STATISTICS EDUCATION RESEARCH JOURNAL

Volume 14
Number 1
May 2015

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STATISTICS EDUCATION RESEARCH JOURNAL

The *Statistics Education Research Journal* (*SERJ*) is a peer-reviewed electronic journal of the International Association for Statistical Education (IASE) and the International Statistical Institute (ISI). *SERJ* is published twice a year and is open source.

SERJ aims to advance research-based knowledge that can help to improve the teaching, learning, and understanding of statistics or probability at all educational levels and in both formal (classroom-based) and informal (out-of-classroom) contexts. Such research may examine, for example, cognitive, motivational, attitudinal, curricular, teaching-related, technology-related, organizational, or societal factors and processes that are related to the development and understanding of stochastic knowledge. In addition, research may focus on how people use or apply statistical and probabilistic information and ideas, broadly viewed.

The *Journal* encourages the submission of quality papers related to the above goals, such as reports of original research (both quantitative and qualitative), integrative and critical reviews of research literature, analyses of research-based theoretical and methodological models, and other types of papers described in full in the Guidelines for Authors. All papers are reviewed internally by an Associate Editor or Editor, and are blind-reviewed by at least two external referees. Contributions in English are recommended. Contributions in French and Spanish will also be considered. A submitted paper must not have been published before or be under consideration for publication elsewhere.

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Publication: IASE/ISI, The Hague, The Netherlands
Technical Production: The University of Texas at El Paso, El Paso, Texas, United States of America

ISSN: 1570-1824

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EDITORIAL

Welcome to the first issue of *SERJ* for 2015, which Bob delMas has prepared. Since taking over from Bob in July 2014, I have begun to appreciate fully the enormous amount of work he did for *SERJ*. The constant monitoring of manuscripts from submission to revisions to publication is time consuming, as is the reporting and decision-making required about the quality of the research. I thank Bob for all the time and service he gave to *SERJ* in a voluntary capacity and for his generosity in smoothing the pathway for me by providing the systems he set up for processing *SERJ* papers.

New Co-Editor I would also like to welcome the new Special Issue Editor, Manfred Borovcnik (Alpen-Adria-Universität Klagenfurt, Austria). Manfred is well known for his work in probability including co-editing (with Ramesh Kapadia) one of the first books on probability education in 1991 (*Chance Encounters: Probability in Education*). Manfred is replacing Peter Petocz. Peter has kindly agreed to continue to oversee the November 2016 Special Issue on Learning and Teaching Probability within Statistics with guest editors Egan Chernoff, Efi Paparistodemou, and Dionysia Bakogianni. Meanwhile Manfred is assisting Jim Ridgway and James Nicholson, the guest editors for a Special Issue on Statistical Literacy, which is planned for the May 2017 issue. This additional special issue is part of a push to increase the visibility of *SERJ* and to increase the number of quality submissions. We are also working on getting *SERJ* on more databases and changing from a manual to a computer-based submission system.

Associate Editors Nick Broers, John Harraway, and Gilberte Schuyten have resigned as Associate Editors after giving many years of invaluable service to *SERJ*. Sue Finch (The University of Melbourne, Australia), Jennifer Kaplan (University of Georgia, USA), and Michele Millar (Mount Saint Vincent University, Canada) have been appointed as Associate Editors.

Call for nominations for new Assistant Editor Current Assistant Editor Larry Lesser is another vital person in the *SERJ* editorial process. Larry is in charge of getting the accepted papers to publication standard and for publishing the papers. Larry will be relinquishing this job in another year and therefore we need someone now to volunteer for this position so that they can learn what to do and make the transition seamlessly. The Assistant Editor is appointed to the Editorial Board for a four-year term. The Assistant Editor is in charge of the copy-editing and preparation of manuscripts for publication and for producing each issue in PDF format. Work is intermittent during the year and increases during the weeks leading to the publication of a new issue each May and November, when communication with authors and editors is also needed. The Assistant Editor may also be involved in updating the *SERJ* website or taking part in other activities of the *SERJ* editorial board. The ideal candidate will have excellent command of the English language, interest in editorial work, familiarity with basic desktop publishing or PDF-producing software, and some familiarity with research in statistics education.

Interested persons in the statistics education research community should send a letter of intent and a short curriculum vitae to Maxine Pfannkuch (m.pfannkuch@auckland.ac.nz), to whom any queries about the position may be addressed.

MAXINE PFANNKUCH

Statistics Education Research Journal, 14(1), 5-7, http://iase-web.org/Publications.php?p=SERJ
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Articles published in this issue There were several promising manuscripts under review at the time my tenure as Editor for *SERJ* ended last summer, and I have had the privilege of shepherding these articles through the revision process to be published in this issue. The articles cover a variety of topics: teacher knowledge for least squares regression lines, the use of collaborative tests in online statistics courses, developing teachers' understanding of hypothesis testing, students' reasoning about tests for differences between groups, and the development of two teachers' knowledge for teaching statistics at the middle-school level in Brazil.

Stephanie Casey and Nicholas Wasserman look at pre-service and in-service teachers' informal knowledge for the line of best fit. Nineteen teachers were presented with five bivariate plots that represented varying degrees of positive or negative correlation. For each plot, teachers were asked to place a piece of wire so that "it best fits the data". Teachers' responses to follow-up questions were used to categorize their understanding of the line of best fit, the criterion they used to place the line, and how the teachers' understanding changed as they went through the five tasks. The teachers were found to have reasonable levels of knowledge about the placement of an informal line of best fit with the exception of a plot of bivariate data with no association. Another interesting observation was that the context sometimes had undue influence on placing the line, such as identifying a trend based on their knowledge of the context rather than a consideration of all the data points in the plot. Casey and Wasserman discuss the implications of their findings for developing teachers' knowledge and future research.

Audbjörg Björnsdóttir, Joan Garfield, and Michelle Everson report on a study of two different approaches of collaborative testing – consensus and non-consensus – in an online statistics course. They were interested primarily in the effect of the two different approaches on students' learning, attitudes, and quality of group discussions in the online environment. This well-designed study that used random assignment to treatment presents several null results (e.g., no statistically significant differences with respect to final course grade and students' attitudes toward statistics). Differences were found between the two types of collaborative testing with respect to qualitative aspects of the group discussions. For example, under the non-consensus experimental condition, students were more likely to point out errors in thinking or ask for clarification during group discussions. The authors offer a variety of plausible explanations for the results that have implications for teaching and future research.

Jason Dolor and Jennifer Noll describe the use of guided reinvention with teachers to develop their conceptual understanding of statistical inference. Thirteen pre-service and in-service teachers participated in a teaching experiment where they were given the task of reinventing a method of informal hypothesis testing for categorical data. Dolor and Noll document how the scaffolding of the teachers' understanding of variability was used to move the teachers through five stages to develop their understanding of empirical sampling distributions and the logic of hypothesis testing. A hypothetical learning trajectory and its implications for teacher development and future research is presented.

Thomas Hogan, Brian Zaboski, and Tiffany Perry studied how students without advanced statistical training interpret research that reports a difference between two groups. In two different studies (40 undergraduates in the first study and 88 in the second), students were presented with summaries of research reports that communicated statistically significant differences between groups and asked to estimate the scores of the groups. Inferred effect sizes were computed from the estimates and compared to the actual effect sizes. Overestimation of effect sizes was found in every case, a finding which the researchers dubbed the "tall-tale effect". Results from the second study provide

evidence that overestimation may be more pronounced for results based on percentages compared to means and that the change of a single word (“slightly” versus “significantly”) can affect the degree of overestimation.

The final article – by Leandro de Oliveira Souza, Celi Espasandin Lopes, and Maxine Pfannkuch – reports a case study of two teachers who participated in a professional development program called the Teacher Professional Development Cycle (TPDC). The TPDC was created in response to the introduction of statistics into the Brazilian middle school and high school mathematics curricula. The authors argue that one of the major challenges is the lack of content and pedagogical knowledge for teaching statistics in the preparation of Brazilian mathematics teachers. The TPDC model, which emphasizes time for reflection and innovation during professional development, is based on models of statistical thinking. As the authors state, the purpose of the study was to investigate “how a collaborative group can develop strategies to overcome their limitations in their approaches to teaching statistics content”. Implementation of the TPDC approach is described and case studies of two of professional development participants are presented to illustrate how the approach can help teachers to increase their knowledge and skills for teaching statistics.

ROBERT DELMAS