

Welcome to the Jungle

An Orientation Guide to the Disorder of Mathematics Education

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The Promise of Socio-Political Research in Mathematics Education”

Welcome to the jungle, we've got fun and games
We got everything you want honey, we know the names
We are the people that can find whatever you may need
If you got the money honey we got your disease
(Guns'n'Roses. "Welcome to the jungle")

Regardless of whether the attention to the socio-political dimensions of mathematics education is to be rated as a “shift of paradigm”, a “turn” (e.g., Valero 2004, Gutiérrez 2013) or rather as the development of a new “branch” (Jablonka and Bergsten 2010, Jablonka et al. 2013), such dimensions have been gradually recognised as an important part of mathematics education research. It is about to become institutionalised as a firm strand of mathematics education research just as “philosophy of mathematics (education)”, “history of mathematics (education)”, “modelling and applications” or “geometry”. Established conferences like ICME and CERME now incorporate in their programmes working groups exclusively dedicated to socio-political studies; the “Mathematics Education and Society” conference series has become an inherent part of the field (see e.g., Mukhopadhyay and Greer 2015, Berger et al. 2013, Gellert et al. 2010); on a regular basis, themes like “equity”, “diversity”, “social justice” and “critical education” are

problematized in edited collections (see e.g., Bishop et al. 2015, Skovsmose and Greer 2012, Herbel-Eisenmann et al. 2012, Forgasz and Rivera 2012, Atweh et al. 2011, Alrø et al. 2010, Black et al. 2009, Clarkson and Presmeg 2008, de Freitas and Nolan 2008, Valero and Zevenbergen 2004) and special issues of the most renowned journals (see e.g., Morgan and Kanes 2014, Gutiérrez 2013a, Meaney and Valero 2014); and one of the four sections that compound the very recent Third International Handbook of Mathematics Education is dedicated to “Social, Political and Cultural Dimensions in Mathematics Education” (Clements et al. 2013).

“The socio-political dimensions of mathematics education” has thus become a banner whereby researchers, who desire to contribute to the betterment of society, can situate their work within mathematics education. They do not longer need to do so at the margin of the field, as it was the case thirty years ago when the first elements of socio-political approaches started to appear as research areas such as ethnomathematics or critical mathematics education (see also Gellert in this volume). Those works are often critical of past and current approaches to mathematics education, and have the explicit aim to politicize the practices of teaching and learning mathematics as well as research itself.

Against this background, the term “socio-political” promises to bring new insights to the persisting question of why mathematics appears to be just for some, but not for all (see e.g., Gates and Vistro-Yu 2003). We can conceive this promise as a finally sounding wake-up call; however, it can be conceived as well as the pythou Kaa from The Jungle Book (Walt Disney Productions 1967) when singing:

Trust in me, just in me
Shut your eyes and trust in me
You can sleep safe and sound
Knowing I am around.

To succumb to the temptation and therefore embracing the socio-political label provides a sense of reassurance and clean conscience to the researcher. It supplies researchers with a coherent narrative wherein to situate their work amidst a field and a practice where failure (in school mathematics) is a generalised feature. Also, it enables researchers to see themselves as partisans against the negative effects of mathematics education, thus making it difficult to critically reappraise what might be their own role in these same effects. By not being at the margins of the field anymore – with implications for publishing, teaching, funding and traveling (to conferences, project meetings and the like) – the politically engaged researcher finds reassurance in the idea that, through their work, political concerns are being addressed in mathematics education. The fact that the apparent progress marked by research is hardly accompanied by an improvement of the teaching and learning of mathematics outside the realm of research (that is after the research caravan has moved on or where it does not dwell), often goes unremarked.

The politically engaged researcher can continue her or his research because the socio-political banner is there to offer her or him reassurance that he or she is on the right path. The aspiration of this volume is to show that the motive of “politi-

cizing” operates in the ambiguous field of tension between political activation and (unintended) political pacification.

Socio-Political Research – A Diverse Forest?

There is nowadays in the field of mathematics education a considerable array of different approaches, theories and methodologies the politically engaged researcher can select from. One can opt for a postmodern approach, emphasising issues of power and identity (e.g., Gutiérrez 2013b, Stinson and Bullock 2012, Valero 2015, Valero and Stentoft 2010, Walshaw 2004); one can also decide for a more traditional use of critical theory (e.g. Skovsmose 1994, Gutstein 2006), or for exploring the vast array of contemporary theories by bringing into the field the work of contemporary philosophers, linguists or sociologists and their cutting-edge research (Brown and Walshaw 2012, Brown et al. 2016). However, the politically engaged researcher is also confronted with a quite narrow and pre-defined horizon to which he or she should align his or her movement. There appears to be an unquestionable assumption that “mathematics for all” is the only possible emancipatory prospect wherein to situate one’s work, if the purpose is to be recognized for politically relevant research or to build up an identity as a political mathematics educator. In order to be of value or importance, ideas must contribute to the evolution of this sublime prospect.

It is our contention that such a narrowing of the political horizon to a regulative ideal – “mathematics for all” – curtails the ways in which researchers could conceive the “political” in mathematics education and disavows a more critical approach to the field’s place in political economy. It narrows down the speculative *could* which is oriented to a yet to be thought future, to a normative *should* that is oriented to perpetuating the ideals of the present tense.

Instead of conceiving the systematic failure in providing mathematics for all as the result of particular obstacles that, once removed, would allow the fulfilment of the ideal, we challenge the reader to conceive these obstacles as being immanent to the field of mathematics education as such. That is, not only these obstacles cannot be removed but are there precisely to create the illusion that without them, mathematics for all will be possible. It is thus not the obstacles, but the illusion what maintains the status quo.

Fuelled by the definition of what should be, there is a clear danger for the socio-political dimensions of research to become both proceduralised and technicalised: fixed theories on how to conceive mathematics for social justice; fixed methodologies how to research it; and finally fixed pedagogies for how to apply it. As a result, while there is no doubt about the diversity of approaches to research the societal dimensions of mathematics education, this diversity, however, takes place within a relatively unified symbolic order; an order which is well aligned to the operating modes of global capitalism.

This volume rests on the possibility of finding the social and political relevance of mathematics education exactly where it appears to be contradictory, chaotic or even “messy”. Instead of taking for granted the ideal of “mathematics for all”, the contributions gathered in this volume seek to unsettle this ideal, by probing the way researchers use it as an empty signifier creating a sense of harmony between different research approaches. In this regard, the title of the volume can be seen as an indication that in order to revitalize our political imagination, we need to break with the alleged coherence or “order” of mathematics education.

From Diversity to Disorder

But how is it possible to break with this allegedly coherent order, particularly under the condition that this order is not monolithic, but already diversified? Moreover, how can this be possible, when the allegedly coherent order is not an authoritative mandate, but rather an “open” appeal that agents pursue in a self-determined, free and often enthusiastic way? Breaking with order *from within* appears as an indissoluble dilemma, as an impossibility. At the same time, any order of meanings that is not simply self-referential but relates to the empirical reality of lived experiences must include a constitutive moment of inner contradiction: a paradoxical moment whose recognition from within can be suspended temporarily for practical (or pragmatic) reasons, but that nevertheless remains finally unresolved and unresolvable¹. Such paradoxical moments call into question the distinction between “inside” and “outside” of a symbolic order. However, this commonly assumed dichotomy has been effectively undermined by contemporary philosophers (see e.g., Deleuze's (1993) concept of the “fold”, or Žižek's (2009) elaborations on the “parallax”). Following such attempts to undermine the only apparently unbridgeable division of inside and outside, the task would be, then, to systematically arrange an array of “inside” perspectives, so that they lay bare the intrinsic paradoxes in the *mode of collision*. Let's take Jorge Luis Borges' encyclopaedia of animals as an example, which has not least achieved fame through its discussion in the preface of Foucault's “The order of things” (2009, p. xvi. originally published in French in 1966):

This passage quotes a ‘certain Chinese encyclopaedia’ in which it is written that ‘animals are divided into: (a) belonging to the Emperor, (b) embalmed, (c) tame, (d) sucking pigs, (e) sirens, (f) fabulous, (g) stray dogs, (h) included in the present classification, (i) frenzied, (j) innumerable, (k) drawn with a very fine camelhair brush, (l) et cetera, (m) having just broken the water pitcher, (n) that from a long way off look like flies.

According to Foucault, this encyclopaedia succeeds in

¹ See the Gödel theorem (Gödel 1931) as an example that should be more or less familiar to most mathematics educators.

breaking up all the ordered surfaces and all the planes with which we are accustomed to tame the wild profusion of existing things, and continuing long afterwards to disturb and threaten with collapse our age-old distinction between the Same and the Other. (ibid.)

It is *through* this apparently absurd and surreal order of categories that we are enabled to think meanings that were impossible to think beforehand. The fact that we can think these meanings which were formerly impossible is less the result of naming and fantasizing a corresponding meaning (e.g. sirens) than the result of a contradictory order that distinguishes the categories by means of a classification:

It is not the ‘fabulous’ animals that are impossible, since they are designated as such, but the narrowness of the distance separating them from (and juxtaposing them to) the stray dogs, or the animals that from a long way off look like flies. What transgresses the boundaries of all imagination, of all possible thought, is simply that alphabetical series (a, b, c, d) which links each of those categories to all the others. (p.xvii)

Hence, it is through admittance to an order that we can reach a space beyond it – a disorder – without simply assuming a different, supposedly coherent “external” order. It is the specification of a (yet) strange and suspicious order that forces us to stop thinking things in the manner we are used to; it compels us to make familiar orders of meaning collide with unfamiliar ones. It is through this collision that orders reveal their contingency and lay bare their intrinsically “political foundation” (Žižek 2000). Following this line of thought, we perceive “the disorder of mathematics education” *not as the absence of order*, nor as an allegedly original and natural state that precedes our current perception of the world. Rather, we perceive the disorder *as the intrinsic excess of order*, a not foreseeable surplus, an obscene downside that results from the process of ordering itself. As Pfaller (2011) demonstrates, any symbolic order necessarily includes the command for its very own violation.²

Thus, when we aim at breaking with the alleged coherence or “order” of mathematics education from within to lay bare the disorder beyond familiar perceptions of mathematics education, a relativist celebration of diversity appears as a dead end. Simply adding a new alternative perspective leaves the status quo perfectly intact. Only by facing the obscene downside of order can we dismantle the political contingency of the status quo, revealing its disordered foundation, injecting it back into the political arena.

Thus, we shall not conceive the “disorder of mathematics education” as neither a complement to the existing branch of “socio-political research” (e.g., “deconstructions of socio-political research in mathematics education”), nor as a subcategory of “socio-political research” (e.g., “poststructuralist approaches to the so-

² “We shall not forget that ‘symbolische Ordnung’ makes both in French and English semantic reference to the social system of rules [Regeln] and also to a command [Gebot]; hence, ‘l’ordre symbolique’ and ‘the symbolic order’ are not only denoting an order [Ordnung] but also a command, referring to the command [Anordnung] to transgress that order.” (Pfaller 2011, p. 26, own translation)

cio-political dimensions of mathematics education”), but integrate it into the (yet) absurd taxonomy of existent branches of mathematics education as a research field:

(a) calculus, (b) algebra, (c) history of mathematics education, (d) mathematics education with zero gravity, (e) embodied mathematics, (f) gardening mathematics (g) workplace mathematics, (h) gala dinners at ME conferences, (i) socio-political dimensions, (j) et cetera, (k) dynamic geometrical software, (l) technologies, (m) disorder, (n) branches that from a long way off look like praying wheels, (o) mathematical modelling, (p) all kinds of animals.

For this reason the present volume gathers a selection of scholars (from PhD students to well-established professors), who seek on the one hand for ways of productively engaging themselves in the disordering of mathematics education as a research field, while on the other hand practicing a strong commitment to theory (another name for the symbolic order). This strong devotion to theory, however, must be coupled with the recognition of the inbuilt fallibility of any theory. Instead of disavowing the messiness and the contradictions that emerge from researching mathematics education through a theoretical lens, the authors of this volume seek to make these contradictions visible. In this way, the present volume highlights precisely the problems, tensions and contradictions that are part of existing research.

How to Systematically Organize a Disorder (in Research Practice)...

If we want to perceive disorder not as the absence of order, but as the excess of acts of ordering, how can we practically create an academic space that maximises the likelihood of collisions that generate an unforeseen surplus? This volume has its origins in a conference that Hauke Straehler-Pohl and Nina Bohlmann hosted at the Freie Universität Berlin in January 2015. In the call for the conference, 27 international delegates were invited to relate their work in one way or the other to “the disorder of mathematics education”. Instead of identifying a unified and unifying *problem*, the call just problematized the current state of socio-political research in mathematics education, thus leaving it open for delegates to interpret the “disorder” in their own fashion (see a slightly elaborated version of the initial call on <http://www.ewi-psy.fu-berlin.de/dome>). In this way, through relating a very own perspective on “disorder”, each delegate contributed with their perception of what the problem of current socio-political research is. Some of the delegates have developed or are currently developing cutting-edge methodologies allowing mathematics education research to meet the claim of being socio-politically relevant. Other contributors have produced a radical and re-politicised critique on the kind of research approaches that claim to be socio-politically relevant. As a result, we celebrated a conference, where a range of different assessments of what the prob-

lem is, and how it could and should be approached, collided – in the spirit of sharing, discussing and contesting the developed approaches. In brief: to make the different assessments disputatious and hereby sound out the conditions under which an understanding of socio-politically relevant mathematics education research can be developed beyond any abstract idealisation of the societal role of mathematics education. The delegates left the conference with the feeling that they had worked hard and constructively for three days in a common spirit; however, having produced a disorder that points towards a multiplicity of different and partly contradictory directions.

... and how to Retrospectively Order it

Against this background, if there is a common trace uniting the different contributions present in this volume, it is the assumption that any sense of unity always displays the structure of a defence against the contradictory nature of education and research. On the one hand, any political vision of mathematics education needs to be contextualised within a broader picture that transgresses the boundaries of educational institutions, like schools or universities. Albeit in different ways, contributors assume that mathematical knowledge, beliefs in and about mathematics, and a “mathematical mind-set” are not the sole result of an institutionalised education (schools and universities). A mathematical rationality is present in contemporary society and reproduces itself through technologies, social practices, media and other spheres of social life. The analysis of how current cultural, social and political practices enact mathematics in a panoply of different ways, allows contributors to criticise the apparent ideological coherence on what mathematics is and to criticise the common shared idea that more and better mathematics for all is an intrinsically benign goal. In order to make this compilation accessible for readers, we thus set out and classify the diverse papers in sections, aware that each classification highlights certain group-resemblances and neglects others, making visible certain contradictions by suppressing others. Thus, during the process of editing this volume, the titles and the compositions of the sections were in a state of permanent transformation – which might never stop transforming if we were to edit this volume for ever, trapping us in a vortex, like the eyes of the python Kaa. However, as a date of publication inevitably serves as a record of one single moment in time, we have come to the following classification of the contributions to this volume:

- A. What bonds us to mathematics,
- B. Disordering narratives of progress in mathematics education,
- C. Disordering school mathematics,
- D. Disordering the role of the mathematics education researcher.

Section A: What Bonds us to Mathematics

The first section of this volume challenges the assumption that the collective effort of making more and more students learn more and more mathematics is beneficial in itself. When focussing on different roles of actors in social practices (adults/parents, consumers, mathematics educators), instead of assuming a division between the proponents and opponents of mathematics, the chapters in this section analyse how opposition and endorsement are effective together. In this way, the chapters of this section analyse how the bond to mathematics is a result of this ambivalence.

Sverker Lundin and Ditte Storck Christensen ask why people who rarely use mathematics in their daily lives (adults), nevertheless consent to the necessity of making (their) children learn it. The authors explore the role of compulsory schooling in the development of this ambivalent attachment to mathematics, where people learn to love and hate mathematics simultaneously. By sending children to school, where a “show” of mathematics-love is performed for the adults’ gaze, adults delegate to children their disavowed love for mathematics, similar to e.g., the use of praying wheels.

Hauke Straehler-Pohl discusses available reflections regarding the flowering of mathematisation and demathematisation of social practices and relates them to current technological developments. He reveals mechanisms that allow people to enjoy this development despite (or rather because of) a sense of alienation that comes along with it, and draws conclusions concerning the further development of a mathematics education that critically reflects its role in society. He proposes to provide a legitimate space for students in the mathematics classroom to reject the demand to solve problems of social significance by means of mathematics.

Alexandre Pais asks for the reasons why so many mathematics educators prefer to create a reality so at odds with the one experienced by the vast majority of teachers and students worldwide. He shows how researchers, instead of recognizing this mismatch as a symptom, utilize it to sublimate the reality of research at the cost of the reality of school mathematics. The author conceptualizes the collective act of sublimation as a defence mechanism, leading mathematics education as a research field into a state of narcissism. As an alternative, Pais suggests a form of reality-therapy for mathematics education, one that invites researchers to seriously engage with its symptoms: students’ systematic failure, absence of change, increasing of testing, etc.

If the chapters are right in their common conclusion that the desire for more mathematics education is constitutively built on the condition of ambivalence, it becomes clear that mathematics education requires a profound discussion about how it *does* perceive and how it *could* perceive progress.

Section B: Disordering Narratives of Progress in Mathematics Education

The second section therefore focuses on current narratives that shape the field of mathematics education (research) and give meaning to it. The chapters particularly centre upon those narratives that purport and address progress and development by means of mathematics. This section compiles chapters that deconstruct and/or reconstruct current narratives, revealing how they respond to historical and social developments, trends and requirements. In this way, the chapters lay bare the narratives' intrinsically political foundations and hence open them for political and scholarly debate.

Uwe Gellert opens this section with a chapter that comments on the argumentation by Pais in the preceding chapter. He argues for further reflections on the concrete demands of mathematical knowledge in contemporary society. The topic of universality of mathematical education is the pivot around which historical, functional, emancipatory and political considerations unfold. Gellert meticulously reconstructs how “mathematics for all” emerged as a response to tangible material and social imbalances and confronts this reconstruction with the critique developed by Pais (2012) on the topic of equity. In this way he lays bare the shortcomings both of the narrative of “mathematics for all” as well as of its critique. As a result, he argues for a search for mediating alternatives.

Aldo Parra-Sanchez critically analyses the assumption prevalent in ethnomathematics that its privileged focus of study should be the intersection of culture and mathematics. If we are to understand “emancipation” as a dominant narrative of progress in ethnomathematics, Parra-Sanchez reveals how the privileging of intersectional approaches rather tends to undermine than to fulfil this intention. As an alternative he suggests to shift attention away from the study of intersections towards the practice of “barter” that serve for researchers *and* researched to mutually inform and, in particular, to irritate each other.

Eva Jablonka and Christer Bergsten focus on the narrative of “good mathematics teaching” and its actualisation in teacher evaluation and curriculum design. The authors explore how “good mathematics teaching” easily slips into becoming an empty signifier. They reconstruct through three different examples the way in which the signifier “good mathematics teaching” feeds into a hegemonic narrative for persuading sponsors and policy makers to fund and promote research. In this process, meaning is created self-referentially, installing a self-perpetuating machinery for financing, defining, measuring and producing “progress”.

Similarly, Candia Morgan addresses the junction between research, policy and practice. She focuses on the theoretical and ethical problems that arise from this encounter. However, instead of deconstructing one particular narrative of progress, she turns her attention to a general constitutive dilemma of research in mathematics education: “users” of research in politics and practice tend to recontextualise research to serve their own interests and to incorporate the results into

alternative discourses that appropriate the users' pre-existing narratives. Not as a solution for the dilemma, but as a way to productively deal with it, Morgan suggests to step out of the role of researcher in order to engage in the social practices one seeks to affect.

Alex Montecino and Paola Valero produce a critical analysis of the way international entities such as OECD and UNESCO convey progressive ideologies about the importance of mathematics and the role of teachers as both products and agents of those ideologies. They systematically analyse the way teachers are portrayed in a multitude of different documents, and conclude that there is a strong tendency in current educational policies to transform teachers into agents of the market with the task of selling this precious piece of knowledge called mathematics.

Anna Llewellyn considers and critiques the role of technologies of power and surveillance, and governmentality in mathematics education research. The chapter deconstructs the fiction of the free, autonomous self, and discourses of progress as a key taken-for-granted truth of mathematics education research within the UK and other Western contexts. It is argued that the natural, developmental, free, child is (re)produced through both overt and covert surveillance and monitoring, from both schools and universities. Llewellyn thus calls into question the modern idea of progress, of which mathematics is one of the cornerstones.

Common to the chapters in this section is their concern with developing a practice of reflexivity (Bloor 1976, Bourdieu 2001) on mathematics education as a research field. That is to reflect the external circumstances that have shaped mathematics education as a field in its emergence, showing how it is socially and historically contingent. The next section will take advantage of this practice of reflexivity and move the focus back to the privileged subject of mathematics education: school mathematics.

Section C: Disordering School Mathematics

In the third section of this volume the authors centre their attention on the particular object of school mathematics. This happens in the spirit of avoiding the shortcomings of the taken-for-granted narratives of progress that have been deconstructed in the preceding section. All chapters address school mathematics as fundamentally situated in social, political and economic contexts, revealing its idiosyncrasies. Thus, this section puts the premises of the whole book into test: how can “disordering” practices of reflexivity help research to develop an alternative relation to its object?

David Kollosche casts a gaze on students' perceptions of mathematics from a socio-critical perspective. He does so by developing a framework that allows him to interpret students' perceptions as expressions of their developing subjectivities. He discusses how devotion to mathematics, suffering from mathematics, as well

as seeing personal relevance and the opportunity to be challenged by mathematics, can be considered technologies of the self that students develop in response to mechanisms of subjection. These mechanisms, through privileging and sanctioning, make visible the dogmatic power-knowledge of school mathematics.

Jehad Alshwaikh and Hauke Straehler-Pohl focus the relationship between learning mathematics and the socio-political context where it “lives in” in Palestine. The authors work out how the construction of a passive mathematics learner and the simultaneous construction of mathematics as an abstract form of knowledge serve the status quo in Palestine. However, as the promotion of agency and relevance resemble all too much those narratives of progress deconstructed in the first and second section of this book, the authors decide to identify with this dilemma instead of avoiding it. They provide drafts for two hypothetical classroom activities that are designed as provocations for teacher education that simultaneously sensitize for the urgency of making mathematics relevant to Palestinian life and sensitize for the risks that come along with this.

While assessment is invariably conceived as a pedagogic strategy to enhance learning, Lisa Björklund-Boistrup in her chapter posits it instead as a governing apparatus. Reconstructing everyday assessment acts from Swedish mathematics classrooms, she construes four different discourses of assessment that position students differently in terms of power and in terms of opportunities to engage with mathematics. Relating these four discourses to each other, she construes an assessment dispositive that not only acts as a gatekeeper for some students, but also effects teachers' opportunities to transform their practice.

David Swanson refocuses debates on alienation and mathematics education around the unifying factor of the commodity form of production. Inspired by Walter Benjamin, he develops a methodology of montage that does not simply borrow from the arts, but serves as an experimental scholarly approach to truth. This methodology enables him to arrange excerpts from student interviews in a way that they reveal how the commodity form of production has translated down from a macro-structure to students' experiences. At the same time, the montage opens up an outlook for a different possible realisation of mathematics education.

Melissa Andrade Molina and Paola Valero focus – similarly to Kollosche – on how school mathematics instils technologies of the self in students, shaping what they call “the desired child”. They illuminate how school geometry privileges certain conceptions of space while sanctioning others. The analysis of curricular material from Chile and OECD documents reveals how school geometry fabricates a desired form of subjectivity that requires students to detach from the “eyes of their bodies” in favour of a rationalized, a “sightless eye”. The power-knowledge of school geometry thus subjugates one configuration of the body to another, instrumental one at the cost of alienating students.

Tony Brown's chapter suggests a similar effect of school mathematics when he analyses the relation of rationality and belief in learning mathematics. The chapter reveals how conceptualizing beliefs as “irrational” distortions of “rational” mathematical thought is first of all a product of a tightened form of social management.

The paper argues that rational mathematical thought necessarily rests on beliefs. Loosening the administrative grip so that the diversity of beliefs can play out in the mathematics classroom, Brown maintains, could release students' and teachers' own powers. In the process of creating this book, this chapter disappeared from the book's surface and reappeared in *Educational Studies in Mathematics* (doi: 0.1007/s10649-015-9670-7). All contributors to this book, including the author himself, consider it nonetheless a part of this book.

Common to all the chapters in this section is a suspension of the temptation to already base their analysis of school mathematics on normative pre-assumptions of what *ought-to-be* and focus on what *is* in the first place. Nevertheless, based on such analysis of the current state, the chapters offer speculative imaginations of what school mathematics *could be*.

Section D: Disordering Role of the Mathematics Education Researcher

Developing research with the aim of transforming the status quo through speculative imaginations of *could-bes* implies walking on a thin line, always risking slipping into pacifying narratives of *ought-to-bes*. Furthermore, it often implies relating oneself to discourses within which one is positioned and with which one simultaneously seeks to break; it often implies taking advocacy for not only emancipating oneself but also one's environment, while being aware that emancipation always implies a subjective position. To put it shortly, it confronts the socio-politically engaged researcher with challenges on the level of her or his subjectivity. The last section of the book is thus dedicated to exercises of researchers' self-reflexions about their role and place in research practice.

Peter Appelbaum's chapter addresses the dilemma of how mathematics educators who are positioned simultaneously as inside and outside of the field of mathematics education can productively deal with their desire to promote change. He builds on Deleuze's notion of the *fold* in order to destabilize the differentiation of insides and outsides, and suggests the development of nomadic topologies as seeds for change (of subjectivity, of the research field, and of broader socio-political contexts simultaneously). Reflecting on his own research biography, Appelbaum illustrates how developing such topologies can alter researcher's subjectivity by exploring five arbitrary phases towards enacting educational space as (artistic) studio.

David Wagner reflects on the way *he* positions *himself* when publishing research in mathematics education. He takes the recurrent question "Where is the maths?" as an example that is often strategically employed to artificially construct a division of mathematics education as research field, coercing researchers to either position themselves on the "side of politics/culture/etc." or on the "side of mathematics". Analysing his own research practice as an author in relation to a

reader, he illuminates how differently developed storylines not only address different readers, but also bring different model readers into being. Wagner concludes with concrete suggestions for how researchers can reflect already in the process of writing on the positioning that can be associated with the texts they produce.

Mônica Mesquita closes this section and in doing so, she closes the book. Mesquita addresses the probably most fundamental question that the contributors to this volume grapple with: how is it possible to be a critical researcher while simultaneously struggling with surviving in a capitalist world-order? How can critical researchers “realize themselves”? Based on her own biography, she reflects on how this desire places the researcher in a “boundary space”. However, Mesquita argues, critical researchers should not let themselves be paralyzed by being “in” the boundary, as it is exactly in the boundary, where the production of yet to be thought knowledge has the potential to disturb the hegemony of the system. However, producing such form of new knowledge requires a certain posture and so Mesquita closes this book with an appeal of Étienne Balibar:

Let us be intolerant with ourselves and “pass on to another stage”.

... If You got the Money Honey, we got your Disease ...

Finally, the title of the volume plays with a double meaning of the word “disorder”. While it has become clear that we perceive mathematics as a chaotic realm of different meanings, whose (dis)order is contingent upon collective acts of ordering, the second meaning of the word humorously plays with the position of the contributing authors in the field of mathematics education. While it is certainly wrong to claim that the contributors suffer from exclusion or discrimination – some authors have reached quite powerful positions in the international field, continuously publishing cutting-edge articles in the most renowned journals – they share the feeling that they are enduringly regarded in a distanced, at times suspicious manner. Scholars with a “disorder” can thus be humorously understood as those who appear not to function in the way they are supposed to; a way that is not aligned with some of the most unquestioned assumptions in mathematics education, such as the idea that mathematics is important for the daily life of people or the enticing goal of “mathematics for all”. Not seldom, researchers engaged in the “disorder” are insinuated because of their cruel “pessimism”, as if their worldview was an infectious disease and not simply a political positioning. A political positioning that more often than not comes along with an optimism that a different world, actually *is* possible – an optimism that this world is possible in exactly the same reality we *live* in, and not in a *dream*-reality that we first need to construct by a more and more fine-tuned research machinery.

The aim of the present volume is not to achieve consensus but precisely to unravel the established consensus on the importance of mathematics and its role in

education and the broader society. The articles are thus to be understood as invitations to challenge fossilised beliefs, and it should not be too difficult to find opposing positions in the different contributions. This very same spirit animated the conference which preceded this volume. Our contention is that contrasting and disagreeing is a much more prolific method to address the current problems of mathematics education than constructing an apologetic narrative that, although narcissistically pacifying, leaves many of the contradictions of mathematics and its education untouched. Through this volume, we invite everyone in mathematics education to join the “folks with the disorder” and to dare to be dysfunctional at times.

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