

Connecting Science and Mathematics Education to fundamental values and intercultural learning

- *An innovative professional development course* -



Yes, why should it be?
Mathematics and science are
neutral sciences, only based
on facts!

I think, mathematics is
surely not influenced by
cultural aspects!

Science has no connection
to fundamental values of
our multicultural societies!

Are they really neutral?

Are mathematics and science really neutral? For example, if we want to decide on whether measles vaccination should be obligatory or not, this decision is not only influenced by facts from natural sciences but also by ethical and moral values and by parents' autonomy on deciding for their child. The decision on reducing plastic waste is surely also influenced by the rules of labour market and economical aspects. Students as future member of our democratic societies should be prepared to engage in such discussion, to analyse different sources and to come to a balanced decision in terms of active citizenship.

In addition, although mathematics and science are often considered to be culturally independent and neutral, they are not. Different cultures use sciences differently, see different connections to their religion and have advanced science and mathematics through their researchers and experts. For example, the triangle made famous by Blaise Pascal in the Western world has been known many years before in the Arab and Chinese world. Also, we have to acknowledge that students educated in different cultural areas use different algorithms, different language and are familiar with different contexts. These aspects all influence science and mathematics teaching and should be considered when planning lessons.

However, and this is the key point, science and mathematics teachers are neither prepared to include citizenship education nor taking into account different cultural backgrounds in their education. As a diverse class differs not only in terms of cultural background, but also especially in the different achievement levels of the students - not necessarily connected to their cultural background - this issue should be also taken into account.

Our innovative professional development course supports mathematics and science teachers taking up these challenges and preparing our future members of society for active citizenship:

The course consists of three modules:

Modul 1: Addressing different achievement levels

Modul 2: Contexts to enhance active citizenship

Modul 3: Multicultural settings

The modules are freely available on <https://icse.eu/international-projects/masdiv/>