



## 15th International Congress on Mathematical Education

7-14 July 2024 • ICC Sydney, Australia  
Come and be counted

# Topic Study Group 3.18: Data science teaching and learning

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## Team details

### Co-Chairs

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## Overview

Data science lies at the intersection of the fields of statistics, computer science and application. This emerging discipline requires learners to gain new skills to be able to explore so-called “big data” characterized with the four Vs: Volume, Variety, Velocity, and Veracity. Competent reasoning about data has become essential, especially as those data become increasingly personally and societally consequential. For example, to ensure a vibrant democracy, gaining a robust understanding of data in such areas as migration, global warming, health and poverty, so-called “civic statistics”, becomes important. But (big) data itself rarely comes in a tidy format and so data handling and data management have become important as well.





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Owing to these trends, modelling, the use of digital tools, and storytelling and argumentation with data have been given an even more prominent role than before. However, the topic “Data science teaching and learning” and its approaches as well as statistics education are still diverse from a mathematics education perspective. Beyond a wide variety of curricular approaches there are several recent special issues on Data Science Education, both within Statistics Education (Teaching Statistics; Statistics Education Research Journal) and related fields (Journal of the Learning Sciences; British Journal of Educational Technology), illustrating the interest in this “hot topic”.

TSG3.18 aims to synthesize research and curricula on the teaching and learning of data science on all levels – from primary to secondary, tertiary and the vocational sector. Selected relevant and big questions within this Topic Study Group are

- How might a trajectory of data science learning look as students move across the primary, secondary, and tertiary/vocational levels?
- How might a trajectory of data science learning intersect with anticipated learning in related fields such as computing, artificial intelligence or civics?
- What knowledge, skills and dispositions are required to prepare people to cope with the complexity of big data and to develop data acumen?
- What are the challenges for integrating data science into the school curriculum/undergraduate statistics courses, or designing a data science curriculum at school level/undergraduate statistics?
- What are effective ways to support instructors implementing aspects of data science teaching and learning at different educational levels?

## Areas of interest

We expect TSG 3.18 to discuss submissions on major issues on research on data science teaching and learning in any of the following themes:

- Curriculum approaches to implementing data science teaching and learning at the school, university or at the workplace / vocational level.
- Design-based research approaches to implementing data science teaching and learning at the school, university or vocational level.
- Teaching and learning of particular aspects of data science, such as the exploration of big data (messy and ill-structured data), examinations of data ethics and data governance as they relate to the analysis of data, understandings of models and techniques particularly well-





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suited for big data, the use of coding, the use of professional digital tools like R, Python, Jupyter Notebooks or the use of machine learning methods, etc.

- Assessment issues with regard to data science teaching and learning.
- Research on teacher education or professional development on data science teaching and learning.
- Teaching and learning of data science in collaboration with other disciplines (e.g. computer science, the arts, and the natural and social sciences) or with partners from industry and administration.
- Literature-based conceptual analysis of a subdomain of data science as the basis of curriculum design.

### **How to make a submission to this Topic Study Group**

Submissions for Topic Study Group Papers and proposals for Posters open 28 April 2023 via the official ICME-15 website, [icme15.org](http://icme15.org). The website also contains a timeline of dates for the activity of the Topic Study Groups in the lead up to the Congress.

For questions about this TSG, please contact the Co-Chairs using the email addresses provided.

