding modelling and problem solving, see [21, 28, 31, 40]. Such public pedagogy [3] mirrored standard textbook approaches — simplified, artificial models, glossing over details, confounding variables — even as it dressed up key concepts and relationships in engaging video and animation.

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A more general observation is that the focus on the pandemic distracted from the enormous crises around the world that existed pre-pandemic, and continue to this day, inadequately addressed. This latter point indicates one more way in which mathematics education and its impact on problem generation and solving can have far-reaching consequences for what becomes the focus of attention, reproducing and amplifying global legacies of power, as well as related assumptions about what is a universally agreed-upon "urgent need."

3. Mathematics education as dystopia

Common criticism of school mathematics and popular versions of mathematics focuses on failures of mathematics education — the failure to engage students in the learning of skills and concepts, but more importantly, the failure to empower people mathematically to anticipate and respond to localized and global crises. While such criticism is a caricature of only the worst aspects of school mathematics, it does point to a long-standing plight of mathematics education, that of its ongoing challenges in overcoming its tendency to enculturate students into a passive state of accepting given skills and concepts, given problems already solved and hence uninteresting, and the need to defer application of practiced skills until a future one may never actually experience [4]. Mathematics education in this respect can be named a *dystopia*, using a concept that inherits its meaning from the related concept of *utopia*.

In Plato's *Republic*, a utopia is "a politically perfect state," and in Thomas More's 1516 work entitled *Utopia* [45], it is a place that can never exist. Claeys [14] outlines three types of utopianism: literary utopias, utopian ideologies and communal movements. Mathematics education has its own literary utopias, those tales, videos, and standards documents of magically wonderful classrooms filled with inspiring teachers who know about their students' lives and the diverse funds of knowledge they bring with them from multicultural and hybrid cultural families and communities. Students in these utopias are engaged in active communication, explaining their thinking with multiple representations to themselves, to peers in a mathematical community, and in several drafts of clear explanations prepared for a skeptical audience. Learners in utopias share their learning with their neighborhood, finding ways to use mathematics as participants in social and political life. Utopian ideologies in mathematics education range from cognitive and constructivist frameworks, to more recent applications of "being less helpful" [44, 52], *LatinX* methodologies [23], foregrounding and exploiting the brilliance of Black children [37], and more. Communal movements in mathematics education are less obvious, but exist: those mathematics educators who place their work in parallel with this article might belong in this category, engaging within our own enclaves a fantasy of social and cultural transformation. Such movements tend to remain on the margins even as they leave traces as practices are co-opted by the mainstream, dominant culture: The communal movement of the 10^{th} and 11^{th} centuries in Europe formed walled cities that balanced the powers of feudal lords and roaming bandits, from which many notions of "liberties" and "individual rights" emerged in more contemporary republics and democracies; the counter-cultures of the 1960s established the importance of questioning authority and the political power of protest to support civil rights, aspects of which continue to echo in current contexts. Communal movements in mathematics education have come and gone, leaving their own traces: the "New Math" of the 1950s and 60s; the "Back to the Basics" movement of the 1970s and 80s; critical mathematics education; Bob Moses' Algebra Project [46] and other social justice mathematics efforts; Mathematical Mindset applications of "brain science" [10], and increasingly important, ethnomathematics.

`Wikipedia` tells us that "[d]ystopian societies appear in many fictional works and artistic representations, particularly in stories set in the future". Claisse and Delvenne [15] describe *dystopia* as the depiction of a dark future, based on the systematic amplification of current trends and features. It relates to a complex narrative posture that relies on the critical observation of a threatening present that would lead to an apocalyptic future "if nothing were to be done."

Dystopian authors act as whistle blowers of a special kind. On the one hand they are credible, since they are the first to witness the forerunners of the catastrophe and strive to convince us of the emergency. On the other hand, they are insistent on the apocalyptic potential of the threat, at the risk of ruining not only its credibility, but our very capacity of action. Indeed, if the worst is unavoidable anyway, why would it matter to do anything at all to prevent it?

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School mathematics classrooms might be used in this way, in literature and films, as the ultimate example of why school is so awful. Yet we ask our readers to think of them differently, in terms of the lived experience of many classrooms around the world. In these classrooms are found many of the characteristics of dystopia, described by Newman [48] as "common elements:" suspicion of scientific social planning; the unhappiness of the characters portrayed; sources of control of behaviour outside the individual; behavioural methods of governance, and violation of a presumed inherent need to struggle. Let us explore these elements one by one:

reordered to match the list order below

Suspicion of Scientific Social Planning. In general, few school mathematics classrooms enact professional and evidence-based research recommendations for best practices [71, 72]. Rather than engaging in the utopian visions listed above, and rather than spreading the ideologies of communal movements, some of which we listed as well, school mathematics is consistently critiqued as wallowing in repetitive drill on decontextualized skills and concepts. Rather than supporting students' abilities to participate in social and cultural planning and to use mathematics in understanding the historical and political contexts and implications of social policies and practices [4, 5, 6, 32, 63], school mathematics leads ironically to graduates of school experiences who are incapable of understanding the mathematics of most policy arguments. These "stupidified" citizens are left to distance themselves from the content of policy and practice, and in the process, to develop strong suspicions of them (especially as they live the results of these policies and practices based on them) [55].

Unhappiness of the characters portrayed. In school mathematics classrooms, we have real people, not characters. These unhappy people, often expressing strong negative emotions and attitudes towards mathematics [26, 34], are the stuff of legend, doomed to tedious lectures, repetitive drill on meaningless exercises, and the threat of punishment if they make their feelings known. In the pursuit of successful performance on assessments,

learning is reduced to rote behaviours that can be refined and performed consistently without the requirement of engaging in the alienation that such work demands [43]. Indeed, many teachers collude with this unfortunate situation, offering ways to alleviate the tedium and pain of no understanding and alienation, through mnemonic tricks for memorizing rote recipes, keywords, and facts; offering extrinsic prizes for meeting objectives; and otherwise making a form of mild torture into a palatable exercise in deferred satisfaction [12, 30, 71, 72].

Sources of control of behaviour outside the individual. Despite long discussions in the field of mathematics education research highlighting the importance of self-regulated learning [50], student-centred approaches [9], and inquiry-based curricula [20], a typical school mathematics classroom is organized with a teacher telling students what to do, showing them how to do it, and supervising practice at doing it [43]. Students are not making decisions about what they should learn, what they need to do to learn, how to learn, where to learn, when to learn, and so on. As John Mason noted, "the more the teacher is explicit about what behaviour is wanted, the less opportunity the pupils have to come to it for themselves and make the underlying knowledge or understanding their own" [43].

Behavioural methods of governance. The previous point is intimately related to the behavioural methods of governance found in most mathematics learning environments, in which an adherence to strict codes of conduct are universally expected of the students, although there are variations across cultures, nations, communities, and even individual schools or classrooms [33]. Violations of those expectations are frequently confronted with punishments, and a shift for teachers from facilitating learning to managing behavior.

Violation of a presumed inherent need to struggle. Although there is a long history of mathematics educators calling for the importance of struggle in learning mathematics, and the centrality of struggling to learn in the formation of a mathematically empowered student [13, 62], school mathematics is mostly characterized by teachers who create situations where the learners learn "without even realizing it," passively coming to know and being able to perform tasks successfully after a reasonably efficient period of time [57, 60]. ~~This indirectly buttresses an implicit curriculum that mathematics is otherwise difficult, requiring much struggle.~~

so is this correct or not? if correct, why worry that it is buttressed?

We do not claim that these dystopian characteristics are expressed to the same extent in all classrooms around the world. On the contrary, we are aware that

there are distinct national patterns of behavior in typical mathematics classrooms of a country, which have been described, for example, as the c*haracteristic pedagogical flow* [61], the *cultural script* [67], or more recently, the *received curriculum* [2]. Indeed, several comparative studies in mathematics education provide evidence-based examples of such arguments, such as the two TIMSS video studies [27]; Ma's work [42] on Chinese and US elementary mathematics teachers, their training, subject matter and pedagogical knowledge, and instructional practices; and, from an exclusively European perspective, Andrews' analyses [1] of mathematics teaching in five countries: Flemish Belgium, England, Finland, Hungary, and Spain. ~~What this combined dystopia constructs are an ongoing enculturation and acculturation into a passive dystopian way of life.~~ What this leads to is a paradox: a school discipline universally hailed as empowering and liberating is little more than training in passivity: accepting questions and problems as uninteresting, posed by others, and already solved anyway and therefore meaningless [3, 13]. In other words, mathematics education as dystopia uniquely succeeds in preparing people to be unprepared for crises — situations where they would have been ready to reframe the situation, invent approaches as *bricoleurs* who use mathematical concepts and skills as culturally available resources for newly imagined ways of life [4].

pink sentence unclear, ~~rephrase?~~

4. Post-apocalyptic mathematics education

We already have at our disposal in popular culture a variety of possible post-crisis futures. Films, novels, video games, TV programs, podcasts, and more provide a banquet of post-dystopian tools and strategies for living. The paradox of school mathematics, like all dystopian paradoxes, is at the heart of what French sociologist Jean-Pierre Dupuy called 'enlightened catastrophism' [19]. Breaking with what he deems a 'failed' philosophy of risk and precaution, Dupuy claims that the first step toward avoiding a catastrophe is to think of it as an event that is not only unavoidable, but has actually already happened. He asks us, deliberately and rationally, to adopt a posture of irrationality regarding possible dark futures. Examples of this use of mathematics as dystopian acceptance of catastrophe abound — the uses of graphs and statistics in the cries about the fate of our planet if we do nothing about climate change; the associated perils of severe weather and war refugees; the inability of individual nations to respond to the COVID-19 pandemic.

Can we learn from dystopian writers how to anticipate and shape our views of science and technology in society? Yes, if we focus on embracing the dystopia as real and present, rather than 'in the future', as Claisse and Delvenne suggest:

> If some of them prove to be successful (i.e. if they end up triggering a sequence of action and prevention), it is because they offer the reader the actualized, embodied experience of a possible threat. This anticipatory knowledge-in-flesh is, itself, a form of action. Even while some anticipatory knowledge would be dismissed or obsolete, some strong traces remain in the socio-cultural landscape: they sometimes offer powerful fictional, uchronic precedents that keep on enabling and constraining the actors willing to engage in new initiatives. [15]

What we need is a way of understanding the dystopia of mathematics education as the "embodied experience of a possible threat," as anticipatory knowledge-in-flesh, which, according to Claisse and Delvenne, is a form of action in and of itself. Indeed, we do have at our disposal such a way of understanding: critical ethnomathematics. In the next section, we briefly introduce critical ethnomathematics as a specific kind of ethnomathematics that has features useful to the situation we are analysing in this epistemological and theoretical article.

5. Critical ethnomathematics as knowledge-in-flesh action in itself

Ethnomathematics emerged in the context of colonization — the domination and exploitation of regions of the world primarily by Western European and American nations [18]. In its early development, ethnomathematics served two contradictory functions: the recognition of the hierarchies and associated erasures of local (mathematical) knowledges and practices; and a perhaps ironic, perpetuation of the inequalities and unequal power relations of the colonial period via the use of local knowledges and practices in ways that buttressed the perceived superiority and universality of Western mathematics [16]. That ironic perpetuation can be described with the term "coloniality" — the systemic structures that perpetuate hierarchies and inequities of colonialism long after the official political forms of control have been relegated to history. new par

Critical ethnomathematics is the term we are using in this essay for those forms of ethnomathematics that specifically centre their work in addressing coloniality see [59] for an earlier reference to the term). Critical mathematics education took shape following the initial period of critique that characterized early ethnomathematics, combining the social justice and political goals of critical mathematics education with the anthropological and cultural knowledge afforded by ethnomathematics. The key idea that is relevant for this article is

that critical mathematics education accepts the paradox of ethnomathematics as celebrating local knowledges yet somehow in the process as relegating them to second-class status, as an unavoidable catastrophe of colonialism, and our current geopolitical and sociocultural transnational situation as a particular example of coloniality [65]. In a story analogous to a pandemic run amok, colonialism has left its indelible mark on mathematics education: The taking of dystopic Western school mathematics as the definition of mathematics for the entire world; the legitimization of any local, mathematical ways of being only when understood as an example of a pre-defined concept or algorithm found in Western mathematics; entire realms of mathematical activity reduced to those attributes that conform to the colonizing epistemological structures, and others forever lost to humanity via coloniality's epistemic erasure. Each of these have already happened. We are living them. Critical mathematics education's efforts to think through the processes of living this catastrophe on an epic, global scale, and the possibilities that these efforts establish for meaningful life in this post-catastrophe reality, are examples of what Dupuy [19] describes as deliberately and rationally adopting a posture of irrationality regarding possible dark futures.

So: what are the dark, 'present futures' of post-apocalyptic, critical ethnomathematics, and how can we use them as analogies for living, experiencing, anticipating, and responding to global crises? Well, first of all, it is an ethical issue to clarify that any one local experience of a global crisis is only one tiny piece of the critical ethnomathematical awareness already being lived globally and systemically, as part of coloniality structures that enter one's awareness in the moment only due to the currently experienced crisis. For example, COVID became a "global crisis" when it affected Western, industrialized nations to a tremendous extent; war refugees from Ukraine, Syria, or North Africa are represented differently in different parts of the world. Local crises absorb attention while those experiencing them ignore or are distracted from what are possibly more pressing problems in the rest of the world. Using the pandemic experience to write about such issues, as some have done recently, might be critiqued as a good example of coloniality: Often, a global crisis is only a focus, "now," because of the weight of the crisis for Western mathematics education scholars and readers of a particular journal. Those in the subordinate, "global south" and indigenous communities throughout the world who, thanks to systemic structures of coloniality, are forced to claim this historic moment as momentous themselves, would then find their own global crises to be less represented in scholarship.

6. Embracing dystopia

Critical mathematics education embraces coloniality as both the problem and the method of social change; we propose here further that mathematics education can and should embrace coloniality and dystopia as its problem and method. Rather than searching for solutions to the legacy of colonialism, critical mathematics education recognizes the dystopia of coloniality as here to stay, and appropriates both Western mathematics and the coloniality of school mathematics as its own tool, not for "dismantling the master's house," but for accomplishing local and indigenous goals of dignity and reconciliation [6]. This contrasts with the pursuit of utopian dreams. Those working to implement curricular reform imagine a post-dystopic vision; they try to overcome dystopia, and are doomed to failure no matter what gestural leaps they attempt. As Stein and her colleagues [66] argue, "decolonization is increasingly treated as a site and subject of consumption and accumulation, not only of material benefits, but also of knowledges, relationships, experiences, and even critique itself". This is why we urge avoidance of the term *decolonial critiques*, as is fashionable academic currency, arguing instead against solutions and alternatives to colonization within existing paradigms, regimes of property, and comfort zones. We understand "colonial patterns of relationship and colonial habits of being are reproduced at the very moment they supposedly become unsettled ... when efforts made under the umbrella of decolonization are re-routed back into the same desires and entitlements that produce colonization in the first place," so that "the transformative possibilities and ethical responsibilities of decolonization are eclipsed, and decolonization itself becomes weaponized as an alibi to continue colonial business as usual." CITE?? Fantasizing a possibility of decolonization is a fallacy, as is curricular reform. It is better to appropriate methods and resources of dystopia for alternative, local goals. It has sometimes been coined 'creolization' [3, 4].

This approach critiques reform efforts in general as typically enacting a utopian-fueled fantasy of leaping out of the current dystopia [39, 54]. A caricature of reform efforts would describe policy-makers as saying, "Oh, this didn't work. Let's try something else, which would be so great!" Instead of imagining and designing utopias, developing and promoting new curricula, and encouraging teachers and students to act as utopian characters, we urge the following: start with acknowledging that the current curricula, teachers, students, and policy-makers are currently actors in a dystopia. Instead of trying to escape that dystopia, we could appropriate tools of the dystopia for local and indigenous struggles. The dystopia is both the problem and the method.

Even as we pursue local and indigenous appropriation of tools and practices of coloniality for locally-identified purposes, we recognize the problematic term "indigenous" as preserving and maintaining distinctions of colonialism. One might say that we are perpetuating the dystopia. A 'composite' definition of both terms, utopia and dystopia, understands how most utopias are linked by their commitment to a form of enhanced sociability, or a more communal form of living, sometimes associated with ideals of friendship, while their dystopian counterparts are substantively connected by the predominance of fear, and the destruction of 'society', as a polar opposite of friendship. Perhaps we can reframe indigenous in this sense of an 'enhanced sociability;' where enhanced sociability has been maintained for some period, "utopia" has been lived to some extent [14]; and where the opposite occurs, "dystopia" is the relevant descriptor. Fundamentally, utopia and dystopia are mutually determining.

Mathematics education in the time of war in Ukraine, in the time of COVID, in the time of mass migration from severe weather and famine ... is here to stay, as is mathematics education in the time economic inequality, the breakdown of democracies ... Mathematics and mathematics education are at the heart of each crisis, serving at once as forms of knowledge with which we describe and come to know each aspect of the global crises together, and in erasing alternative forms of knowing and coming to know about our world and its future. new par

Inherited from critical mathematics education is the key concept, "abyssal gap of coloniality" [17] — that separation literally and epistemologically between metropolitan and colonial societies. Even today, people who live in or whose origins are in former colonial countries — and women, refugees, etc. — are framed as inferior by structures of coloniality. This distinction also concerns people's knowledge, a distinction that ignores the intrinsic value of various bodies of knowledge in favor of dominant social, political, and economic structures. This knowledge is excluded and essentially erased, because the people who produce this knowledge are excluded as creators and finders of knowledge. new par

Epistemological clashes between different kinds of knowledge, in particular, between scientific and non-scientific forms of truth, are only recognized once one takes a critical stance. One kind of knowledge — counting as true — is on the one side, while the 'other side' is relegated to mere "beliefs, opinions, intuitive or subjective understandings" that at best are issues for scientific inquiry. In this way "abyssal thinking" consists of distinctions and dichotomies that construct a divided world [17]. It is supposed that people stay in a static situation — the dystopia does not change placement relative to the abyssal line.

Yet people are also different, even if they share elements that define them on one side or the other [8]. "Kinds of people are cemented through research and administrative apparati, but also through uprising and revolt" [41]. People are constructed in these kinds of ways for the purposes of governmentality, but at the same time, since people are not just the object of static nominalism and not merely "passive receivers of imperial administration and control" [25], they react in resistant ways.

Traditional mathematics education scholarship expresses coloniality and other characteristics of power relationships through languages of accountability and global economic competition. Mathematics education is both experience and cause of this dystopia. We can explore ways to open imagination, giving learners spaces for creativity and knowledge of self, and in using problems posed by the students themselves; such a utopian imaginary of mathematics education can challenge the perspective of globalization, exploring for example alter-globalization [5] — where there is space for solidarity, participation, self-determination, dignity, and reconciliation. However, there is no magic in pursuing utopia, as in contemporary rhetoric and its dreams of "Mathematics for All", "Life skills", "Citizenship", "Problem Solving," and "Mindsets." Language such as deregulation, climate, and inequality, relegated to those ways in which people "solve problems," establishes the abyssal gap between politics and life [35], a language of culture, survival, justice, existence, land, and land reform might describe what is at stake with necessary clarity. Such language is central to critical ethnomathematics. What would mathematics education look like if culture, survival, justice, existence, land, and land reform replaced numeracy, life skills, problem solving, and mindsets in our rhetoric, framing of research and practice, policy documents, to dwell in dystopia rather than in fantasies of various utopias?

Latour proposes a within-dystopia response to the pandemic: "Let us take advantage of the forced suspension of most activities to take stock of those we would like to see discontinued and those, on the contrary, that we would like to see developed" [36]. We advocate an analogous approach for mathematics education through the following questions, paraphrased from Latour.

- What are the activities, in and out of school and remote school learning, now suspended, that you would like to see not resumed?
- Describe why you think those activities are harmful / superfluous/ dangerous / inconsistent, and how their disappearance or suspension or substitution would make the activities you favour easier / more consistent.

(Make a separate paragraph for each of the activities listed in the first question).

- What measures do you recommend to ensure that the workers / employees / agents / entrepreneurs who will no longer be able to continue in the activities you are removing find support for their transition toward other activities?
- Which of the now-suspended activities would you like to develop / resume or even create from scratch?
- Describe why your newly developed or resumed activities seem positive to you, and how they make it easier / more harmonious / consistent with other activities that you favour, helping to combat those that you consider unfavourable. (Make a separate paragraph for each of the activities you list).
- What measures do you recommend to help workers / employees / agents / entrepreneurs acquire the capacities / means / income / instruments to take over / develop / create these favoured activities?

7. A recap for pandemic times

In those places around the world where COVID-19 was experienced as the most urgent crisis, there were three main mathematics-related trends:

(a) The greater need than we might have previously realized for the wider public to comprehend and interpret the mathematics behind models, graphs, etc., related to the pandemic, and in general as preparation for any crisis.

(b) Perpetuating the same curricula that did not prepare people for understanding the crisis in the first place even as schools focused during the pandemic on how to make (mathematics) teaching more accessible.

(c) Inconsistencies between what the public needs and what schools are doing.

To understand why these trends unfolded, we analysed school mathematics and mathematics education as dystopia. Critical ethnomathematics is a model of how to embrace dystopia rather than to try to overcome it or avoid it. Critical ethnomathematics education is an approach that addresses dystopic elements of contemporary mathematics education practice while centering attention on coloniality and the need to exploit traditional school mathematics in ways that serve local cultural, political, and environmental needs, in a broader, ethnomathematical commitment to local and indigenous mathematical practices.

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