Using Data Science to improve Statistics Teaching: Educational Data Mining and Learning Analytics?

In the past decades, not only Data Science has entered the scientific landscape and has established a still forming discipline. With the terms Educational Data Mining and Learning Analytics, two more buzzwords are in the debate that link Data Science and Educational Research. Both disciplines have in common that they apply methods from the field of Data Science to learning-related data. Moreover, both strive to improve teaching and learning. For statistics education, the question to ask is how the research discipline as well as our classrooms can benefit from this to the greatest extent possible.

The research presented here uses the example of an introductory course on statistics to show how educational data mining and learning analytics can benefit statistics education. Using approaches from Educational Data Mining and Learning Analytics, learning during the Covid-19 pandemic was studied in comparison to traditional learning. Helpful insights into student learning processes were gained, highlighting successes in learning during the pandemic but also pointing to problems students experience. These insights help improve statistics education on a macro level. In the same course, Learning Analytics-based feedback could be provided to students for their learning and corresponding help was integrated into the support structures of the course. This way, Learning Analytics influenced learning on a micro-level.

The example of this introductory course on statistics, therefore, shows that, in particular, the parallel use of Educational Data Mining and Learning Analytics on a micro and a macro level of statistics teaching and learning promises great potential for statistics education.