

CALL FOR PAPERS: RESEARCH ON DATA SCIENCE EDUCATION

SPECIAL ISSUE OF THE STATISTICS EDUCATION RESEARCH JOURNAL (SERJ)

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1. BACKGROUND

Data science has become an emerging field at the intersection of statistics, computer science and application fields. From a statistics education perspective, this discipline requires learners to gain “new skills”¹. to be able to explore large and messy datasets, so-called big data (Ridgway, 2016; Gould, 2017) These big datasets are available in many contexts and competent reasoning about data has become more and more important (Biehler, Frischemeier, Reading, & Shaughnessy, 2018). The influence of big data raises questions about future possibilities for social participation, self-determination and self-realization in professional and private life and also for the necessary underlying education processes at the school and university level. To ensure a vibrant democracy, gaining a robust understanding of data, for example in such areas as migration, global warming, health and poverty, so called civic statistics (Engel, 2017), becomes even more important. But data itself does not necessarily come in a tidy format and so data handling and data management have become more and more important as well. Owing to these trends, modelling and the use of digital tools have been given an even more prominent role than before.

However, the field “data science” is still diverse from a statistics education perspective, pointing in many different directions. There are a wide variety of curricular approaches, including such examples, as the International Data Science in Schools Project IDSP (<http://www.idssp.org/>), the IDS project of the University of California (<https://www.idsucla.org/>) and the ProDaBi project (Biehler et al., 2018). This special issue aims to synthesize curricular approaches and research findings on data science education. We would like to take up these curriculum issues and discuss the state of the art and future trends of data science (education) that could inspire ideas for the teaching and learning of data science on all levels – from primary to secondary and tertiary levels. Relevant questions we wish to tackle with submissions in the frame of this special issue are (1) How do we prepare people to cope with the complexity of big data? (2) What knowledge, skills and dispositions are required in data science to develop data acumen? (3) What are the roles of statistics, computer science, and domain knowledge in a data science curriculum? Which new topics should be included in the curriculum (e.g., machine learning, predictive modelling)? How differently should traditional topics be taught from the perspective of data science? (4) What are new ways to engage students in studying data science? (5) 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? (6) What are effective ways to support teachers/instructors implementing aspects of data science in schools/at the tertiary level?

2. POSSIBLE TOPICS

We will be particularly interested in research articles centered around teaching and learning data science in the context of statistics courses at any level, from primary to tertiary education of students and also teacher education and professional development. Given the infancy of the field, we encourage not only original empirical research (whether quantitative or qualitative) and research reviews, but also conceptually-oriented

¹ (see: <https://iase-web.org/conference/roundtable20/notices/Discussion%20Document%20for%20Roundtable%202020.pdf>)

articles that address issues of learning and teaching data science, including curricular issues. For example, we would welcome a thorough, literature-based conceptual analysis of a field as basis of curriculum design, but not simply a report on how a class was conducted.

For instance, we are looking for:

- Articles that report on curriculum approaches to implementing data science at the school or university level.
- Articles that report on research about teaching and learning data science in the context of statistics courses at any level, from primary to tertiary education.
- Articles that investigate the teaching and learning of particular aspects of data science, such as the exploration of messy and ill-structured data, the use of coding, the use of professional digital tools like R, Python, Jupyter Notebooks or the use of machine learning methods, etc.
- Articles with research on teacher education or professional development in data science education.
- Articles that investigate the teaching and learning of data science in collaboration with other disciplines (e.g. computer science) or with partners from industry and administration.
- Articles with a literature-based conceptual analysis of a subdomain of data science as basis of curriculum design.
- Reviews of current research on data science (education) within statistics.

3. SUBMISSION GUIDELINES

Expression of interest (including abstract of max. 250 words) to contribute to this Special Issue have to be sent as a pdf file including authors with affiliation and email address to serj.specialissue.dse@gmail.com by **30 September, 2020**. Full papers are expected to be submitted by **30 January, 2021**. Manuscripts for this special issue will be limited to a maximum of 6000 words of body text and authors are encouraged to aim for 4000-5000 words of body text (apart from abstract, tables and graphs, references, appendices). Manuscripts should be submitted in accordance with SERJ Template, which can be downloaded from <http://iase-web.org/Publications.php?p=SERJ>. The general author guidelines for SERJ: <http://iase-web.org/documents/SERJdocs/authorguide.pdf>.

The Special Issue is currently planned to be published by **June 2022**.

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