

# MATHEMATICS FROM THE PERSPECTIVE OF CRITICAL SOCIOLOGY [1]

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*The promotion of a conception of mathematical literacy is related to the promotion of a particular social practice in the context of modern societies. This raises the importance of viewing mathematics with the lens of critical sociology. Looking at mathematics from critical sociology can help us to pay attention to the particular cultural practices that produce mathematics. This approach can bring about implications for the education of mathematics for schooling.*

This contribution presents an argument in support of looking at mathematics with the lens of critical sociology. Further, it shows how this argument can help citizens to become critical of the practices of mathematics surrounding their life. Moreover, I will present ways of approaching mathematics as a cultural practice and of citizens to become critical about the “static nature of mathematics”. This type of particular practice of mathematics might not necessarily lead citizens to become critical on the structures based on mathematics. Instead this particular culture of mathematics can uphold the interest and power structures of particular groups of people.

## BACKGROUND

Often, the learning of mathematics has been associated with socially constructed fear of mathematics - learners at different levels conceive of mathematics as a boring, a dry and an uninteresting subject; the subject one just needs to pass in the examination. This socially constructed attitude towards mathematics has put many people in a situation where they distance themselves from learning mathematics and ultimately are devaluing mathematics. Subsequently they put themselves into the disadvantageous position vis-à-vis their needs of understanding, interpreting, creating their meanings and actions within the complex world, where practices of mathematics have colonized this world. Critical mathematics education can help in linking mathematics with society in order to understand and resolve issues of society, such as the issue of equity in distributing the benefits of mathematics to all (Skovsmose, 1994; D’Ambrosio, 1996). Furthermore, the research on critical mathematics education is suggesting that understanding mathematical principles is very critical for a person in order to remain an active participant of this increasingly globalized world. And these principles are not devoid of value judgments. That is, there would remain strong chances that experts with mathematical knowledge may misguide us and create many troubles in our lives. This brings our focus on the banality of expertise.

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1 An expanded version of this work will appear in Alrø, H., Ravn, O., & Valero, P. (2010) (Eds.). Critical mathematics education: Past, present and future. Rotterdam: Sense.

And there also emerges another relevant question: how much autonomy has a learner in formulating knowledge which addresses not only her/his individual needs but also her/his collective needs as a citizen within the society? In this respect, the role of mathematics in the context of the learners has vital importance for the preparation of citizens to become critical citizens.

## **CRITICAL CITIZENSHIP**

Critical citizenship is an important aspect of a critical sociology of knowledge. Some of the aspects associated with the concept of citizenship with relevance to mathematics education are: Social Justice: fairness, equity, responsible action; Inquiry into issues: racism, inequality in different dimensions (human rights violation etc), poverty etc; Democracy: proportionate representations, polling, and population; and a need to understand the complex interplay of the situations, which necessitates the need to realize the goal of creating critical citizenship. These situations may include free flow of information through various media, which may necessitate the need for critical appraisal and evaluation of the available information and of actively taking part in the production and disseminating of the information to a wider public. For example, Ole Skovsmose (1998) elaborates the relationship of citizenship with mathematics education by using the term *Mündigkeit*:

... the *Mündigkeit* can be given specific interpretation, such as the students being able to participate in political discussions taking place in a local community. And, most important, *Mündigkeit* also includes competence in investigating decisions with mathematically formulated arguments (Skovsmose, 1998, pp.196-199)

That is, in order to face the fast changing world and to become actively engaged not only the preparation to become critically literate is decisive, but also mathematics plays an important role. For example, (a) Morgan (1997) has brought our focus on the importance of critical literacy:

Critical Literacy encourages students to challenge taken-for-granted meanings and ‘truth’ about a way of thinking, reading and writing the world. It works against the notion that meaning is transparent, neutral and unproblematic. Critical literacy also questions the neutrality of power relations within the discourses. In pedagogic terms, students should be encouraged to develop enquiring minds that question the cultural and ideological assumptions underwriting any text. They also learn to investigate the politics of representation in the discourse, interrogate the unequal power relations embedded in texts and become astute readers of the ways texts position speakers and readers within discourse (Morgan, 1997, p. 259).

And (b) mathematics can be conceived of as a human invention, and as a tool it can help to provide a critique of different social structures of the society. Normally mathematics has been conceived of as a neutral discipline having nothing to do with the social activities of people, despite of the fact that it is one of the products of the human enterprise. This characterization of mathematics as infallible has on the one

hand led mathematicians to invent complicated symbolic languages to handle complex models of human thoughts; on the other hand, it has created space for conceiving of mathematics as being only for gifted people. In consequence, a socially constructed fear was created and sustained. This raises the importance of viewing mathematics education in relation to its role within wider society and how this relationship can play a role in distributing power among different sections of society. One way to conceive of mathematics as a cultural practice can be related with the efforts of looking at mathematics as a part of the political project with conflicting interests and ideologies. This way the citizens could have possibilities to appraise cultural practices that generate mathematics (Jablonca, 2003).

## **CHALLENGES TO EDUCATIONAL PRACTICES OF MATHEMATICS**

Mathematics education faces varied challenges especially when it comes to prepare future citizens who are ready to be critical to face the challenges of the increasingly globalized world. These challenges are, for example, reflected through the reform efforts of the National Council of Teachers of Mathematics (NCTM) of the USA. The major focus of NCTM is to pay attention on students to become problem solver and encouraging students to be engaged in the process where they can be led to see the generalizations of mathematical statements and see the potential of these generalizations in creating abstract systems. However, there is an ideological basis for these reform efforts and also there are political interests that the NCTM is trying to achieve through these reforms. One of the political objectives is to introduce mathematics as part of “mathematical sciences”. This designation leads one to conceive of mathematics as having an essence and it can conceal the traditions and networks of associations responsible for the production of mathematics as a discipline. In this way mathematics has been reduced to a field which is stable and not changing. That is, it gives an illusion that the future is certain. On the contrary, the future is uncertain. In other words, through the illusion of problem solving the participation of learners is regulated by the expertise with an idea that problem solving increases flexibility. In this way, the human agency is restricted and circumscribed by the expertise whose political objective is to stabilize and harmonise the world of participation. Here expertise retains its power of defining the domain and practices of mathematics education. In this vein, it is important to consider mathematics as a field of a cultural practice that is constituted by an amalgamation of institutions, authority relations, analogies, memories and images that are assembled together in different junctures of time and places to arrange and categorize objects of reflection and action (Popkewitz, 2004). For example, Ian Hacking (2002) argues that mathematics embodies different ways of thinking about and creating new objects. Each style of reasoning in mathematics opens up different objects of scrutiny and provides a classificatory scheme by which lives are experienced, truths authenticated, and futures chosen. He compares algorithmic and combinatorial styles of reasoning with special styles that are “self-authenticating.” That is, each style “introduces its own criteria of proof and demonstration, and... it determines the truth conditions

appropriate to the domains to which it can be applied” (Hacking 2002, p.4). Thinking of mathematics in this way can direct our attention to its practices and it could be considered as a group of techniques for bringing new kinds of facts to our awareness. This is one of the challenges that future mathematics education has to confront when one wishes to pay attention to critical features of the society.

## CONCLUSION

Here I have made an argument that looking at mathematics with the perspective of critical sociology is an important aspect of the education of mathematics for schooling. This perspective requires us to take the notion of critical citizenship seriously so that citizens can retain their ability to give an input to authority in order to bring a critical eye on mathematically formatted arguments. Moreover, it can also lead us to equating mathematics with a tool like language which can be used to interrogate a variety of claims that can be made through mathematics - in this way mathematics can make the familiar strange.

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