

## Editorial

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### INTRODUCTION

(Big) Data are everywhere – they shape the challenges and opportunities we face today. Helping learners and citizens navigate uncertainty, interpret data and its visualizations. Moreover, working responsibly with digital tools and resources is no longer optional, but essential in all STEAM disciplines. From 30 September to 2 October 2025, the 14<sup>th</sup> IASE Satellite Conference entitled “Statistics and Data Science Education in STEAM” took place at the University of Münster, Germany, just before the ISI 65<sup>th</sup> World Statistics Congress in The Hague, The Netherlands. This conference offered a unique forum to share approaches on how statistics and data science can enrich teaching and learning, from primary classrooms to higher education and professional development, with a particular focus on STEAM contexts.

94 registered participants from 23 countries attended the conference and discussed innovative approaches to statistics and data science education within STEAM settings. The scientific program included two keynotes, 54 oral presentations, a poster session, seven workshops and four NetLunchings, covering six thematic areas that highlighted the role of statistics and data science in interdisciplinary STEAM contexts (for details see section *conference goals and topics* below). The conference opened with a welcome reception on 29 September, inviting participants to an evening of reunions, catch-ups and first acquaintances that set the tone for the upcoming three days. The keynotes provided important impetus: Joachim Engel highlighted civic statistical literacy in the context of democracy education, and Andee Rubin demonstrated a variety of ways in which data can be used ‘everywhere’ in the learning process. The conference concluded with a panel discussion, led by Aisling Leavy as the moderator and the panelists Helen MacGilivray, Robert Gould and Karsten Lübke who took the opportunity to reflect on the conference and its topic from different perspectives.

### CONFERENCE GOAL AND TOPICS

The theme of the IASE Satellite Conference, “Statistics and Data Science Education in STEAM”, emphasized the critical role of statistics and data science in shaping education across all STEAM disciplines and all educational levels including teacher education and professional development. As data-driven decision-making becomes increasingly essential, integrating statistical and data science skills in STEAM education empowers learners to solve complex problems, innovate, and make informed decisions in diverse fields. Following the conference theme, participants explored the ways in which we can foster interdisciplinary learning, equipping students with the analytical and critical thinking abilities required in the data-centric world of today. Given that definitions of data science are still evolving, discussions at the IASE Satellite conference focused on developing a shared understanding of what data science encompasses from a statistics education perspective.

We had submissions and contributions related to and across the following topics:

#### *Topic 1: Harnessing STEAM Contexts to Ignite Inquiry in Statistics and Data Science*

This topic explored how the integration of science, technology, engineering, arts and mathematics (STEAM) can spark curiosity, deepen engagement and add context to statistical and data science learning. When problems are rooted in interdisciplinary contexts, students are empowered to approach data-driven inquiries driven by problems that exist in STEAM contexts. The contributions in this topic highlighted how STEAM-based learning environments can transform the exploration of statistics and data science into a more dynamic, imaginative, and impactful educational experience.

*Topic 2: Enhancing STEAM Education through Modelling in Statistics and Data Science*

This topic focused on the role of modelling in education, exploring how students can develop the ability to construct, refine, and analyze models to understand and predict outcomes in various STEAM disciplines. This topic brought together educators, researchers, and practitioners to share innovative methods, tools, and strategies for using modelling in ways that promote deep understanding and application across STEAM subjects.

*Topic 3: Advancing Educational Practices to Enhance Understanding in Statistics and Data Science*

This topic had the intention to showcase and explore forward-thinking strategies, techniques, and models for teaching statistics and data science at K-12, undergraduate, and graduate levels. Submissions under this topic investigated new approaches, teaching and assessment methods, and instructional design practices that push the boundaries of traditional classroom instruction. The contribution in this topic demonstrated creativity, foster deep engagement, and showed how to promote critical thinking in the intersection of statistics, data science, and other STEAM disciplines.

*Topic 4: (re)Defining Literacy in the Age of Data*

In today's rapidly evolving digital landscape, the concept of literacy is undergoing a profound transformation. In this topic, we explored the evolving definitions of literacy that incorporate attention to a range of literacies (e.g., data, statistical, digital, visual, critical, ethical communicational, ethical, interdisciplinary, algorithmic, Artificial Intelligence) and how educators are developing these critical literacies in students to prepare them for success in a complex, data-driven world. Contributions in this section included perspectives on how to broaden our understanding of literacy and strategies for fostering these multiple literacies in a way that empowers students to think critically, communicate effectively, and solve problems creatively with the use of data in interdisciplinary contexts.

*Topic 5: Innovating and Expanding the Boundaries in Statistical and Data Science Education*

This topic encouraged contributions that challenge the status quo, breaking away from conventional pedagogies and disciplinary silos to create new opportunities for interdisciplinary learning, creativity, and international collaboration as well as incorporating Generative Artificial Intelligence as personal tutors for students. Selected papers explored how expanding boundaries can foster inclusivity, adapt to the digital age, and empower students to solve complex real-world problems including Work Integrated Learning.

*Topic 6: Fostering Probabilistic Thinking*

In today's world, society grapples with numerous challenges including climate change, economic volatility, pandemics and various social issues such as mass migrations, gender-based violence and lack of inclusivity and diversity. As probability plays an increasingly crucial role in navigating these complex issues, strengthening education in probability can empower students with the reasoning and critical thinking skills necessary for evidence-based decision making. Foundational concepts in data science, such as machine learning, are closely tied to probability, underscoring its relevance in addressing real-world problems. In topic 6 we have had a range of submissions on approaches to developing probabilistic thinking and decision-making rooted in probability, articulation of probabilistic approaches (theoretical, frequentist and subjective) and ways to help students overcome barriers to learning probability.

## ACKNOWLEDGEMENTS

The 2025 IASE Satellite Conference was planned by an International Program Committee (IPC), the Local Organizing Committee (LOC) as well as multiple staff members of the hosting organization. We would like to take this opportunity to thank everyone involved in bringing the conference to life and ensuring its successful and smooth operation.

*Local Organizing Committee*

- Daniel Frischemeier (Münster, Germany) – Chair
- Lisa Birk (Münster, Germany) – Co-Chair

- Gerrit Loth (Münster, Germany) – Co-Chair
- Simeon Schwob (Münster, Germany) – Information manager
- Verena Witte (Münster/Tübingen, Germany)
- Karin Binder (Paderborn, Germany)

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- Ayse Bilgin (past IASE president) (Australia)
- Alejandra Sorto (past IASE president) (USA)
- Bruno de Sousa (IASE president) (Portugal)

IASE Satellite conferences require a great deal of work to organize, and the commitment of many people from around the world who are willing to contribute their time and effort. We would like to thank all authors who submitted and presented papers or posters as well as all session chairs for their efforts. A special thank you goes to the facilitators of the workshops, Volker Kraft, James Nicholson & Sean McCusker, Helen Müller & Jan Wirwahn, Lara Billion, Tim Erickson, Hollylynne Lee & Emily Thrasher, & Thomas Bartoschek, as well as our speakers and organizers of the NetLunchings, Theresa Büchter & Lena Jaeger, Felipe Ruz, Benjamin Risse & Edzer Pebesma, and Thomas Skill, without whom the scientific program would not have been as rich and colorful as it now was. We would also like to express our sincere gratitude to all the reviewers (please see the full list below) for their invaluable contribution in enhancing the quality of the papers through their generous provision of time and expertise. Finally, we would like to thank all participants for bringing the conference to life through their meaningful conversations and active engagement throughout the event.

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#### *Group photo with most of the participants*



In: Birk, L., Loth, G., Jotzo, L., Binder, K., & Frischemeier, D. (Eds.) (2026). *Statistics and Data Science Education in STEAM. Proceedings of the Satellite Conference of the International Association for Statistical Education (IASE), September/October 2025, Münster, Germany.* © ISI/IASE.

*List of reviewers for the IASE Satellite 2025 proceedings*

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