

CRITIQUE AS UNCERTAINTY

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Critical mathematics education has developed with reference to notions of “critique” “critical education”, “critical theory”, as well as to the students’ movement that expressed, among many other things, a critique of authority and of instrumental reasoning; the ethnomathematical research programme that identified mathematics in a variety of cultural settings; and the anti-racist and feminist movements that addressed forms of exclusion sustained, if not intensified, through mathematics education.

In fact, the term “critique” might have been stretched out of proportion through a great number of sometimes incongruent uses. Acknowledging this, I want to consider what conception of critique might emerge in the future. In particular, what could critique refer to if we move beyond the outlook of Modernity? Naturally the “outlook of Modernity” is a broad notion; here I refer to just two characteristic assumptions of this outlook, namely (1) that scientific progress is the true driving force behind progress in all spheres of life, i.e. that the rationality of science is trustworthy, and (2) that it is possible to provide an apposite foundation for any critical approach.¹ Thus, a critique serves to prepare the ground for this trustworthy rationality. On this basis, critical approaches have taken different directions. While Kant’s critique addressed epistemic structures, Marx’s critique addressed social and economic structures. However, does the post-modern condition, as formulated by Lyotard for instance, invite new formulations of a critical approach? Or does this condition turn critique into an obsolete notion subscribing only to presumptions rooted in the Modern outlook?

In order to clarify these questions, I will emphasise in the following that mathematics and mathematics education operate in a variety of practices; that both mathematics and mathematics education are part of an uncertain world where they contribute to the very production of contingencies; and based on these observations I want to relate critique and uncertainty.

MATHEMATICS AND MATHEMATICS EDUCATION IN A VARIETY OF PRACTICES

Mathematics operates in a variety of socio-political practices. It is a part of everyday situations, professional contexts, technological enterprises, research procedures. It operates as part of a world-wide distributed technical rationality, which can be analysed in terms of mathematics in action.²

¹ For a further discussion of “assumptions of Modernity”, see Skovsmose (2005).

² For a discussion of mathematics in action, see Skovsmose (2005); and Christensen, Skovsmose and Yasukawa (2008).

We send e-mails; we use credit cards; we contract loans; we get ensured. Workplaces include mathematics-heavy practices: part of a production is automatised, quality control takes place, cost-benefit analyses are conducted, goods are brought to the market, and prices are set and advertised. All such practices are mathematics-heavy. So is political decision making where, for instance, implications of alternative economic policies are investigated through simulation models. Mathematics is operating in technologies of surveillance, in health care, in weather forecasting, in ecological forecasting concerning the state of world. Mathematics forms a part of any form of technological enterprise as well as research processes in technology and science. The globalised networking with respect to communication, economy, production, distribution of welfare and poverty, and social inclusion and exclusion, include mathematics put into action.

If we consider the scope of mathematics in action, it is not surprising that there is a huge concern for managing, in an efficient and proficient way, mathematics as part of the educational system – a concern which recently has been expressed in international comparisons of students' performances in mathematics. Mathematics education signifies a worldwide means of developing and distributing a set of competencies and of labelling people through a finely graded exam system. At all levels of the general educational system, mathematics is a crucial component. It also forms part of a broad range of further education within science, technology, engineering, medicine, economy, management, etc. Apparently, mathematics education is responding to the fundamental demands of the modern labour market, which now takes the form of a knowledge market.

MATHEMATICS AND MATHEMATIC EDUCATION IN AN UNCERTAIN WORLD

Technological determinism holds that technological development sets the course of social development in general. An optimistic form of this determinism finds that technological development – due to its intrinsic laws and to the fact that it is science-based – will eventually ensure social welfare on a grand scale. Contrary to this, a pessimistic technological determinism depicts technology as a highway into a dehumanised world, due to the very rationality of it. I find that moving beyond the outlook of Modernity means moving beyond any form of determinism, both pessimistic and optimistic.

I find that mathematics-based technology brings us deep into a terrain of uncertainties and contingencies. Situations are produced which can bring society in very different directions. Predictability with respect to what technological innovations will emerge, how technology will be applied and with what consequences, is minimal. Social development is leaping forth in a hazardous way,

due to a technologically produced density of contingencies.³ I find that mathematics in action makes up part of this terrain of contingencies. It is an integral part of an uncertain world. Just to illustrate my point: On the one hand, exploitation of natural resources is driven by technology, operating through a mathematically expressed rationality. On the other hand, mathematics enters into the models by means of which we seek to provide forecasts concerning the impact of technological enterprises. We cannot identify any long-term ecological implications without using mathematics-based models of simulation and forecasting. Naturally any such forecasting might be wrong – but whatever it might be, it depends on mathematics. Mathematics plays an important role in a huge variety of practices, the nature of which may differ greatly. Those roles are not qualified in any particular way, due to some assumed nature of mathematics. Instead, mathematics forms part of technologically produced uncertainties.

Mathematics education also forms part of open-ended social processes. On the one hand, one might assume that mathematics education blindly adapts to the demands for competencies expressed in dominant economic and technological structures. Thus, one may interpret mathematics education as a way of developing a competency in following manuals, as a way of developing a prescription-readiness, which is important in a multiplicity of work-practices.⁴ Mathematics education operates on market conditions in a globalised economy, where processes of inclusion and exclusion operate, not least through the educational system. There is, however, no transparent relationship between the competencies a mathematics education might provide and those competencies mathematics-dense practices might presuppose. Thus, on the other hand, one might find that mathematics education establishes citizenship and reflective insight. This education might ensure groups of young people new opportunities in life. It may be part of a string of processes of “social justice”, and very many suggestions for what this could mean have been put forward. So, mathematics education is a crucial part of an unpredictable world.

CRITIQUE AND UNCERTAINTY

Let us now return to the notion of critique. As mentioned, Kant tried to establish a critique-with-a-foundation, elaborated in terms of a transcendental philosophy from which he provided an analysis of pure reason, i.e. of the a priori conditions for obtaining knowledge. Marx wanted to criticise, not just conceptions of economic structures, but the very economic structures themselves; and when, later on, Marxists criticised the political economy, theirs turned into a critique-with-a-foundation, the foundation being the one provided by Marx. The notion of critique of Critical Theory is partly inspired by Marx, but it does not assume a Marxist orthodoxy. Thus, the critique of Modernity formulated by Adorno and Horkheimer in *Dialectic of*

³ I have expressed this observation through the general notion of “happening”, which is characterised by not being determined by the previous course of events (see Skovsmose, 2005).

⁴ For a discussion of prescription-readiness, see Skovsmose (2008).

Enlightenment is far from assuming any conformist format. Together with Foucault's analysis of the "archaeology of knowledge" and "the order of things" it represents a breaking away from a critique-with-a-foundation. Furthermore, these analyses leave behind any assumptions about the existence of an intrinsic progress encompassed in science and technological rationality.

I find that exploring further the idea of critique-without-a-foundation is important in making sense of any critical approach moving beyond the outlook of Modernity. A critique-with-a-foundation can easily be linked to a well-specified mission, i.e. a particular identification of what it is the critique should bring about. However, I suggest that we see critique (now to be understood as a critique without-a-foundation) as an expression of *uncertainty*. As a consequence I find it important that critical mathematics education acknowledges that the roles of both mathematics in action and mathematics education are open-ended. Both mathematics in action and mathematics education are without "essence"; they are not destined to play any "good" or "bad" role in social development. Instead they represent contingencies.

A critical mathematics education may, therefore, be characterised in terms of concerns with respect to the different possible socio-political roles mathematics in action and mathematics education could play. These could be concerns regarding forms of exploitation and suppression that might be exercised through mathematics or through mathematics education. They could be concerns about how to realise social justice in an uncertain world. But what about notions like "exploitation", "suppression" and "social justice"? To what do such notions refer? And what about formulations like: "Critical mathematics education *must* strive to actively struggle against any form of cultural, social, or economic suppression!" And: "Critical mathematics education *must* be an education for social justice!" Such claims could assume a profound meaning when one operates with a critique-with-a-foundation. However, a critique-without-a-foundation is not easily turned into a prescriptive format. It cannot presume any association with a "proper" driving force of progress. Apparently, there are no simple "musts" to be formulated. In fact one may find that if critique is without foundation, we had better give up making any claims about what *must* be done, altogether. Could this be part of the post-Modern condition?

I acknowledge that trying to develop critique-without-a-foundation makes it difficult to operate with strong "musts". But I do not believe that by giving up a critique-with-a-foundation, we will end up in absolute relativism. A critique-without-a-foundation is an expression of uncertainty, and I see this observation as principal in order to establish a critique beyond the outlook of Modernity.

With respect to critical mathematics education, my suggestion is that we acknowledge the uncertainties related to the possible roles of both mathematics in action and of mathematics education. We have to reconsider the operations of mathematical rationality in all possible practices. We might not be able to define good practises or bad practices, but we might consider questionable, surprising, convincing, and risky practices. We might try to indentify categories within which

we can formulate how mathematic education operates in a globalised knowledge market – for instance by providing a prescription-readiness. We might try to formulate what social justice could mean, as indubitably, it could mean very many different things in different contexts. Social justice is a notion overburdened with uncertainties.

Uncertainty is characteristic of any critical approach, including critical mathematics education. Acknowledging this, we attempt to zigzag our way into the future at some distance from absolutism and absolute relativism both, though always balancing over an abyss of contingencies.

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