

1-2018

The Unbearable Lightness of Dis|appearing Mathematics: Or, life and reason for the citizen at times of crisis

Anna Chronaki

Follow this and additional works at: <https://scholarworks.umt.edu/tme>

Let us know how access to this document benefits you.

Recommended Citation

Chronaki, Anna (2018) "The Unbearable Lightness of Dis|appearing Mathematics: Or, life and reason for the citizen at times of crisis," *The Mathematics Enthusiast*. Vol. 15 : No. 1 , Article 3.

DOI: <https://doi.org/10.54870/1551-3440.1415>

Available at: <https://scholarworks.umt.edu/tme/vol15/iss1/3>

This Article is brought to you for free and open access by ScholarWorks at University of Montana. It has been accepted for inclusion in The Mathematics Enthusiast by an authorized editor of ScholarWorks at University of Montana. For more information, please contact scholarworks@mso.umt.edu.

The Unbearable Lightness of Disappearing Mathematics:
Or, life and reason for the citizen at times of crisis

Anna Chronaki¹

University of Thessaly, Greece, GR

Malmö University, Sweden, SE

ABSTRACT: In the early 1960s, Ursula Le Guin wrote ‘The Masters’, a short novel that offers a sharp contrast to the ‘maths for all’ discourse of contemporary mathematics education reforms. Le Guin writes of a world – Edun – where ‘mathematical prohibition’ is law. Mathematical reason is banned for all people by the Priests of Edun, and failure to obey is punishable by death. Despite the threat of this totalitarian anti-math regime, some citizens create a collective heterotopia in which they practice mathematics in secret. Le Guin’s story is an opportunity to conduct a thought experiment: ‘what if maths became forbidden?’ This ‘what if’ experiment (Haraway 2016) allows us to consider how statements such as ‘maths for all’ or ‘no to maths’ are grounded in rationalisations that construe mathematical subjectivity as a determined actor for citizen agency in contemporary societies. The paper suggests that we need to move beyond a ‘maths for all’ or ‘no to maths’ dichotomy by interrogating how they both operate as ‘states of exception’ around politics of fear producing in/exclusions.

Keywords: biopolitics, in(ex)clusion, bare-life, precarious life, politics of fear, affirmative politics, reason, mathematical subject, agency, citizen

¹ chronaki@uth.gr

I. The Masters: *Life at the threshold of Mathematical Prohibition*

“The smoke was thick now, hiding the flames and the figure among them. But Ganil could hear his voice, not soft now, loud, very loud. He heard it, he forced himself to hear it, but at the same time he listened in his spirit to a steady voice, soft, continuing: ‘*What is the Sun? Why does it cross the sky? [...] Do you see how I need your numbers? [...] For XII, write 12 [...] This is also a figure, a figure for Nothing*’”

- Ursula Le Guin, *The Masters*, p. 58: *Last words by Mede, Ganil’s friend, as he dies.*

In her début science fiction story, ‘The Masters’, Ursula Le Guin tells the story of Edun; a dystopia in which practicing mathematics is forbidden. The story was originally published in the American science fiction magazine *Fantastic* and was recently adapted to the opera by Peter Foley and Kate Chisholm under the name *Hidden Sky*.² Le Guin invites her readers to follow Ganil, a young mathematician, who seeks shelter by becoming a Master at Edun. In Edun, sun and light have become scarce resources in the face of severe environmental decay. In this world of general crisis, the Priests have forbidden Masters, apprentices and the mass population from practicing mathematics. Only the Priests may practice mathematics, and the lay people are constrained to a common-sense life, absent of the burden of mathematical contemplation. Failure to obey is punishable by death. This ‘mathematics prohibition’ serves to tacitly construct maths as the cause for Edun’s environmental crisis.

In order to become a Master in a Lodge, Ganil had to take an Oath. The Oath is a promise to never reveal the rites and mysteries of the Lodge; to live, work and think well; to avoid all heresies; to betray all neuromancers to the Courts of College; to obey the High Masters and Priests and to deny the culture of his forefathers. A crucial part of the Oath is to swear to live free of the curse of mathematical reason. Although it was never explicitly said, mathematical reason was held responsible for all perils experienced at Edun. As such, being a Master in the *polis* of Edun means surrendering to a life of mathematical repression. Ganil had to furthermore denounce his will to gain knowledge,

² The *Hidden Sky* is an award winning musical theatre opera adaptation of the novel *The Masters* authored by Ursula Le Guin in 1963. Kate Chisholm is the playwright and Peter Foley the composer and director. The opera has been on stage three times from 2000 to 2010. More details can be found here: http://www.hellagoodmusic.com/works/theater/hidden_sky.htm

his competence to reason about mechanical or natural phenomena, and even his skills to invent or construct new ideas, tools, models, artefacts, apparatuses or networks.

In this paper, I employ Agamben's theorizing about *states of exception* – or situations in which crisis justifies elites' transgression of the rule of law – toward an analysis of mathematics education reform discourse. In the case of Edun, severe environmental crisis is leveraged by elites to introduce mathematical prohibition as an urgent need (Agamben 1998). By this law, the individual accused of maths heresy runs the risk of losing not only one's *bios* (i.e. life as citizen) but even one's own *zoê* (i.e. biological life). Agamben's (1998) theory of states of exception is an expansion of Foucault's notions of biopower, as diverse modern techniques that achieve to regulate, discipline and control populations by subjugating the human body. Foucault provided examples of biopower that include disciplinary strategies and punishment mechanisms enforced within institutional sites such as the prison, the family or the school. In modern times, biopolitics has been increasingly geared towards regulation of the mass population through the concept of security. As such, technologies of self-governance are geared to the production and particularly the protection of the viable or normal citizen.

Foucault (1973/2003) argues how biopower unfolds as a 'discourse of security', establishing binaries between 'us' and 'them' or between the 'normal' (i.e. legitimate citizens) who deserve to live and the 'abnormal' (i.e. undisciplined or illegal citizens) who are expendable. Agamben argues that biopower is not an orientation of modern politics, but the very essence of politics. Drawing from Aristotle's discussion of citizenship or life in the *polis* as consisting of *bios* and *zoê*, Agamben argues that the distinction between *bios* (i.e. the political life of the citizen) and *zoê* (i.e. biological life) is constituted by a simultaneous exclusion and inclusion. Ultimately this in/exclusion process can create not only marginalised or subaltern subjects, but also the 'homo sacer'; a person who, as offender, loses the right to citizenship and is condemned to live outside the *polis* without social and legal status. In contrast to the life of the citizen (i.e. *bios*), the 'homo sacer' exists only as bare life (i.e. *zoê*) out of the juridical order (ibid., p. 102). Ursula Le Guin in her novel narrates how the mathematical subject risks of becoming a 'homo sacer' in Edun and, thus, ceasing to be citizen.

Agamben argues that in current 'societies of control' we must also turn attention to the 'homo sacer' as a political subject. In *Edun*, the political subjectivity of homo sacer is crudely epitomized in the case of Mede, Ganil's friend. Finally, Ganil is found guilty of doing mathematics, arrested, sentenced to death and executed – losing both *bios* and *zōē*. However, despite the risk of death, some still opt toward practicing mathematics in secrecy as a collective heterotopia in the sense of developing a non-hegemonic physical or mental space where otherness is experienced as both utopia and dystopia (Foucault 1986).

At this point, one might wonder what might be the relevance of Le Guin's story in relation to current discussions of 'maths for all' or 'no to maths' in the field of mathematics education? First, one needs to account how certain policies worldwide attempt to cure mathematics education, urging reforms that would secure access to 'maths for all' through curricular changes, international or national assessment practices, teacher education programs, as well as, didactic and pedagogical products. Such cultural renewal of mathematics education claims to provide refined micro-contexts such as real-world simulations, models, or word-problems where the 'use-value' of mathematics is experienced as competences 'transfer' across school and workplace rationalised around the 'importance' of mathematics in the everyday. Against this hegemonic imperative, some researchers have worked to denote its fictional status arguing how mathematical activity creates a 'cynical distance' from a real-life that remains complex and impossible to grasp in its totality (Lundin 2011, Pais 2011, Straehler-Pohl 2017, Kollosche 2017). As such, the idea of mathematics as an important constituent of everyday activities is interrogated, and at the same time, the use-value ideology of mathematics as disavowing its part in the politico-economic structures of capitalism becomes critiqued. They ask mathematics educators to 'stop acting' as if mathematics is crucially important and, instead, say 'no'.

Although some mathematics education researchers embrace the 'no to maths' as a way to question the hegemonic status of a 'maths for all' fiction, such a move runs the risk of creating a bipolar dichotomy amongst the 'yes' and 'no' to maths claims. It advances a view on mathematics as a disappearing commodity and, at the same time, obscures from conceiving mathematics' potentiality otherwise. 'The Masters' helps

reconsider ‘maths for all’ and ‘no to maths’ within our current state of affairs by asking us to imagine a state where mathematics is outlawed for all citizens. This state does not only marginalise the mathematically able body but throws it out of its borders. Reading this novel alongside Agamben’s view of the life of citizen as *bios* and *zoê* reveals that both ‘yes’ and ‘no to maths’ discourses may run the risk of producing a ‘state of exception’ based on politics of fear. In this paper, Le Guin’s story ‘The Masters’ is explored as a ‘what if’ laboratory (Haraway 2016) where a contemplative space to interrogate the ‘disappearing mathematics’ can be created. I read the story in companion with Giorgio Agamben, Donna Haraway, Michael Bakhtin, Hannah Arendt and Alfred Whitehead, whilst keeping in mind prevailing discourses in mathematics education around the turbulent times of the 60s. In doing so, I have attempted to avoid a potential trap amongst a ‘*maths for all*’ and ‘*no to maths*’ dichotomy.

This paper is organised in five sections, including the introduction. The second section discusses the disappearing of mathematics as liberating the citizens of Edun from reason, and provides a historiography of the ‘no to math’ discourses in post-Marxist social theory. Throughout the ‘no to math’ discourse, reason is discursively fabricated as a synonym to mathematical reason. In a similar vein, the crises of Edun are blamed on violent or immoral scientific or technological uses of reason. In the following two sections, the theories of Hannah Arendt and Alfred Whitehead are employed to explore how reason relates to common-sense about the human condition. In the final section, I return to bipolar discourses around the ‘maths for all’ and ‘no to maths’ and discuss how they both tend to produce the very same thing: *fear*. Albeit using different narratives, this fear is being discursively constructed in a direct relation to the life of citizens.

II. A ‘*what if...*’ Laboratory

What is the world that Le Guin narrates in ‘The Masters’ and why is mathematical subjectivity configured as a dangerous and heretic matter in the land of Edun? Why is ‘mathematical prohibition’ utilized as a fear-inspiring law designating a ‘state of exception’? How could we, today, encounter Le Guin’s fiction along with contemporary discourses concerning the role of mathematics as biopower in the realm of mathematics education? Biopower in mathematics education is often geared towards construing the

desired citizen through a diversity of techniques that strive to discipline both students and teachers in the context of national and international comparative practices. What is mathematics today? What are the effects of considering mathematics as a formatting power in society, a way of reading, comprehending and emancipating the world, or, even, a system for fabricating the modern and neoliberal citizen? Is there room today for exploring a different kind of life with mathematics? The story of 'The Masters' could be read as a 'what if...' laboratory where relations around mathematics, life, ethics, reason, earth in decay, fear, violence, individual and state power are recurring themes. Here, we can re-consider and experiment with it in the light of a seemingly naïve, but, pressing question: 'What if mathematics became forbidden for all?'

The 'what if...' lab crafted by Le Guin in the short story of 'The Masters' does not provide easy answers to the above questions. Instead, through creating a dystopia (or utopia?) of a land that forbids mathematics, Le Guin invites us to step back from the 'maths for all' and 'no to maths' poles and speculate the unknown, the unthinkable or, even, the undesirable. Haraway (2016) advocates the value of such narratives in our struggles to articulate the meaning and effects of discourses that threaten to become 'regimes of truth' or normalized parts of practice and policy too quickly. She says: 'We have the habit of mind of going for a theory of everything very fast'. Although Haraway affirms the necessity of abstractions, she argues how 'stories' ground us into contingency and temporality. As an example, she refers to Kim Stanley Robinson's novel 'The Years of Rice and Salt', which provides a thought experiment for some provocative questions: 'What if the great plagues had destroyed Europe? What if? What if this tiny little thing had been a little bit different? What might have been the consequences?' Haraway argues that the importance of such a practice is not so much to support an imaginary of an alternative reality. Keeping a 'what if' approach is a way to keep things in play and a way to interrogate the promises and dangers of our times. Haraway notes, "It helps us to be not quite so hoodwinked by the notion of necessity. Including the necessity of tragic domination of the secular project of phallic man, which I think the Anthropocene is a name for (...) Humour, mixed with concern, anger, curiosity, and the imaginative insertion, every so often, of a 'what if'." (Haraway et al. 2016, p. 560)

Le Guin describes Edun as a state that not only takes distance from the ‘maths for all’ discourse, but actually forbids mathematical activity for the lay person. Why would the author want us to engage in such a trope? And how is this trope relevant for us today as we try to reconsider the subject of mathematics education in life and society? Although contingent to contemporary discourses of ‘maths for all’, Le Guin’s move does not seem accidental in her novel. Mikhael Bakhtin’s work on narratives centres the continuous presence of alterity; the encounter with the other as the inherent polyphony in every literary text. Discussing the meaning of any *word* as ‘*the problem of the text*’, Bakhtin (1986) explains eloquently that, rather than solely a conversation between the author and reader, “the word is a drama in which three characters participate” (p. xvii). The third participant, referred to by Bakhtin as the ‘specular subject’ or ‘superaddressee’ is always present alongside or in-between the author and reader. The speaking subject shapes an utterance not only according to the object of discourse (i.e. what the speaker talks or what the author writes about) and their immediate addressee (i.e. whom they are speaking or writing to), but also according to the ‘particular image in which they model the belief they will be understood, a belief that is a priori of all speech. Thus, each speaker authors an utterance not only with an audience-addressee, but a superaddressee in mind’ (Bakhtin 1986: xvii). The superaddressee can be traced through hegemonic discourses operating as ‘regimes of truths’ or ideological frames forming the specular subject. Le Guin’s specular subject is grounded in the 60s, when she wrote *The Masters*, and draws from discourses around modernity and science as ideological and political struggles.

During the 60s, both modernity and science were under attack for the social and environmental horrors they created for nature and society. The ensuing ‘science-wars’ involved epistemological disputes about the ‘rational’ or ‘civilised’ in contrast to ‘wild’ or ‘savage’ minds³. In this context, mathematical reason, scientific rationality and

³ Postmodernist standpoints concerning the nature of science, the role of science in society and its relation to nature have contributed to the development of what we refer today as ‘science-wars’. The term ‘science-wars’ refers to two interrelated debates around epistemological and ontological questions. The epistemological question refers to the nature of truth and the debate unfolds between ‘perspectivists’ or ‘relativists’ and ‘objectivists’. The ontological question problematises the nature of reality in controversial positions of constructivism and scientific realism. Postmodernists espouse, by and large, perspectivism, relativism and constructivism and reject scientific realism, whilst their opponents endorse objectivism and scientific realism whilst rejecting constructivism. It is often that postmodernists ascribe to Paul Feyerabend’s perspective of ‘epistemological anarchism’ in which in science ‘anything goes’, making it possible to endorse both ‘reliable’ and ‘mythical’ knowledge. A polemic and misleading critique comes from Gross and Levitt’s (1994) influential paper which describes postmodernists as anti-science Luddites, anarchists, academic lefts or the enemy within

technological determinism become interrogated as non-ethical governing practices that have produced horrors in modern society. At the same time, efforts to reform mathematics education – such as the ‘new-math’ or ‘modern’ mathematics – emerged. These reforms of the 60s still have effects on contemporary ‘maths for all’ discourses that invoke social justice, equity and democracy. Le Guin’s question of ‘*What if mathematics became forbidden?*’ appears to suggest a prediction of the future amidst the debates of the 60s. Today, a conjecture of ‘mathematical prohibition’ may seem extremely provocative or even taboo. It might be correct to note that institutional practices or educational policies nowadays worldwide could not ‘dare’ to envisage a curriculum without mathematics. The establishment of mandatory primary and secondary school mathematics curricula was a response to societal and political demands for development, progress and security after the horrors and catastrophes of the first and second world wars. In this historical context, the discursive constitution of mathematically dis/abled subjects via national school based curricula and global assessment practices such as PISA, OECD or TIMSS has provided a ‘system of reason’ (Popkewitz 2009) that has served to in/exclude the un/desired citizen. It has also promoted a vision of equity as ‘development’ via ‘the urgency for all to change’ and become citizens with rational agency: competent problem solvers or critical reasoners (Chronaki 2011, Pais & Valero 2012, Yolçu 2017, Andrade-Molina 2017).

Contemporary educational policy calls to ‘maths for all’ are interwoven with a complex net of discourses for the mastery of mathematics. Mathematical reason is taken as the ultimate objective, certain, neutral and transparent process in making meaning and producing ‘true’ or ‘real’ knowledge in an earth and society under decay. The universality of this discourse reads as if mathematics itself can be constituted responsible for the re/construction of a sustainable and democratic citizenship.⁴ In turn, this discourse

scientific circles. In Gross and Levitt’s view, postmodernists reject the very idea of science or scientific knowledge and do not accept any ‘authority’ in science and/or describe science as dangerous.

⁴ Indeed, ancient civilisations rooted in the geopolitics of what we call today Europe, Middle East or Asia, but also indigenous or first nation populations in the Canadian or American grounds have contributed to fundamental mathematical practices such as counting, measuring, reasoning, locating, sensing or constructing. Now, these practices have been reformulated into a specific version of mathematics that has travelled mainly (but not only) from the West to indigenous communities. This both reinforces and enforces a Eurocentric worldview as a culture-politics-science-life supremacy. Alongside religious catechism and missionary education, mathematics has become an essential colonising instrument strategically serving the empire, which, by and large, has ignored, diminished or ignored the contributions made by local cultures.

has been utilised as a disciplinary apparatus for governing not only the modern or neoliberal citizen, but also the indigenous or first nation colonised bodies and fe/male or dis/abled bodies (see Chronaki 2009 discussing feminist postcolonial critiques in school technoscience based on Spivak 1999, Harding 1998, Haraway 1997). Nowadays, most children and adults, if asked, would probably condemn compulsory math as it occurs in enclosures of learning or administration. Many studies report symptoms of children's repeated failures in school mathematics and lack of motivation to engage with decontextualized tasks or 'pseudo' models of a complex reality. Furthermore, research continuously uncovers class stratifications and racialization of mathematical and unbridgeable gaps related to children's backgrounds cultures, languages, genders, epistemologies and ontologies (Walkerdine 1998, Popkewitz 2004, Walshaw & Brown, 2012). Despite continuous research attempts towards addressing the above through innovative didactic, pedagogic or curricular interventions and theorizing the persistence of affect such as fear, anger, frustration, boredom or indifference we, today, continue to confront school mathematics as 'dead' (Fasheh 1997) and mathematics education at a continuous state of 'disorder' (Straehler-Pohl, Pais & Bohlmann, 2017).

We might claim an increased awareness of the futility or fallacy of remedying, correcting, renewing and readjusting school practices for a 'maths for all' (Lundin 2011). We can also urge each other to say 'no' to mathematics (Straehler-Pohl et al. 2017, Pais 2017, Kolloosche 2017). Such gestures, however, re-enforce the bipolar view of 'maths for all' and 'no to maths' that were present in the 'science wars' debates. Despite epistemological and political differences amongst current and old debates, they both tend to create a binary of 'yes' and 'no'. This bipolar view traps us into an affective relation of loving and hating mathematics rather than allowing us to consider ramifications of each view. With Agamben, we realise how both the 'yes' and 'no to maths' gestures which are built on discourses of 'fear' and 'fearism' result into people placing their *bios* and *zoê* on danger. Specifically, the 'yes' promotes maths as a saviour for a desired citizenship (and loosing maths as the fear of not being a good citizen) and the 'no' frames mathematics as a danger (imagine the one who exhibits maths ability starting to develop a fear of being too rational). Either conceiving mathematics as the 'saviour' or as the 'danger' in society

produces certain kinds of citizenship based on mathematical subjectivities such as the able, the marginalised, the subaltern or even the homo-sacer.

As such, Le Guin's story may help us to interrogate the 'yes/'no' dichotomy by examining the conjecture that, since mathematics has been responsible for state horrors and the earth's decay by producing docile bodies, then forbidding mathematics to the mass population will resolve crisis and will secure the betterment of life. By playing out this conjecture in her novel, she experiments with the idea of an enforced liberation from reason. Of course, she could have opted to explore a different question, that of 'What if mathematics itself was set free?' But, by confronting the question of 'what if mathematics is forbidden?', she engages us with the potential disappearance of mathematics in society – an unspeakable discourse in mathematics education circles today. In the following sections, the disappearing of mathematics in Le Guin's novel will be discussed in relation, *first* to liberating life from reason, *second* to life in-between power, reason and common-sense and *lastly* to reason as an anarchic 'art of life'.

III. Disappearing Mathematics: Or, liberating life from reason

“And I swear never to teach the Mysteries of Machinery to any gentile. I swear this beneath the Sun.”

-Ursula Le Guin, *The Masters*, p. 42: *The Oath before entry to Edun*

Ganil enters Edun walking naked, alone, shivering in the cold wind and holding a torch in sheer darkness. The 'voice' of an old man in white hair guides his steps. “*Now walk!*”, *‘Walk forward’*.” Ganil is petrified in the immense darkness where “the current of time had stopped”. He feels the pain in his body as he listens to a 'voice': “*You lie in the Grave. You lie in the Grave of Knowledge. So lie your forefathers forever beneath the ashes of the fires of Hell*”. Then, the same voice, pointing to Ganil's torch, signals: “*That is the Light of Human Reason. It guided you to the grave. Drop it!*” and continues: “*Now rise... rise from darkness and walk in the Light of Common Day*” (Le Guin 1963, p. 41).

From the very first scene in Le Guin's story, Edun is pictured as the dystopic land where the end of mathematics becomes law in order to force a return to common-sense life. As Ganil tries to enter the state of Edun, described as the land of Common Day, he is obliged to prevent mathematical contemplation of any sort. In Edun, the deployment of

state power in the everyday involves the mandatory disappearance of all kinds of mathematical activity such as calculating, using models, constructing artefacts and describing or interpreting natural phenomena. Attempts to make ‘accurate’ approximations of measurement beyond the use of a comparing stick and even modifications of existent machinery is condemned as heresy. The use of Arab numerals and algorithms are seen as black arts. Work with Roman numbers is paradoxically permitted, which can be read as Le Guin’s efforts to remind us of the forceful battles amongst algorists and abacists in the years between 1100 and 1500. Historically, the Europeans in the Middle Ages who promoted the use of Roman numerals and the abacus for enacting calculations were called abacists, whilst those who advocated the use of the Hindu/Arabic numerals along with the use of algorithms were called algorists. The four hundred years from 1100 to 1500 witnessed the long, and sometimes bitter, struggles between the abacists and the algorists. By 1500 algorithmic computing had won supremacy and in another hundred years the abacists were almost forgotten, whilst by the eighteenth century no trace of an abacus was found in western Europe (Eves 1983). The algorithm ban of the middle ages could be considered an analogy of current debates about how technology embedded algorithms (i.e. coding or programming languages) embody biopolitics through their capacity for panopticon surveillance in both macroscale online networks and nanoscale robotic biomedical systems. In all of these, algorithms lay hidden through automated procedures and can be set to observe, analyse and govern individual movements, acts, behaviours and preferences.⁵

In Edun, banning mathematics becomes a governing mechanism for citizens. It is rooted in discourses that frame the need of a return to a common-sense state where people are liberated from competences in number, logic or reason. In our times mathematics as a matter of global curricular learning has been imposed as key for

⁵ Self-assembly is the process in which small components automatically assemble themselves into large, complex structures. Examples in nature abound: lipids self-assemble to form a cell’s membrane, and bacteriophage virus proteins self-assemble to form a capsid that allows the virus to invade other bacteria. Even a phenomenon as simple as crystal formation is a process of self-assembly. How could such a process be described as “algorithmic?” The key word in the first sentence is *automatically*. Algorithms automate a series of simple computational tasks. Algorithmic self-assembly systems automate a series of simple growth tasks, in which the object being grown is simultaneously the machine controlling its own growth --The broad goal of nanoscience is to manipulate molecules with nanoscale precision. (Dotty, D. 2012. Theory of Algorithmic Self/Assembly: The challenge of programming molecules to manipulate themselves. Review article. Communications of the ACM. December 2012. Vol. 55. No. 12. 78/88).

governing the cosmopolitan citizen through logic, rationality, reason (Popkewitz 2008). The notions of governmentality and governing were coined by Foucault (2008) to expand the meaning of government to include not only political structures used directly to manage and administer, but also biopolitics enacted through the ‘conduct of conduct’; through the microphysics of power on individual human bodily practices. Paradoxically, one may note how such microphysics of power evolve for citizens both in Edun and in our times. In Le Guin’s story, the people of Edun say no to all modern and neoliberal monstrosities just by simply saying no to mathematics. First, they say no to the disciplining of the individual through school knowledge enclosures and, in particular, paradigms of order as authority, representation or individual rights (Foucault on *disciplinary societies*). And second, they say no to neoliberal fantasies in life that aim towards a total control of individual and collective moves through technologies that work implicitly at both macro and micro scales (Lazzarato on *societies of control*).

Throughout the descriptions of life in Edun, one can detect discourses that hold mathematics as the heart of science and technology in both modernity and neoliberal societies, and therefore also hold it responsible for the burdens of a generalized crisis we face today. Specifically, in the modern age, science has been overused by political power to serve values of progress, development, expansion, invasion, welfare, security and world peace. The turbulent political scene in the US during the 60s, where Le Guin lived and wrote this story, revolved around fear and anxieties. This was due to the Vietnam war (also known as resistance war against America) from 1955 to 1975 and the Sputnik shock in 1957, due to the launch of a man-made satellite by the Soviets. The latter event essentially forced the US to make science a national priority. The US and the Soviet Union fights for dominance in science and math were related to ideas about progress and development. During that time, the tyrannies of Nazism, Fascism and Stalinism developed through the use of ‘reason’ and ‘rationality’ in the course of military, administrative and state power. The stage of horrors and catastrophes in Europe, Russia and the US created the impetus for new left political activists and social theorists to fight for democratic emancipation and freedom of speech. Additionally, labour struggles, civil rights, earth rights, gay rights, wo/men rights and sexual liberation came to the fore as social issues.

It was within this context that the ‘new math’ reform was introduced in the US with an emphasis on axiomatising, algorithmic computing and abstract reasoning. Although it has started as an academic mathematics project amongst a group of distinguished mathematicians in France, it was soon promoted in the US, just after the Sputnik shock, as a way to reform the mathematics education curriculum⁶. The new math influenced curricular reforms worldwide in the 60s and 70s in countries of the so-called developed world such as US, UK, Japan, France and Germany. The new math placed enormous emphasis on abstract operations and symbolic logic reconfiguring formal mathematics as the queen of disciplines. Opposition was eventually expressed by parents, teachers and educators who complained furiously about the void amongst new math curricular pressures for formal axiomatic thinking and people’s ordinary experiences – a debate that is still with us today as a gap amongst diverse mathematical practices (Kline 1973, Walkerdine 1998).

In the light of post-war events, historians and political philosophers from diverse left perspectives started discussing science, maths and ethics beyond the myth of a neutral or innocent practice. Modernity evolved around a generative belief in mathematical reason, scientific rationality and technological determinism through a blind dedication to the pursue of knowledge forming what Foucault called the ‘disciplinary societies’. Mathematical reason, in particular, was envisioned as the heart of any technoscientific endeavour and its violent use in political projects of development made it responsible and accountable for society’s calamity. Briefly, critical theorists attached to Frankfurt School’s legacy have moved the argument that reason as part of technological determinism was key in advancing industrial or capitalist regimes and thus limiting subject’s autonomy and freedom to resist oppressive authority (Adorno & Horkheimer 1947:2002).

⁶ The idea of ‘new-math’ was largely influenced by the Bourbaki group of mathematicians who progressed mathematics into a sophisticated axiomatisation based on set theory, symbolic logic, Boolean algebra etc. and aimed for higher levels of abstract mathematical thought. The ‘new math’ recontextualisation as school curriculum reform in the US was advanced as a means for preparing the young generation for mathematical reasoning. Readiness for abstract, symbolic and algorithmic thinking through reasoned argumentation procedures was seen as a vital skill in developing future generations who could compete Soviet scientists and especially nuclear engineers.

In his manuscript *'One Dimensional Man'*, Marcuse (1964) explained how the coupling of reason and freedom has declined in the late industrial epoch where the citizen as labourer and worker cannot even oppose the hegemonic domination imposed via techniques of 'reason' in the context of work as an increased economic, political and cultural concentration. In addition, 'new left' scholarship in the course of post-Marxist, post-structuralist or post-colonialist approaches have interrogated the discursive construction of certain 'regimes of truth' or 'universals' by means of pure reasoning. The perils of 'reason' in society have been explored by Foucauldian genealogies, but also by certain post/colonial or de/colonial critiques on how Eurocentric visions of 'reason' have been imposed onto the active, yet, for some, the 'wild' life of indigenous or first citizens which are still rendered in tacit linguistic genres as under/developed, un/cultured or un/civilized (Spivak 1999). Walkerdine (1998) observes how the image of mathematics in society and schooling moved from a science of numerical calculation to a science of reason and reasoning that has influenced the formation of progressivism in mathematics education curricula and explains: "The powers of the mind were to be marshalled in order to govern a population through reason and the population would itself be developed enough to reason" (p. 30).

The focus on mathematical reasoning in school mathematics curricular reformations is an integral part of discourses that help to develop a progressive society through the making of the desired reasoned and rational individuals. Reason has become an instrument of domination that not only persuades, organizes and administers, but also liquidates negativity and tames resistance in the context of oppression. The axis of political thought around Althusser, Foucault, Deleuze or Ranciere have initiated critiques of modernity in direct relation to scientific reason or rationality. However, they also open the limits of 'critique' for a new aesthetics of mathematics as multiplicity in '*vitalism*' or '*vital power*' in Deleuze's words (Deleuze 1988) or, perhaps, as a new '*distribution of the sensual*' in Ranciere's (Ranciere 2004). In sum, by narrating the 'dis/appearance of maths' in relation to 'liberating life from reason', Le Guin creates a space where the discourse of a sheer negativity around mathematical reason as key for the burdens of modernity reflects also an ambivalent move. This ambivalent move goes from what Foucault called 'disciplinary societies' rooted in the enclosures of family, school, factory,

hospital or prison towards their increased replacement by ‘societies of control’ based on governing mechanisms of which “the language [...] is numerical” (Deleuze 1990 p. 4) and where algorithm, code and password tend to replace word, text or signature. At present times, having to confront the monstrosities of religious fundamentalism, racism and secularization as a worldwide generalized crisis one might need to question what might be the effects in life for the citizen of an enforced dis/appearance of mathematical reason as enforced absence (disappearance) or/and as an arduous enforced presence that seems to appear with difficulty (dis-appearance).

IV. But, what is life? And, could reason relate to the human condition of life?

The question around the role of mathematics, mathematical subjectivity and life as *bios* (i.e. the life of citizen) in the state of Edun ravaged by the misuse of maths is crucial to Le Guin’s narrative. The Priests struggle to ‘protect’ the mass population from using reason, logic or any forms of calculating devices by imposing a dictatorial ‘state of exception’ through the law of mathematical prohibition. Lay people are obliged to live a common life and abstain from any pursuit of mathematical knowledge.

In such ‘society of control’ individual governing is accomplished through the affective politics of fear (Ahmed 2004) directed at the citizen bodies. Heretical mathematics practitioners experience their life as the bare life of ‘homo sacer’ – the person who loses the status of citizen – as they face the fear of death. Any suspected subject is closely tracked or becomes exiled, and this politics of fear become technologies of their exclusion as citizens (Ahmed 2004). The paradox of the novel is that politics of death or *thanatopolitics* in Esposito’s thinking, becomes an affirmative politics of life in Edun, bringing forth simultaneously its protection and negation (Campbell 2006). Death of the heretics along with fearing the deaf of mathematics did not work simply as a negation of mathematics but as a protection of its own life since it was geared towards a politics that mobilizes people into longing for a return to the light of a common-sense life. But, what is life in the first place? And, how could reason relate to life?

Life, and life on earth, has been thoroughly discussed by Hannah Arendt as constituting the human condition of *active life* that evolves around three forms of activity: *labour* rooted in the biological process of the human body and life in earth, *work* which

corresponds to the making of objects and artefacts as a cycle of production and consumption, and *action*, or the political capacity to act on things that matter and “corresponds to our plurality as distinct individuals” (Arendt 1958:1998, p. ix). These activities are intimately connected with the core of human nature: birth and death, natality and mortality. Arendt writes about active life (*vita activa*) as partially separate from contemplative life (*vita contemplativa*) seen mainly through mainstream western philosophical thought as the activity of esoteric introspection in eternal structures and disassociated from life as lived collectively with others (Arendt 1958:1998). She explains how in modern age we have witnessed a celebration of a certain type of contemplative life where speculative reasoned thinking is overvalued at the expense of active life as labour, work and action.

If social theorists and political philosophers who critique modernity have spoken so cruelly about the perils of ‘reason’ and the dangers of mathematical practice what is left for Arendt? Hannah Arendt in fact problematizes a thirst for introspection in *vita contemplativa* as “*ancilla theologiae*” that becomes a goal on its own sake at the expense of *vita activa* (ibid., p. 292). Indeed, she brings forward the example of Adolf Eichmann’s inability to think. Labouring for the Nazis, he followed blindly ‘reason’ or, in fact, the ‘reasonable’ orders he had to obey wherein the evil of genocide lurked and made him one amongst the Nazi criminals. The Arendtian interrogation of such instances of contemplative thinking as ‘banality of evil’ resounds critiques on how ‘reason’ as ‘pure reason’ serves so eloquently to develop the language of modernity. However, Arendt rejects neither thinking nor scientific practice. On the contrary, she argues for the protection of thinking and science, maintaining that ‘reason’ is deeply weaved with the need to anew. In this, she agrees with Whitehead, who relates reason to novelty, saying how:

The essence of Reason in its lowliest forms is its judgments upon flashes of novelty, of novelty in immediate realization and of novelty which is relevant to apparition but not yet to action. In the stabilized life there is no room for Reason. The methodology has sunk from the method of novelty into a method of repetition. Reason is the organ of emphasis upon novelty. It provides the judgment by which it passes into realization in purpose, and thence its realization in fact (Whitehead 1929, p. 10).

As such, the function of reason, not in stabilized life but in a life always thirsty for newness, might be a violent act – an act geared towards continuous innovation or novelty. Whitehead reminds us that reason can function in varied ways that sometimes can have dangerous effects either on people's capacity to conduct other people, earth or animals, due to pressures to continually produce novelty at any cost. Addressing this issue might be a gesture towards disturbing the cycle of 'reasoning' by means of its negation. As such, a return to common-sense life can work towards 'saving' earth and society in response to the aftermaths of colonialism, modernism or neoliberalism. Arendt argues that the 'victory of the Animal Laborans' would not have been possible unless we had experienced extreme forms of violence based on well reasoned or seemingly reasonable obligations in 'secular' modern and colonialized societies (Arendt 1958:1998, p. 320). She explains that as we lose faith in modern values we tend to become deprived from the idea of an immortal life, a life that could always exist in the future as eternity by saying:

Individual life again became mortal, as mortal as it had been in antiquity, and the world was even less stable, less permanent, and hence less to be relied upon than it had been during the Christian era. Modern man, when he lost the certainty of a world to come, was thrown back upon himself and not upon his world; far from believing that the world might be potentially immortal, he was not even sure that it was real' (Arendt 1958:1998, p. 320).

Facing the loss of security that a vision of immortality begets, the *animal laborans* promise common-sense where mortality is vital to be celebrated as survival, joy or immediate happiness in the present.

Le Guin tries to exemplify a return to a life as '*animal laborans*' by crafting the state of Edun, purposefully called the land of the Common Day, as the place where life must be urgently liberated from reason and as the epoche that signifies a return to common-sense. But, the state of Edun paves out this return by a forceful law and even by paradigmatic death unfolding a discursive rationalisation of mathematical reason as the fearful evil. Le Guin, along with Arendt pleas for a return to common-sense so that people as '*animal laborans*' can engage in full fleshed bodily action grounded in life. Arendt reflects on the loss of common-sense or the human capacity to act with judgement as an endemic malady of crisis in our era: "The disappearance of common-sense nowadays is the most confident evidence of the current crisis. Part of the world is

destroyed in every crisis, something which is common to all of us” (Arendt 1958:1998, p. 227). In her political thought, the intellectual attitude of rational thinking becomes interrogated as being predominantly a modernist dream for creating citizenship ruled by the logic of production and consumption that alienates human beings from their shared world. Total adherence to ‘mathematical reason’ is critiqued as leading into technological determinism that produces societal horrors and catastrophes by disciplining the reasonable subject. But, at the same time, she problematizes a common-sense life without reason. She questions labour and work that refrain from reason as thoughtful judgement entwined in what is common-sense for her, as well as, a sightless turn into an ‘automatic functioning’ of governing practices witnessed in contemporaneous ‘societies of control’:

“The last stage of the laboring society, the society of jobholders, demands of its members a sheer automatic functioning, as though individual life has actually been submerged in the over-all life process of the species and the only active decision still required of the individual were to let go, so to speak, to abandon his individuality, the still individually sensed pain and trouble of living, and acquiesce in a dazed, ‘tranquilized’, functional type of behaviour.” (ibid., p. 322).

Le Guin narrates the dystopic land of disappearing mathematics as a ‘state of emergency’ where the law of ‘mathematical prohibition’ must protect people from the perils of ‘reason’ by negating reason itself. People must return to a common life. As already said, mathematical prohibition was exerted at varied layers constituting life at Edun. One could be found guilty if caught into any sort of mathematical activity, or, even, related to people who were suspects of any type of engagement with mathematical tasks. Disobedience to the law of ‘mathematics prohibition’ was perceived as heresy. People were closely censored at the level of their every day encounters, interrogating not only how people speak and act, but also how they move, gesture, behave and relate with the ‘other’. This can be described as a ‘repressive turn’ of a ruthless “authoritarianism for the masses” (Lazzarato 2011, p. 85). Under the threat of harsh laws and measures that forbid mathematical reason dictated by the oligarchy of Priests in Edun, the fabrication of the ‘*pure*’ or even the ‘*common*’ subject cleared from the sin of mathematics becomes a catalyst for the production not of the free or autonomous subjects, but the self-disciplined or self-regulated, and yet disconnected and subdued citizen. One can note how Le Guin

manages with her story to problematize a return to this much needed common-sense in the complete absence or loss of reason. By exposing on the one hand the perils of a blind resonance to mathematical reason and on the other hand the threats of a total disdain from reason she makes us confront this antinomy as a contradiction amongst inferences upon not easily resolvable conflict. In addition, by provoking her readers to imagine a land where mathematics becomes forbidden in the context of an austere sovereign power producing 'bare life' that even leads to *thanatopolitics*, she urges us to consider also the repression of reason not as the ban of mathematics *per se*, but as a *dispositif* where the politics of life, biopower and common-sense are assembled as entangled elements.

V. Mathematical Heterotopias: *Or, reason as the anarchic 'art of life'*

"By twilight of that cold Alterday they had gone as far as Mede could take Ganil. Indeed Ganil had gone further than Mede could follow him.

Mede: 'You must meet Yin', the fair man said. 'He can teach what you need. Yin works with angles, triangles, measurements. He can measure the distance between any two points, points you can't reach, using his triangles. He is a great Learner. Numbers are the heart of his knowledge, the language of it'

Ganil: And my own language.

Mede: Yes, it is. Not mine. I don't love numbers for themselves. I want to use them. To explain things... For instance, if you throw a ball, what makes the ball move?"

-Ursula Le Guin, *The Masters*, p. 49

Mathematical prohibition in Edun has been constructed as a total necessity, as reason is seen as responsible for earth's decay. Nature in Edun is pictured as the verge of environmental catastrophe, as Sun and Light have become rare and are worshipped as mythical gods. Le Guin describes how one day, when the sun came out, "a soft tremendous murmur rose up from the streets, squares, windows, roofs, walls of the city of Edun", and people cried "Heaven, heaven..." (p. 52). In this atmosphere of severe environmental crisis, mathematical prohibition becomes the tool for saving earth and human life by allowing people to live a common-sense life. However, life at Edun, called the land of the Common Day, becomes impossible for those who cannot tolerate the encumbrances of mathematical repression. Mathematical repression meant suppressing

the subject's freedom to knowledge and was experienced as an intolerable, agonizing and distressing enslavement. For example, Ganil, the newly initiated Master, cannot tolerate how young apprentices, such as Wanno, are not allowed to learn new ways of calculating or measuring, and are thus restricted to tedious memorization of tables.

The lightness of a common-sense life stemming from such forceful disappearance of mathematics becomes, paradoxically, an unendurably heavy weight. Inspired by Milan Kundera's well-known novel⁷, Hagedorn (2015) discusses the "*unbearable gravity of being*" (p. 54) by pointing out how Nietzsche considers mortality and indeed, death, in his 'Birth of Tragedy' as important of being able "to live and even to live happily" (p. 54). Nietzsche (1999), discussing the essence of a human being, refers to Greek tragedy where the ephemeral and wretched race of the human being is destined to death and urges us to consider that: "the second best thing for you is: to die soon" (p. 23) whilst "the very first thing is utterly beyond your reach not to have been born, not to be, to be nothing" (p. 23). It is exactly within this ephemeral character of human life that a creative world can or must be built that brings joy instead of despair at the loss of life, according to Silenus's wise words⁸. Based on Nietzsche's analysis, Hagedorn (2015) argues how "out of an urgent need to make life bearable the Greeks created the magic mountain of the joyful Olympians" (p. 55). Could we dare say that Ganil, Mede, Yin and the necromancers in Edun opt to create their mathematical heterotopia as a way to face their mortality?

We see how Ganil, Mede, Yin and others opted to perform mathematics in secrecy, placing their lives at jeopardy. Ultimately, Ganil meets additional friends who were forming secret mathematics in disguise. Being illegal, mathematics lurked everywhere⁹ in wherever lay people, prentices, Masters or Priests could find opportunities to practice it. Once Ganil made friends with Mede, his co-Master in the Lodge, he shared his passion for mathematics. Soon Mede, Ganil, Yin and others were regularly meeting in

⁷ Milan Kundera's novel '*The Unbearable Lightness of Being*' appeared first in French in 1984 and then in the Czech in 1985, but it took until 2006 before the Czech Republic published the book. The novel narrates the political struggles of the Prague Spring of 1968 through the lives of three lovers, discussing totalitarianism, moral obligation, freedom, love and liberation.

⁸ Silenus was a companion of Dionysus and described this world after King Midas caught him (see Hagedorn 2015, p. 54-55).

⁹ Foucault arrives at a similar observation when discussing sexual repression. He notes that when sex was constructed as illegal and dangerous its presence and popularity could be detected everywhere making it illegal, forbidden, but yet desired.

secret and practiced in their mathematical heterotopia in agonizing despair; seeking to create the conditions that would allow them autonomy in what they desired to do. The secret gatherings amongst Mede, Ganil, Yin and others were not simply an escape from enslavement, but a return to freedom of being and realizing their mortality. Amidst ruthless sovereign conditions and environmental calamity, their desire in mathematics grew deeper.

They regularly met covertly, particularly with Yin, an old necromancer who had been suspect of math heresy and kept in custody. There, before the fire at Yin's house, they could disclose and explore cosmic mysteries and contemplate enigmatic or perplexing questions such as 'what is the sun?', 'what is its shape?', 'is it a circle, or a sphere?', 'how big is it?'. However, this joy and pleasure in seeking knowledge together could, at the same time, put their own life at risk in the face of a society governed by a sovereign power in the name of crisis¹⁰. A crisis that exposes the 'unbearable lightness of being' as discussed by Milan Kundera and which according to Ludger Hagedorn (2015) is today "the secret shibboleth of the post-modern globalised world" (p. 49). Hagedorn eloquently discusses current conditions of 'being' in which our commitment to each other is superseded by a flexible, non-binding mode of life. Against this tendency, Ganil's heterotopia of learners and necromancers pursues maths as a way to interrogate the 'lightness of Being'. Such a response could be read as resistance to state-imposed mathematical repression, but, at the same time, it could be read as a response to life itself (Arendt 1958:1998) that could reshape and sustain their socially grounded mathematical subjectivity. Foucault – in the History of Sexuality – describes how sexual repression leads to displacement, reorientation and intensification of desire and ultimately the production of *heterotopias* that produce and distribute knowledge, induce pleasure and generate power relations. Their mathematical heterotopia was a place where the practice of reason afforded them an anarchic act of life.

Le Guin's utopian politics is often discussed in relation to anarchist freedom. Both Le Guin and anarchism attempt to move beyond the dipole of modern and

¹⁰ Discourses around crisis in society and crisis in education have been seen as recurring and interacting phenomena, always part of broader net of politics of power and regimes of totalitarianism or democracy within society (see Arendt 1953 about the crisis in education).

postmodern epochs in search of new collectivities and new stances toward science or nature. Whitehead, discussing the function of reason in an essay published in 1929, argues that it is anarchic: ‘Reason is the self-discipline of the originate element in history. Apart from the operations of Reason, this element is anarchic’ (p. xx) Although Whitehead’s approach to ‘history’ is through the eventful timescape of nature’s decay as ‘degradation of energy’ or a waste of matter he emphasizes its engendered genesis ‘exemplified by the yearly renewal of nature in the spring, and by the upward course of biological evolution’. Within such perspective of history, where nature itself is woven with ‘natality’ in Arend’s words or regeneration in Haraway’s, one may apply ‘reason’ to reach into the wildest questionings of life itself. Or, even, one may use reason to escape a life that becomes repressive, oppressive or precarious – a bare life lived as a state of exception. And it is exactly the confrontation of such a precarious bare life that make some people in Edun seek and create heterotopias. There, they can be, albeit temporarily, free.

Considering that an attempt to determine the potential function of ‘reason’ can take a long philosophical journey full of controversies in-between on the one hand reason and on the other hand faith, authority, intuition, critique, imagination, agency, purpose, syllogism, argument, rationalism, empiricism amongst scopes of mental experience.¹¹ Instead, Whitehead searches Reason in direct relation to animal adaptation in nature and maintains how we need to hold on two contrasted forms of considering reason: “Reason as seeking a complete understanding and Reason as seeking an immediate method of action” (p. 11) arguing how these two forms must be coordinated. He further explains that reason as abstraction focuses on complete understandings given by a godlike faculty above the world, whilst the pursue of reason as process emphasizes the operation of judgements within messy worlds. He continues stressing: “The Greeks have bequeathed to us two figures, whose real or mythical lives conform to these two notions –Plato and

¹¹ Historically, reason, with roots in the philosophical traditions of Plato and Aristotle in ancient Greece but also in the narratives of Homer in Ulysses, became an episteme based on exploring rigorous argumentation and logic for the pursue of ‘true’. In Enlightenment, rationalists such as Descartes (1596-1650) emphasized reason as a deductive intellectual endeavour, empiricists such as Newton (1642-1727) favoured induction as the need to ground hypothesis into natural observations, whilst Leibniz (1646-1715) focused towards formulating a universal rational language for reasoning emphasizing symbolic logic at the expense of sensory experience (Toulmin, 2003, Whitehead, 1929).

Ulysses. The one shares Reason with the Gods, the other shares it with the foxes” (pp. 9-10). Yet, Whitehead asserts that amidst all these, the ultimate function of reason must be to “...promote the art of life” and his argument evolves by questioning the mere application of reason for ‘the survival of the fittest’ claiming that ‘fitness for survival’ alone¹² is not a satisfactory exemplification of the Art of Life (p. 4). One may wonder if we could, perhaps, turn into a similar path of inquiring for an art of life in mathematics education practices.

VI: Is it, really, about mathematics?

‘The Masters’ narrates life in Edun, a place of severe environmental crisis. Here, sovereign power penetrates the body, tracing its ‘bare life’ through the totalitarian mathematical ban. People are closely tracked and controlled and thus governed by means of this canon, and if found disobedient, they are announced heretics, sent to court and condemned to death. As science fiction stories are popular, particular amongst youth, it is important to ask how mathematical subjectivities are crafted in science fiction, and how these mathematical subjectivities relate to forms of life, governing power mechanisms and discourses of environmental and societal crisis. Still, this short story might have a particular value for researchers in the field of mathematics education concerned about its symptoms and disorders. The story encourages us to revisit the dichotomous moves of a pendulum across the poles of the ‘maths for all’ and ‘no to maths’. What we may consider through Le Guin is that the urgency of an absolute ‘yes’ to mathematics for all in mathematics education research is part of a broader assemblage of institutions, such as schooling, pedagogical models, national and international assessments, competitions, market products and even leisure sites. As such, it becomes part of a complex net of discursive and corporeal power relations.

In reaction to this, a turn to a ‘no’ to mathematics - enforced as math repression to all - could be seen as a temporality that both invites a return to a common-sense life and

¹² Loyalty to reason has been key for enculturating the civilized subject freed from the chaotic mysteries of reality and the superstitious spirit in feudalism of mediaval Europe. For Modernity’s project, mathematical reason was celebrated, at the expense of intuition and senses, for orienting life away from the uncertain grounds of tradition and religion beliefs. Reason became key for producing a world construed around the values of rationality, progress and development, and mediated the construction of ‘machinery’ technologies and administrative strategies, and thus, served to change drastically work and labor (Kant 1781:1998).

produces the homo sacer. With Agamben and Esposito we see how both ‘yes’ and ‘no’ to mathematics can be seen as governing mechanisms or technologies of self imposed by totalitarian regimes producing inclusions and exclusions. For Agamben, biopolitics in western thinking, from the Aristotelian notion of man as ‘*political animal*’ until now is covert sovereignty as power over life. This has been evident in mathematics education practices that produce the mathematically disabled subject as unskilled, incompetent or unfit in a society that strives for progress, as well as the mathematically able subject as fearful, dangerous or disenchanted from a common-sense life. It is in such cases that individuals turn to heterotopic spaces of mathematical activity which, according to Esposito, provide the affirmative politics that protect and create life anew.

However, Le Guin also reminds us that a safe return to a ‘common-sense’ life, cleared from all burdens of savage, enlightened, cultured, colonial, modern, disciplinary or even control societies was never and can never be an easy path. In other words, whilst ‘maths for all’ normalizes citizens through the ideal of mathematical reason, a ‘no to maths’ produces citizens who fear to reason for themselves. Fear of mathematics may lead some to a complete lack of resorting to reason (i.e. mathematics repression), especially since reason becomes more and more embedded and hidden into scientific and technological developments. We come to appreciate that the repressive aspects of state power cannot produce subjects freed or liberated from the powers of reason. Arendt argues for reason as grounded in common-sense, and, similarly, Whitehead speaks of bodily reason that does not serve the survival of the fittest or a complete universal understanding of nature, but rather serves common good. This reminds of Haraway’s claim that we have no alternative but ‘staying with the trouble’ (p. 58) caused by perils and demands in our turbulent epoch and search for ways of ‘sympoiesis’ and ‘symbiogenesis’ (p. 58) or making-with as ‘nothing makes itself; nothing is really autopoietic or self-organising’ (p. 58). We have no alternative but to live-with, think-with and become-with others exploring potentialities of rebirth, natality and regeneration. Is this, perhaps, the way we need to fight for in mathematics education today?

Acknowledgements

I would like to thank Joshua Leavitt for mentioning Le Guin's story, Peter Foley for providing access to the manuscript, the volume editors for their interest in this work, as well as, Margaret Walshaw, Lisa Darragh and Alyse Schneider for their reviews and editing suggestions.

References

- Adorno, T. W., & Horkheimer, M. (1947/2002). *Dialectic of Enlightenment*. Stanford: Stanford University Press.
- Agamben, G. (1998). *Homo Sacer: Sovereign Power and Bare Life*. Stanford: Stanford University Press.
- Ahmed, S. (2004) *The Cultural Politics of Emotion*. Edinburgh. Edinburgh University Press.
- Andrade, M. (2017). Be the Best Version of Your Self! OECD's Promises of Welfare through School Mathematics. In A. Chronaki (Ed.), *Mathematics Education and Life at Times of Crisis*. MES 9 Conference Proceedings. Vol. 2 (p. 393-400). Volos, Greece.
- Arendt, H. (1958:1998). *Human Condition*. Chicago: University of Chicago Press.
- Arendt, H. (1961:1993). *Between Past and Future*. New York: Penguin Books.
- Bakhtin, M. M. (1986). *Speech Genres and Other Late Essays*. Austin: University of Texas Press.
- Chronaki, A. (2011). Disrupting development as the quality/equity discourse: Cyborgs and subalterns in school technoscience. In B. Atweh, M. Graven, W. Secada, & P. Valero (Eds.). *Mapping equity and quality in mathematics education* (pp. 3-21). Dordrecht: Springer
- Deleuze, G. (1992). Postscript on the Societies of Control, *October*, 59, 3-7.
- Deleuze, G. (1988). *Foucault*. Minesota. University of Minesota Press (translated by Sean Hand).
- Campbell, T. (2006). Interview: Roberto Esposito. *diacritics*, 36(2), 49-56.
- Eves, H. (1983). *Great Moments in Mathematics: Before 1650*. Washington D.C.: The Mathematical Association of America.
- Fasheh, M. (1997). Is Math in the Classroom Neutral: Or Dead? A View from Palestine. *For the Learning of Mathematics*, 17(2), 24-27.
- Foley, P., & Chisholm, K. (2000, personal communication). The Hidden Sky: Playwriting of Le Guin's 'The Masters'.

- Foucault, M. (1980). *Power/Knowledge: Selected interviews and other writings*. New York: Pantheon.
- Foucault, M. (1978:1990). *History of Sexuality (volumes 1 & 2)*. New York: Vintage Books.
- Foucault, M. (1973:2003). *The Birth of Clinic*. London. Routledge.
- Foucault, M. (2008) *The Birth of Biopolitics: Lectures at the Collège de France, 1978-1979*. Basingstoke: Palgrave Macmillan.
- Foucault, M. (1986). Of Other Spaces, *Diacritics*, 16 (1), 22–27.
- Gross, P., & Levitt, N. (1994). *Higher Superstition: The Academic Left and its Quarrels with Science*. Baltimore: John Hopkins University Press.
- Hagedorn, L. (2015). Lightness of Being, Gravity of Thought: (Dis-)Orientations in Nietzsche and Kundera. In M.S. Cavalcante Schuback & T. Lane (Eds.). *Dis-Orientations: Philosophy, Literature and the Lost Grounds of Modernity* (p. 49-68). London: Rowman & Littlefield.
- Haraway, D., Ishikawa, N., Gilbert, S. F., Olwig, K., Tsing, A. L., & Bubandt, N. (2016). Anthropologists are talking—about the Anthropocene. *Ethnos*, 81(3), 535-564.
- Haraway, D. (2016). *Staying with the Trouble: Making Kin in the Chthulucene*. Durham: Duke University Press.
- Haraway, D. (1997). *Modest_Witness@Second_Millennium.FemaleMan© Meets_OncoMouse™ : Feminism and Technoscience*. New York: Routledge
- Harding, S. (1998). *Is Science Multicultural? Postcolonialisms, Feminisms, and Epistemologies*. Bloomington: Indiana University Press.
- Kant, I. (1781:1998). *The Critique of Pure Reason*. Cambridge: Cambridge University Press. Translated and edited by Paul Guyer and Allen W. Wood.
- Kollosche, D. (2017). Saying ‘No’ to Mathematics. In A. Chronaki (Ed.), *Mathematics Education and Life at Times of Crisis*. MES 9 Conference Proceedings. Vol. 1 (p. 112-116). Volos, Greece.
- Kline, M. (1973). *Why Johnny can't add: the failure of the new math*. New York: St. Martin's Press.
- Kundera, M. (1984). *The Unbearable Lightness of Being*. New York: Harper & Row Publishers.

- Lazzarato, M. (2011). *The Making of the Indebted Man: An Essay on the Neoliberal Condition*. Los Angeles: Semiotext(e).
- Le Guin, U. (1975). The Masters. In U. Le Guin (Ed.). *The Wind's Twelve Quarters: Short Stories* (pp. 40-59). New York: Harper & Row.
- Lundin, S. (2011). Hating School, loving mathematics: On the ideological function of critique and reform in mathematics education. *Educational Studies in Mathematics Education*, 80(1-2), 73-85.
- Marcuse, H. (1964). *One-Dimensional Man: Studies in the Ideology of Advanced Industrial Society*. Boston: Beacon Press.
- Nietzsche, F. (1999). *The Birth of the Tragedy*. Cambridge: Cambridge University Press.
- Pais, A. & Valero, P. (2012). Researching Research: Mathematics Education in the Political. *Educational Studies in Mathematics*, 80(1-2), 9-24.
- Pais, A. (2011). *Mathematics education and the political: An ideology critique of an educational research field*. Unpublished PhD thesis. Aalborg University.
- Popkewitz, T. (2004). The alchemy of the mathematics curriculum: Inscriptions and the fabrication of the child. *American educational research journal*, 41(1), 3-34.
- Popkewitz, T. S. (2009). Globalization as a system of reason: The historical possibility and the political in pedagogical policy and research. *Yearbook of the National Society for the Study of Education*, 108(2), 247-267.
- Rancière (2004) *The Politics of Aesthetics: The Distribution of the Sensible*. London and New York: Continuum. Translated by. Gabriel Rockhill.
- Straehler-Pohl, H. (2017). Delmathematization and Ideology in times of capitalism: Recovering Critical distance. In H. Straehler-Pohl, N. Bohlmann, & A. Pais (Eds.) *The Disorder of Mathematics Education. Challenging the Sociopolitical Dimensions of Research* (pp. 35-52). New York: Springer.
- Straehler-Pohl, H. Pais, A., & Bohlmann, N. (Eds.). (2017) *Disorder of Mathematics Education: Challenging the Sociopolitical Dimensions of Research*. Switzerland: Springer.
- Spivak, G. (1999). *A Critique of Postcolonial Reason: Toward a History of the Vanishing Present*. Cambridge: Harvard University Press.
- Toulmin, S. (2003). *Return to Reason*. Cambridge: Harvard University Press.

Yolçu, A. (2017). Historicising Math for All. In A. Chronaki (Ed.), *Mathematics Education and Life at Times of Crisis*. MES 9 Conference Proceedings. Vol. 2 (p. 1011-1022). Volos. University of Thessaly Press.

Walkerdine, V. (1998). *Counting Girls Out: Girls and Mathematics*. London: Falmer Press.

Walshaw, M., & Brown, T. (2012). Mathematics education and contemporary theory: guest editorial. *Educational Studies in Mathematics*, 80(1-2), 1-8.

Whitehead, A. N. (1929). *The Function of Reason*. Princeton: Princeton University Press.