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EDITORIAL

Welcome to the first issue of *SERJ* for 2021. There are a number of exciting changes happening for our Journal. As of January 2021, we started using the Open Journal System (OJS) for reviewing manuscripts and publishing issues. This is our first issue published through OJS and many thanks go to our Assistant Editor, Noleine Fitzallen, not only for preparing the papers for the issue, but also for getting us set up in the OJS. All future issues of *SERJ* will be published through OJS and over time we intend to move past issues into the system. This brings me to another exciting change for *SERJ*: going forward, we will be assigning all papers DOIs. We will start by assigning DOIs to the new papers, but we also have plans to work backwards through the previously published issues. Many thanks go to Gail Burrill, IASE Past President, and Daniel Frischemeier, *SERJ* Editor for Special Issues, for their work investigating and creating a DOI system for *SERJ*.

This issue contains five papers, the first four of which use quantitative methodologies. In this issue you will be introduced to a new scale to measure statistics anxiety, specifically for students in online or hybrid statistics courses. The second and third papers explore relationships between previous mathematics performance, affective variables, and perceived or actual cognitive outcomes for undergraduate students in statistics. In the fourth paper, the authors explore content knowledge and attitudes toward statistics of pre-service secondary mathematics teachers. The third and fourth papers remind us of the international mission of SERJ, with one situated in the Caribbean context and the other in the Chilean context. The last paper provides a theoretical framework for analyzing the text accessibility of statistics textbooks. I hope you enjoy these papers, all of which have great potential for moving the field of statistics education research forward.

In the first paper, Lu Liu presents a new instrument designed to measure statistics anxiety for students in online of hybrid mode statistics courses: the Statistics Anxiety Scale in the Online or Hybrid setting instrument (SASOH). While existing measures of statistics anxiety have demonstrated validity and reliability evidence when used with students in traditional and face-to-face settings, the same evidence does not exist for these measures when used with students in online or hybrid settings. Given the number of online and hybrid statistics courses available to students, particularly in the current pandemic, coupled with results indicating that online statistics students have higher levels of anxiety, this instrument is coming to our research community at a very opportune time. Like the existing measures of statistics anxiety, the SASOH uses a multidimensional model. The resulting instrument has 27 items across four dimensions: anxiety about Class and Interpretation, Fear of Asking for help, Online System, and Pre-Conception. While the initial reliability and validity evidence for the SASOH presented is promising, replication studies providing further evidence of the validity and reliability of the instrument are needed. If the SASOH instrument reveals good results in the replication studies, future studies could focus on separating the statistics anxiety scale into meaningful low, medium, and high ranges and these ranges could be used for diagnostic, classification, progress, and modification-of-instruction purposes.

Laura Rabin, Anjali Krishnan, Rose Bergdoll, and Joshua Fogel investigated whether basic mathematics skills are associated with course performance in statistics by undergraduate psychology students. The results of a discriminant correspondence analysis revealed differences in course performance evaluated as the average of three exam grades. In particular, the level of basic mathematics provided the largest contribution to the variability on course performance of all variables included in the analysis. Other variables associated with better exam grades included white ethnicity, non-transfer status, lower year in school, and low procrastination. While the authors recognize the limitations of their study, such as the use of a single institution and exam scores as the response variable, their results suggest support structures to broaden access to and success in introductory statistics courses for students who are diverse in terms of demographics and/or mathematics preparation. Some examples given are placement of students in an accelerated statistics pathway, offering peer tutoring may be a relatively non-threatening form of academic help seeking, and/or syllabus organization that discourages procrastination. These recommendations add to a growing body of literature in mathematics education around student transitions to tertiary level mathematics learning.

Talia Esnard, Fareena Alladin, and Keisha Samlal examined the relationship of previous mathematics performance, statistical self-efficacy, and statistics anxiety on Caribbean students'

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expectations for performance in an undergraduate behavioral statistics course. Key findings using structural equation modeling are that previous mathematics performance had little direct effect on students' expectations for performance in statistics, but moderate indirect effect on their levels of statistical anxiety and self-efficacy. While statistical self-efficacy was positively associated with statistical anxiety, this measure produced a negative effect on their expectations for performance in statistics. Both statistical self-efficacy and anxiety negatively affected students' expectations for performance in statistics, but with minimally higher levels for the latter. There was no evidence of a difference in students' expectations for performance in statistics based on sex or academic discipline. Recognizing the limited scope of their investigation, the authors call for expanding the research to other Caribbean universities so comparisons can be made to strengthen curriculum and pedagogy and efforts to reform the teaching of statistics in the region. The authors also recognize the need for further investigation of the scales and measures used to quantify statistics anxiety and self-efficacy. Future research with robust measures would allow the statistics education research community to explore the relative impacts of changes to curriculum and pedagogy on affective outcomes for statistics students writ large, and not only in the Caribbean setting.

Felipe Ruz, Beth Chance, Elsa Medina, and Jose Contreras analyzed the levels of and associations among pre-service Chilean mathematics teachers' content knowledge and attitudes towards the teaching and learning of stochastics. As student learning outcomes in probability and statistics (stochastics) become more prominent in K-12 (primary and secondary) school settings, teachers face increasing demands to teach stochastics for which they may not be sufficiently prepared, from either a cognitive or an affective standpoint. The authors found the content knowledge of the pre-service teachers to be generally poor and insufficient for the content the Chilean teachers are expected to teach. This was true even though more than 80% of the participants had already passed all their required stochastics courses. Overall results about attitudes showed that participants tended to have positive attitudes (higher than the indifference score). One particularly interesting finding was, while the pre-service teachers agreed the content is important, they also felt less comfortable in their content knowledge and skills to teach it. Although higher levels of stochastics knowledge were associated with more positive attitudes, most of the associations between the cognitive and affective outcomes for the pre-service teachers were low. The authors posit that the weak association between attitudes and conceptual knowledge presents an opportunity for improving content knowledge: with generally positive attitudes these teachers should be motivated and open to further their understanding. The authors make three important recommendations for pre-service mathematics teacher educators: reorganize the stochastics training of teachers, promote content knowledge and knowledge for teaching simultaneously, and utilize modern approaches to develop stochastic reasoning. Given the uptick in stochastics learning outcomes at the school level, these recommendations are timely and have the potential for broad impact in teacher training and student learning.

In the final article, Kai-lin Yang and Khairiani Idris present an analytic framework for evaluating the text accessibility of undergraduate (tertiary) level statistics textbooks. The framework is based on the five attributes of accessibility of science texts: text concreteness, voice of authors, coherent writing structure, selective use of visual information, and integrated verbal and visual information. These five components were reimagined for statistics texts drawing on the literature around critical components of reading mathematics texts and features of statistics texts. After describing the framework, the authors provide an example of its use in analyzing a section of text from a popular statistics textbook. There are many potential uses for such a framework in statistics education. It can be used by authors and publishers to ensure maximum accessibility and readability of textual statistics materials to promote student learning. It could also be used by instructors when selecting materials to use with students. I look forward to future studies refining the framework and applying it to investigate differences in learning outcomes for students related to differences in text accessibility of the teaching materials used.

JENNIFER J. KAPLAN