IASE 2024 ROUNDTABLE CONFERENCE
CONNECTING DATA AND PEOPLE FOR INCLUSIVE STATISTICS AND DATA SCIENCE EDUCATION

PREFACE

The 2024 IASE Roundtable Conference, organised by the International Association for Statistical Education (IASE), was held in Tāmaki Makaurau Auckland, Aotearoa New Zealand 2-5 July 2024. Forty people from 12 different countries met and discussed new and evolving ideas on the conference theme: "Connecting data and people for inclusive statistics and data science education". The conference was sponsored by The International Statistical Institute (ISI), The Department of Statistics | Te Kura Tatauranga at the University of Auckland | Waipapa Taumata Rau, and The New Zealand Statistical Association. Over four days, there were nine paper sessions, two workshop sessions, several networking and structured discussion sessions, with a discussant summary and closing session at the end of the conference. Twenty three original papers on the conference theme were presented and discussed, providing participants with time to engage meaningfully with one another over the topics and themes. Through a mixture of formats including extensive discussions in small groups, the meeting advanced current knowledge about conceptual frameworks, teaching methods, technology solutions, and curricular materials.

CONFERENCE GOAL AND TOPICS

The overall theme of the conference was *Connecting data and people for inclusive statistics and data science education.* Given that the creation and use of data is a human-driven process, this conference aimed to discuss the inclusivity of the teaching and learning experiences for both students and teachers within statistics and data science. The conference opened with a keynote by Andrew Sporle who discussed the important question, *Can we build equitable statistical literacy in a world of automated analytics?* Andrew pointed out, in a world where the data and automated analytics undermining AI are encoded with social biases, the opportunity to create more equitable data environments lie in empowering indigenous and minority communities to become data leaders as they form a growing share of the future workforce. Examples of emerging solutions that utilise such opportunity include local community-led mentoring initiatives, indigenous data governance training programmes, and professional data standards. The session ended with a call to action for IASE to invest in these global collaborations as well as local data initiatives further, shifting from data literacy to data agency so that marginalised communities can actively shape the data that impacts them. Within the overall theme, contributions focused on the following topics.

Topic 1: Supporting learners with diverse needs and abilities

This topic considered questions such as: *How do we design statistical learning environments to support learners with diverse social, cognitive, and/or physical abilities? How do we transfer ideas from and take on new perspectives to statistics and data science education drawing from disability studies and inclusive education? How do we create digital tools that afford access to learners that see and interact with the world in diverse ways?* The paper in this topic investigated how transformative technologies might contribute to an equitable teaching and learning environment for statistics instruction. Such lessons become especially instrumental for minority students who are given fewer opportunities to strengthen their student identity, authority and agency. The discussant for this topic was Saleha Habibullah who highlighted the attention given by the paper to supporting students with special needs.

Topic 2: Creative approaches to supporting learners in under-resourced contexts

This topic considered questions such as: *How can statistics and data science concepts be taught in settings where there is limited access to digital technologies? How is statistics and*

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data science education carried out or continued in conflict zones? How can multivariate data be visualised, analysed, and communicated without using digital tools? What are ways learners can visualise data in their community drawing from the assets of their community? What does statistics and data science education look like in remote and rural settings?

Both papers in this topic explored instructional methods that leverage classroom aspects outside of digital technologies access — physical engagement through taking a random walk and social engagement through peer instruction — to develop understanding of foundational statistical concepts. A complementary peer instruction workshop demonstrated how that instructional method can be adapted to the participants' own lecture contexts. Saleha Habibullah also led the discussion on this topic and posed the question of how statistics educators in developed countries can draw inspiration from these presentations and support their colleagues in developing countries.

Topic 3: Drawing from multiple ways of knowing in the teaching and learning of statistics and data science

This topic considered questions such as: H*ow do indigenous ways of knowing data and the world inform new ways of envisioning the teaching and learning of data? How are ethno-statistics developed in different settings? How is technology designed or used to leverage different ways of knowing in the exploration of data? How are asset and community-based approaches used in the teaching and learning of data? How is data collected and used in different communities, cultures, and social groups?*

The paper in this topic explored the practices high school teachers used to wrangle messy, authentic survey data collected from students in a semi-structured workshop environment. Through introducing teachers to the complex, humanistic, and evolving nature of the data cleaning process in data science, the study offered insights on how to scale authentic data exploration for the classroom. Teaching and learning with authentic data was further explored in the workshop which showcased an online "census" questionnaire that schools in New Zealand and overseas can take part in to give their students a real and relevant data gathering experience. The discussant for this topic, Gail Burrill, noted how community-based, technologically augmented approaches can be used to support areas in need of statistically informed individuals.

Topic 4: Considerations of socio-political aspects of statistics and data science education

This topic considered questions such as: *How do we support learners in interrogating issues of bias and misuse of data to consider ethical uses of data? What data ethical principles are important for learners? How do we consider ethical issues in terms of who owns data and who can use it particularly when that data is from and about historically marginalised groups? How do we support learners in understanding issues of data privacy? How do we increase access to technological tools for connecting people and data? How can we rethink the underlying logic of statistics challenging its roots in eugenic perspectives? How do we use data to connect people in fair and just ways?*

In this area, several papers addressed specific ways we can engage with the socio-political aspects of data science: listing historical and contemporary scholars who challenge dehumanising algorithmic bias to counteract eugenicist perspectives; conceptualising a social justice focused data investigation process to empower instructors in creating their own lesson plans; implementing transnational, virtual classroom discussions of data ethics to build student awareness of equity. Gail also led the discussion on this topic and linked these ways of making equity routine to the role generative AI can take in the statistics classroom.

Topic 5: Interdisciplinary approaches to engaging in data and data literacy

This topic considered questions such as: *How do frameworks, theories, and epistemologies from other disciplines provide different perspectives and approaches to the teaching and learning of statistics? How do interdisciplinary efforts teach us more about the teaching and learning of statistics and data science? How do other disciplines approach the teaching and learning of data and data literacies? What is the role of data and statistics education in STEM and STEAM efforts? How do digital tools support interdisciplinary work and perspectives for investigating data? What are the educational challenges in teaching statistics from an interdisciplinary perspective?*

The variety of meanings data literacy can take on necessitates a shift from cooperative multidisciplinarity to collaborative interdisciplinarity. Several contributions in this topic considered interdisciplinary options for the curriculum, for teacher training, and for an inclusive classroom. Others reflected on the challenges associated with the implementation of statistical projects when the educators themselves are not aligned regarding statistical terms and concepts. We also saw cases in which digital tools allowed students to work with data from multiple disciplines, or in which technology facilitated the understanding of multivariate analysis between students of different disciplines. Alongside the paper sessions, two workshops facilitated discussion of how interdisciplinary, experiential learning can advance statistics learning through sharing stories of non-STEM students developing data skills through a co-created framework and interdisciplinary practices in current curricula. The discussant for this topic, Priya Parmar, commented that these examples of interdisciplinarity illustrate a need for data teams whose members bring complementary competencies and communication skills to the table.

Topic 6: Taking a humanistic stance in teaching and learning with and about data

This topic considered questions such as: *How do we design learning experiences for learners that involve personally relevant data? How do we use technology in ways to connect people and data? How do we draw from and lift up learners of diverse identities in teaching and learning data literacies? How do we design meaningful learning environments taking sociopolitical issues into account? How do we centre the learner in experiences with using and learning about data?*

Under this topic, some papers explored how humanistic statistical education can be achieved in the classroom through utilising culturally significant data in data visualisation lessons, advocating with data in a modelling environment, and critical thinking activities about notions of chance. Other papers went beyond the classroom and talked about institution level initiatives for students to experience data gathering and industry adjacent data science work, equipping teachers with pedagogical tools to prepare inquiry based lessons and the impacts of additional training in statistics. In addition to the papers, a workshop was held during which participants mapped activities to a currently used investigative cycle and updated statistical ethics standards to help them develop lessons with an ethical lens. The discussant on this topic, Rob Gould, proposed that subthemes of community, data relevancy, technology and professional learning underpin the above papers, and could be further extended by looking at the history and design of data practices.

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Group Photo with (most of) the participants