UNIVERSIDAD DISTRITAL
FRANCISCO JOSÉ DE CALDAS

Góndola, Enseñanza y Aprendizaje de las Ciencias

DOI: https://doi.org/10.14483/23464712.19152

GÓNDOLA
ENSEÑANZA Y APRENDIZAJE DE LAS CIENCIAS

Historias de vida

INTERVIEW WITH DR. OLE SKOVSMOSE*

Por: Olga Lucía Castiblanco Abril**

Foto. Archivo personal Dr. Ole Skovmose.

Dr. Ole Skovsmose (OSk): Professor emeritus at the Department of Culture and Learning at Aalborg University, Denmark. He develops his research from the perspective of critical mathematics education. He studies the political dimension of mathematical knowledge, and analyses the mechanisms of power as related to bringing mathematics in action.
His work contributes to developing central concepts of critical mathematics education (landscapes of investigation, mathematics in action, close-ups of students and the ghetto) without forgetting the permanent relationship with its practical possibilities. He has published several books, including Towards a Philosophy of Critical Mathematics Education, translated into Spanish, Dialogue and Learning in Mathematics Education (together with Helle Alrø), Traveling Through Education, In Doubt, Critique as Uncertainty, Students' Foregrounds, and Connecting Humans With Equations (together with Ole Ravn).

Olga Castiblanco (OC)
Doctor of Science Education, and Professor of the Physics Teaching Department in the Faculty of Science and Education, Universidad Distrital Francisco José de Caldas, Bogotá.

OC: Dr. Skovsmose, thank you very much for accepting our invitation to this interview for the open acces journal *Góndola, Learning, and Teaching Science* of the Universidad Distrital Francisco José de Caldas in Bogotá, Colombia.

* Profesor Voluntario Universidade Estadual Paulista Rio Claro SP Brazil. osk@hum.aau.dk https://orcid.org/0000-0002-1528-796X

** Licenciada en Física de la Universidad Distrital Francisco José de Caldas (Bogotá-1996), Magíster en Docencia de la Física de la Universidad Pedagógica Nacional (Bogotá-2004), Doctora en Educación para la Ciencia de la Universidad del Estado de São Paulo (Brasil-2013). Docente investigador de la Universidad Distrital Francisco José de Caldas. olcastiblancoa@udistrital.edu.co - https://orcid.org/0000-0002-8069-0704

Reading your work, we find your contributions of great value for re-thinking mathematics teaching. Firstly, we would like to know how or why you decided to study the philosophy of mathematics. Many people think that philosophy and mathematics are not related, even among those who work in natural science. But we consider that the critical mathematics education to which you refer leads us to think that doing mathematics is an act *of* humans and *for* humans, with all that this implies, and therefore goes beyond formulating calculations or applying formulas. Is this perspective related to the dimensions that you have characterised for the philosophy of mathematics, from the ontological, epistemic, social, and ethical aspects?

OSk: When I was young, I had no intention of becoming a researcher. It was not my ambition. I came from a working class family. My father was a tailor, employed at a workshop for a low salary, and that was it. However, I wanted to become a teacher. I liked working with children, and I was very dedicated to being a coach for young people, my age, playing handball. After I left school, I worked for a couple of years in a land surveyor company before I entered teacher training college. It was not a university study, and at the college we studied all kinds of topics, like religion, mathematics, Danish, everything you need in order to teach. At the college, however, I became interested in philosophy. I read all kinds of philosophy, even if I didn't really understand what I was reading. Anyway, I felt that philosophical topics were important to me. At the college, I was good at mathematics. I was good, but at the level of teaching basic mathematics. Anyway, I got ambitious and wanted to enter university after finishing my teacher training. I was a bit old to do that, but I wanted to go to university. As I had not gone to a gymnasium – which, in Denmark, is a type of school that gives you general access to university – I needed to enter university via my teacher training. As I had specialised in mathematics, I was only allowed to enter university to study this topic, and so I did.

I studied mathematics and was very happy with this. In the evenings, I was teaching mathematics in a school for adults that wanted to do some further study. I was always teaching during university. After three years at the university, a new regulation was implemented that allowed me to also study philosophy. I liked all the topics in philosophy, but I concentrated on the philosophy of mathematics and on the philosophy of logic. During the last years of my university course, I was teaching at a teacher training college. I was dedicated to teaching, and when I finished my course, I wanted to try to get onto a PhD course in mathematics education. During my studies, I had no intention of becoming a mathematician, nor a philosopher. I wanted to become a mathematics educator.

OC: It is interesting because it is born as a natural process from genuine interest to achieving adequate results in teaching philosophy and mathematics. I imagine that your students are happy to find a teacher who handles mathematics from a more human perspective, so it's less mechanistic, and links with philosophy. This shows that it is possible to think of mathematics as knowledge made *by* humans and *for* humans. Is this perspective related to the dimensions that it has characterised for the philosophy of mathematics, from the ontological, epistemic, social and ethical aspects?

OSk: Yes, I have written the book *Connecting Humans to Equations: A Reinterpretation of the Philosophy of Mathematics* together with my colleague, Ole Ravn, who was previously one of my doctoral students. The book was published in 2019, and here we present a four-dimensional philosophy of mathematics.

First, the two classic dimensions: the ontological and the epistemological, which have been addressed since ancient times. Then we also found it important to include a sociological

dimension. Several researchers have explored this dimension, particularly during the last 30 years. However, during his lectures in the late 1930s in Cambridge, Wittgenstein formulated the idea that mathematics is a social construction, and that mathematical rules can be compared to grammatical rules. Turing was present during these lectures and challenged Wittgenstein's ideas. This challenge was important for Wittgenstein, and forced him to elaborate his conception of mathematics further.

Then comes the ethical dimension of a philosophy of mathematics. This dimension addresses the mathematical formation of society. One can do something through mathematics. I see mathematics as a powerful tool with which one can create wonders, but also horrors, to use a formulation by D'Ambrosio. Mathematics is not a harmless and innocent business, as has sometimes been indicated, for instance, by Hardy in *A Mathematician's Apology*. It is powerful, and you can use it to create many thngs, or design things, or change things, etc. But what you créate is not necessarily wonderful just because it is based on mathematics.

Any kind of action is in need of deep and critical reflection, and this includes mathematics-based action. This is a very important point in formulating an ethical dimension of a philosophy of mathematics. It is important for articulating a critical conception of mathematics. Such a conception forms an integral part of critical mathematics education.

OC: This is very interesting; it is about making sense of the use of mathematics in your life. I find these ideas very novel for teachers, because this is a different perspective on the reason why it is important to learn mathematics. This is not just to say "mathematics is everywhere and is used for everything", but to reflect on what are we going to use mathematics for and why. Currently many teachers want to innovate in their teaching, but often do not know how to act, beyond integrating "attractive tools" into the class. It seems to me that these four dimensions favour the construction of new imaginaries about the teaching of mathematics.

OSk: They could do, yes. However, you can look at it differently depending on who you are talking with. You may want to talk with teachers at school, but also with researchers at university. If we talk with university professors, who are presenting mathematics according to tradition, we might observe that they focus on mathematics. All their teaching efforts concentrate on mathematics. They concentrate on making their university students master mathematics. All tests are about something in mathematics, but never about reflections on mathematics. When we talk with university professors about the philosophy of mathematics, we might point out the importance of the ethical dimension.

I think it is important that mathematicians know that they are doing something very powerful, and that mathematics has an impact, or may have an impact, on society through what it might bring us to act out. The idea that mathematics has no utilitarian value, as highlighted by Hardy in *A Mathematician's Apology*, need to be challenged. Hardy argues that mathematics is a purely mental exercise without any practical use. He illustrates his point by referring to the theory of relativity and to number theory. According to Hardy, Einstein's theory of relativity was purely theoretical. It was pure and beautiful mathematics, but had no significant applications. As we now know, Hardy was completely wrong. And he was also wrong with respect to abstract number theory, which has now got important applications in cryptography, and consequently in war technology. In fact, mathematics brought into action might have all kinds of social impacts. It might bring about wonders as well as horrors. It is important that this complexity is addressed in all forms of university education in mathematics. In fact, it is important that it is addressed in any kind of mathematics

education.

OC: Yes, I agree. Could you tell us a little about what you define as the banality of mathematics?

OSk: The concept of the "banality of mathematical expertise" was created in steps. For many years, I was providing a doctorate course at Alborg University. For some time, I did it alongside Ole Ravn. The students came from different technological disciplines: it could be mathematics, physics, engineering, architecture, medicine. This diversity led us to engage in various reflections. In all the different study programmes, mathematics plays important roles. However, reflections on these roles do not make up any part of the study programmes. The focus in technical disciplines is to be able to *do things by means of mathematics*, rather than to be able to *reflect on what one is doing*. This phenomenon, I refer to as the "banality of mathematical expertise".

By using this expression, I make an analogy with the notion of the "banality of evil" that was coined by Hannah Arendt. It was coined in her report on the trial of Adolf Eichmann taking place in Jerusalem. During the trail, Eichmann did not appear to be a fanatic Nazi roaring against the Jewish people. Rather, he appeared to be an insignificant administrator. He claimed that he did what he had done because he was obedient and was ordered to do so. He did things, but apparently without reflecting on what he was doing. Doing atrocities without reflecting on what one is doing is what Arendt refers to as the "banality of evil".

A similar phenomenon occurs with respect to mathematics when people concentrate on doing mathematics without reflecting on what they are doing. This is what I refer to as the "banality of mathematical expertise". This is, for me, a huge and general problem in mathematical departments the world around. Naturally, there are exceptions. However, in many mathematical departments the study programmes concentrate on mathematics and fail to engage students in reflecting on the possible impact of mathematics – both wonders and horrors.

OC: Oh yeah, I think all of us remember a teacher at the university who filled the board with many formulas, and one was amazed at the professor's knowledge and elegance in talking about mathematics, but nobody understood anything.

OSk: Yes, but even if you understood, you might think you were doing mathematics. However, you would not be grasping the possible roles of mathematics. I remember a course that I once followed at the Copenhagen University. It was on topology applied in economy. I was curious to come to know how topology could be applied in economy, but the teacher went to the board and wrote a lot of mathematics in a careful way. In the end he did not relate it to economics. In the next lesson, he continued writing a lot of mathematics in a careful way, and did not talk about economy. But I wanted to know what topology has to do with the conceptualisation of the consumer. I wanted to enter into a discussion of mathematics and economy, and to see how the topics were related. I asked, but the teacher did not understand the question. Then I said: OK, this course is not for me, I can read about topology myself.

OC: Dr. Skovsmose, your first published work on critical mathematics education was in 1994. We would like to know what ideas have evolved in your conception of this topic nowadays.

OSk: Yes, my conception of critical mathematics education has changed since I published *Towards a Philosophy of Critical Mathematics Education* in 1994. It was the first book I wrote in English. My mother tongue is Danish, and my first articles and books were in Danish. In fact, I had no ambition of working with an international perspective. I was not thinking that way. In the beginning, I did not think of myself as a researcher in mathematics education, but as a reformer of mathematics

education. I tried to contribute to a reform of mathematics education in Denmark. Then, some of my colleagues suggested that I publish something in English. I wrote an article in English which got a positive reaction from researchers outside of Denmark. Then I decided to continue, and the result became *Towards a Philosophy of Critical Mathematics Education*. I stayed a year in Cambridge – from 1990 to 1991 – drafting the book. Then it took me three more years to revise and improve the manuscript, before it could get published.

This book is based on my work in Denmark and on experiences in neighbouring countries. In a way, it presents a Scandinavian version of critical mathematics education. Because of this book, however, I was invited to become the supervisor for a group of black and Indian students belonging to the first generation of PhD students graduating in South Africa after the apartheid regime had come to an end. I felt very honoured to be invited to become a supervisor for this group. As supervisor, of course, I learned a lot. I remember the first time I came to South Africa – it was just after the academic boycott had ended – they invited me to give lectures around the country. I had prepared myself the best I could in advance, but when I came to interact with people, I realised that I needed to rethink and to revise everything that I had prepared. I needed to think quite differently about mathematics education and about what it could mean to engage in critical mathematics education.

Later on, I visited Brazil, where I live today. I find that the Brazilian context is very different from the Danish context, but also from the South African. This inspired me to develop new ideas about what critical mathematics education could mean. I learn many things every time I study authors from different countries. I learn many things every time I give lectures and interact with people. I always hope to inspire people, and at the same time, I get very inspired by listening to their comments, suggestions, and questions. For more than 10 years, I have been supervising PhD students here in Brazil. This is a continuous inspiration for developing critical mathematics education further.

OC: I agree – in educational matters, culture, context, and people are decisive. Great care must definitely be taken with the way in which one address and organise mathematics education. I have a question: Have you encountered the "banality of mathematical expertise" in different countries?

OSk: In this regard, I want to highlight that the school context makes a difference, and this means that the conditions for developing or changing mathematics education must be adapted to the socio-political context. The educational community in Brazil now, for example, is going through a difficult time. It seems more common that teachers get denounced if they move beyond the stipulated curriculum. It might be problematic for a teacher to be innovative and to be involved in critical mathematics education. This was not the case previously. It was not the case in South Africa after the apartheid regime had come to an end, and when I was working there. It was not the case in Denmark. However, the socio-political situations are always changing, and so are the conditions of being involved in critical mathematics education.

At the university level, there are a lot of interactions between departments around the world. For example, mathematics departments in Brazil might be inspired by what is happening in the USA, or in France, or in Italy. The perspective of critical mathematics education might come to make sense in different universities around the world: in India, Czechoslovakia, Russia, Nigeria, Mexico, in many places. When I give lectures about the concerns of critical mathematics education and about the "banality of mathematics expertise", university students and teachers often recognise that this relates to what they are experiencing in their departments.

OC: All right, Dr. Skovsmose. We are very grateful for this opportunity to talk about your work and contribute to giving greater visibility to it, since it is a topic of interest to our society.

OSk: Thank you very much for the invitation. It was a pleasure to talk with you.

BIBLIOGRAPHY

Skovsmose, O. (2021). A philosophy of critical mathematics education. *Philosophy of Mathematics Education Journal*, (37).

Skovsmose, O. (2021). Mathematics and crises. *Educational Studies in Mathematics*. Published online: http://link.springer.com/article/10.1007/s10649-021-10037-0.

Skovsmose, O. (2020). Mathematics and ethics. *Qualitative Research Journal, 8*(18), 479-503. Special Edition: Philosophy of Mathematics.

Skovsmose, O. (2020). Banality of Mathematical Expertise. *ZDM Mathematics Education, 52*(6), 1187-1197.

Skovsmose, O. (2019). Crisis, critique and mathematics. *Philosophy of Mathematics Education Journal*, (35).

Ravn, O. and Skovsmose, O. (2019). *Connecting humans to equations: A reinterpretation of the philosophy of mathematics*. Cham: Springer.

Skovsmose, O. (2016). What could critical mathematics education mean for different groups of students? *For the Learning of Mathematics, 36*(1), 2-7.

Skovsmose, O. (2014). *Foregrounds: Opaque stories about learning*. Rotterdam: Sense Publishers.

Skovsmose, O. (2014). *Critique as uncertainty*. Charlotte, NC: Information Age Publishing.

Skovsmose, O. (2011). *An invitation to critical mathematics education*. Rotterdam: Sense Publishers.

Skovsmose, O. (2009). *In doubt: About language, mathematics, knowledge and life-worlds*. Rotterdam: Sense Publishers.

Skovsmose, O. (2005). *Travelling through education: Uncertainty, mathematics, responsibility*. Rotterdam: Sense Publishers.

Alrø, H. and Skovsmose, O. (2004): *Dialogue and learning in mathematics education: Intention, reflection, critique*. Dordrecht: Kluwer Academic Publishers.

Skovsmose, O. (1994). *Towards a philosophy of critical mathematics education*. Dordrecht: Kluwer Academic Publishers.