

**STATISTICS EDUCATION
RESEARCH JOURNAL**

Publishing Your Statistics Education Research

Katharine Richards, Teaching Statistics

E. Jacquelin Dietz, Journal of Statistics Education

Bob delMas, Statistics Education Research Journal

Rob Gould, Technology Innovations in Statistics Education

Chair: Peter Petocz

ICOTS- 9

Flagstaff, AZ USA

July 17, 2014

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TECHNOLOGY INNOVATIONS IN STATISTICS EDUCATION
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- Give a brief history of your journal including types of papers that are published.
- Describe the submission process, review process, and acceptance rate of submitted papers.
- Identify some common issues that decrease the likelihood that a submitted manuscript will be published in your journal.
- Name two or three take-home points that you would tell potential authors are of the utmost importance.

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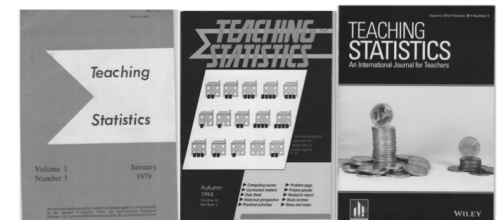
Give a brief history of your journal that includes the current mission statement and the types of papers that your journal publishes including any regular departments or features.

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Teaching Statistics

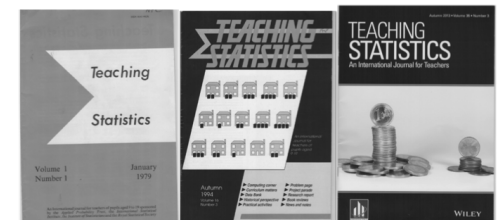
Editors: Paul Hewson and Helen MacGillivray
Presentation by Kate Richards, Editorial Board Member



History

Origins of the journal

- First appeared in 1979, published three times a year ever since
- Aimed at *teachers* of learners aged 9-19
- Aimed at all who teach statistics, i.e. Biology, Geography, Psychology, Sociology as well as Math & Stat teachers
- Original goals listed as "to inform, enlighten, stimulate, correct, entertain and encourage"
- There is a demand from teachers for this resource
- Owned by the Teaching Statistics Trust (UK) and published by Wiley



Content

Types of article

- Articles are peer reviewed but it is *not* a pedagogic research journal
- Historically, we have published a wide range of article types (Practical Activities, Data Stories, Curriculum Matters, Computing Corner) - however we are moving towards "just" having articles (covering any of these areas that may be of interest to a practicing teacher). We also have excellent regular columns such as Statistical Diversions.
- The main aim is to have articles which can inspire excellent practice in the teaching of statistics, regardless of the discipline where it is taught.

We hope the journal can sit on the coffee table in staff rooms and promote discussion about how to teach statistics.



A Short History of JSE



- JSE was founded in 1993. The first editor was Jackie Dietz. JSE is a freely-available online journal.
- The first issue of JSE was published in July, 1993, and the original Managing Editor was Tim Arnold from North Carolina State University. Tim wrote an article describing the structure and philosophy of the journal in the first issue (<http://www.amstat.org/publications/jse/v1n1/arnold.html>)
- Since 1995, JSE has been published three times a year (March, July, November)
- Past Editors: Jackie Dietz 1993-2000; Tom Short 2001-2003; Bob Stephenson 2004-2006; Bill Notz 2007-2009; John Gabrosek 2010-2012
- Current Editor: Michelle Everson, University of Minnesota



JSE Mission Statement

JSE disseminates knowledge for the improvement of statistics education at all levels, including elementary, secondary, post-secondary, post-graduate, continuing, and workplace education.

Complete Mission Statement available at:

http://www.amstat.org/publications/jse/jse_mission.htm



JSE Departments and Features



- Regular Articles
- Data Sets and Stories Papers
- From Research to Practice Papers
- Research in K-12 Statistics Education (established in 2013)
- Teaching Bits
- Interviews with Statistics Educators



Other JSE Features

- JSE can be followed on both Facebook and Twitter
- In 2013, a JSE webinar series was established through CAUSEweb (www.causeweb.org)
 - Authors of papers published in JSE share their work roughly once each month through CAUSEweb (the third Tuesday of each month from 12 to 12:30 p.m. U.S. Eastern time)
 - To view previously recorded webinars, please visit <https://www.causeweb.org/webinar/jse/> . To date, 10 webinars have been recorded.



JSE Best Paper Award



- This award was established by former JSE Editor Bill Notz in 2010 to recognize outstanding contributions to JSE
 - Papers are judged on consistency with JSE editorial policy, innovation, usefulness, writing that engages the reader and expresses ideas clearly, and the importance of the ideas presented in the paper.
- An American Statistical Association committee judges papers and decides on an award winner; the award (a cash prize and a plaque) is given out each year at the Joint Statistical Meetings (JSM)
- Previous award recipients:
 - 2010: Pfannkuch et al. (<http://www.amstat.org/publications/jse/v18n1/pfannkuch.pdf>)
 - 2011: Tintle et al. (<http://www.amstat.org/publications/jse/v19n1/tintle.pdf>)
 - 2012: Woodard and McGowan (<http://www.amstat.org/publications/jse/v20n3/woodard.pdf>)
- The 2013 recipients will be announced later this summer at JSM 2014 in Boston, MA.

What is SERJ?

- Peer-reviewed electronic journal of
 - International Association for Statistical Education (IASE)
 - International Statistical Institute (ISI)
- Published twice a year (May, November)
- Aims to advance research-based knowledge
 - To improve the teaching, learning, and understanding of statistics or probability
 - At all educational levels
 - In both formal (classroom-based) and informal (out-of-classroom) contexts.



What is SERJ's mission?

The mission of SERJ is to:

- Encourage research activity in statistics education
- Advance knowledge about students' attitudes, conceptions, and difficulties as regards stochastic knowledge
- Improve the teaching of statistics at all educational levels.



What does SERJ publish?

To achieve these aims, SERJ seeks to publish

- High-quality papers that
 - Describe new research or
 - Analyse published research
- That can contribute to scholarly knowledge and educational practice in statistics education, broadly viewed



Types of manuscripts

(From Author guidelines)

SERJ seeks reports of :

- Original research
- Integrative and critical reviews of research literature
- Analyses of research-based theoretical models and methodological approaches

Related to teaching, learning, understanding, or assessment regarding statistics and probability

Topics of interest

Research that examines factors & processes of a:

cognitive	epistemological	motivational
attitudinal	curricular	teacher-related
social	technological	institutional

nature related to the development, understanding, and improvement of stochastic knowledge



- A 'boutique' journal, founded in 2007 by Rob Gould
- Founding Exec Editorial Board: Arthur Bakker, Dani Ben-Zvi, Mahtash Esfandiari, Christine Franklin, Joan Garfield, Brian Jersky, Joy Jordan, Cliff Konold, Katie Makar, Deb Nolan, Dennis Pearl, Roxy Peck, Duncan Temple Lang, Roger Woodard, Nathan Yau

About Us

Technology Innovations in Statistics Education (TISE) reports on studies of the use of technology to improve statistics learning at all levels, from kindergarten to graduate school and professional development. The editors believe we must teach students to become data scientists who can think about and reason with data. To do this educators must employ a variety of technologies so students can better understand statistical concepts, learn to gain insight from data, and design and shape technology to meet future needs.

TISE is interested in scholarly papers that address any of these themes:

1. Designing technology to improve statistics education
2. Using technology to develop conceptual understanding
3. Teaching the use of technology to gain insight into and access to data

Papers can fall into three categories. Research papers report empirical studies or develop theoretical context for teaching with or about technology. Position papers describe a timely issue and propose a solution. Technical Innovations describe new technologies and their design or innovative uses of previous technologies. Details are provided in the [Aims and Scope](#).



- Interested in the application of technology to teach statistics,
- research into how and why technology improves learning/teaching of statistics
- descriptions of development and design of new technologies for teaching/learning statistics
- research in how students learn statistical technology
- thoughts about how technology should affect our curriculum



'Departments'

- 'Investigations' are reports of empirical research or establish theoretical foundations for research
- 'Statistical Thinking' includes opinion pieces.
- 'Technology Innovations' describe either new technologies or innovative applications of existing technologies
- 'Notes' are brief comments



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Describe the submission process, review process, and acceptance rate of submitted papers.

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The JSE Submission Process



- Submissions are sent directly to the Editor. Complete information about the submission process can be found at: http://www.amstat.org/publications/jse/jse_author_info.htm
- Authors should include non-blinded and blinded versions of the manuscript, in addition to a completed ASA Author Submission form
- We prefer submissions in Word format but can accept PDF (LaTeX) as well
- All supplemental materials (e.g., Data sets, Excel files, R code, etc.) should be included with submissions



The JSE Review Process

- The JSE Editorial Coordinator, Jean Scott, processes new submissions. She gives each a number (e.g., JSE 14-001) and notifies the Editor and the author
- The Editor reads all new submissions and makes a decision to either reject without further review or to send for further review
- About once a month, the Editor sends an email message to all Associate Editors (AEs) informing them of new papers that need reviewing
- Papers are assigned to AEs on a volunteer basis



More on the JSE Review Process



- The AEs are responsible for finding at least two reviewers for a manuscript
 - The reviewers are blind to the author(s) of the manuscript but the AE is not blind to this information
- Reviewers are sent detailed information about how to conduct the review
 - Ideally, we hope to turn reviews around within five to six weeks



Acceptance Rate for JSE

- The acceptance rate has varied from year to year, but, typically, between 15% to 20% of submitted papers are accepted.
- Some historical data is given in the table below.

Year	New Submissions	Accepted	Rejected	Open
2007	104	31	73	0
2008	88	27	61	0
2009	123	24	99	0
2010	127	22	104	0
2011	114	15	95	0
2012	122	18	104	0
2013	124	17	105	1
2014	64	1	51	10

Submission process

Manuscripts are sent to one of the Co-Editors:

- Regular issues: Maxine Pfannkuch
- Special issues: Guest Editor designated by Peter Petocz
- Manuscript assigned an internal reference number
- Determine if content of manuscript is:
 - Not appropriate for SERJ – not sent out for review
 - Appropriate for SERJ – sent out for review
- Email of acknowledgment sent to contact author



Author responsibilities

READ THE AUTHOR GUIDELINES

which provides detailed information about

- Overview of journal policies and goals
- Audiences and types of papers accepted for publication
- Submission, refereeing, and publication processes
- Manuscript preparation and formatting



Authors can download

- Author guidelines (authorguide.pdf)
- A Word template file (serjtemplate.dot.doc)
- Instructions (serjtempinstruct.pdf)

<http://iase-web.org/Publications.php?p=SERJ>

Review process

- Manuscript assigned to an Associate Editor (AE)
- AE finds two to four referees with expertise and background needed to review the manuscript (can take up to a month)
- Referees are asked to return review within 4 weeks
- AE asked to return report in 6 weeks (after referees assigned)



Review process

KEEP IN MIND THAT:

- AEs and referees are volunteers – not always on schedule
 - AE's responsibility to request overdue reviews
 - Co-Editor's responsibility to request overdue reports
- AE sends report to Co-Editor
- Co-Editor adds report to the Decision Queue



Acceptance Rate

Over the past 4 years, between 15% and 17.5% of submitted manuscripts have been accepted for publication.





Submission Process

- Papers submitted via upload to tise.stat.ucla.edu.
- Require a blinded version.
- Word accepted but PDF preferred
- Latex accepted, but primary upload should be pdf version of LaTeX file (include associated style files and .tex file.) Editor assimilates reviews and makes decision: reject, substantial improvements needed, minor modifications required, accept.

Review

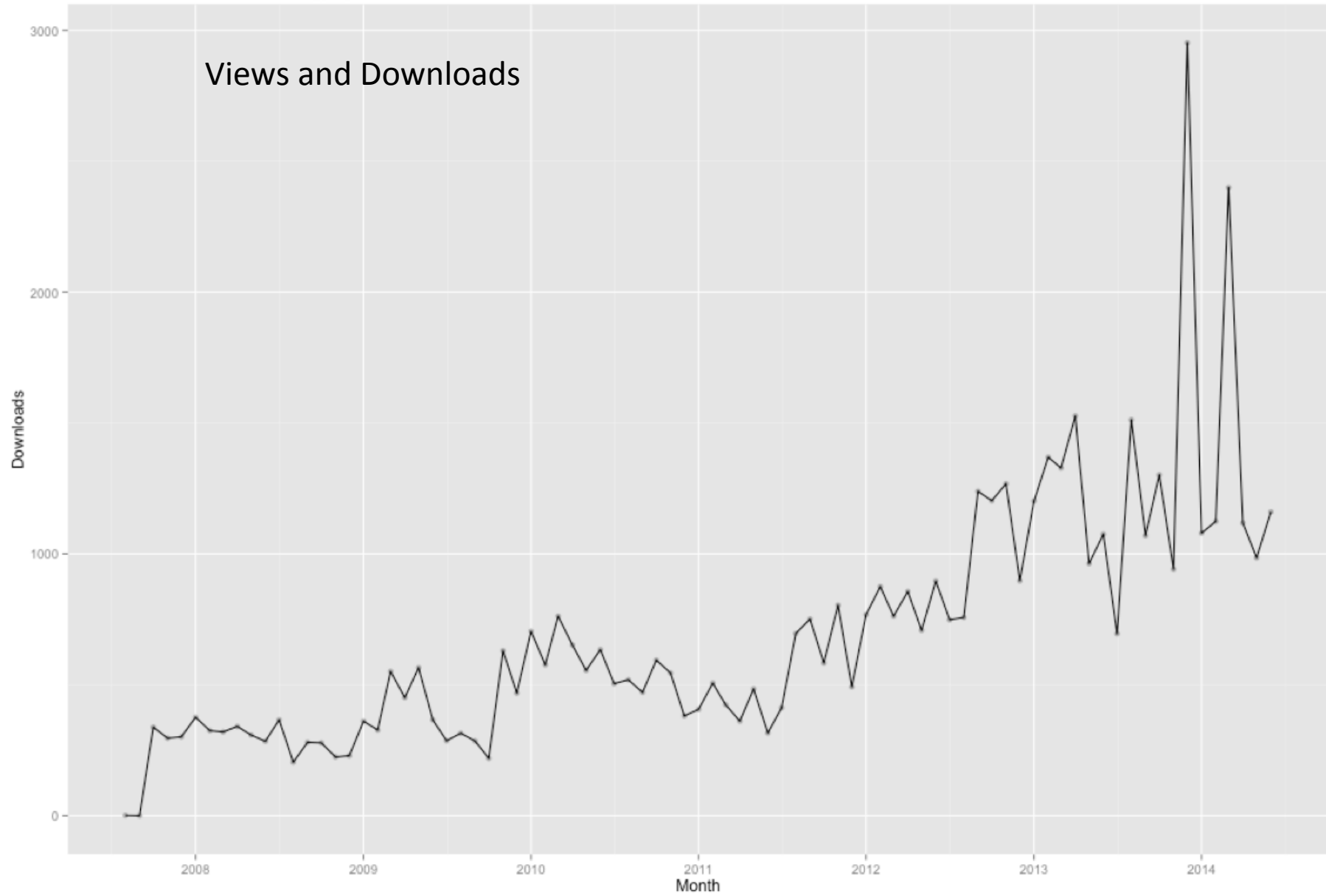
- If editor decides paper is appropriate, sends to two reviewers.
- Each reviewer give 30 days
- Editor assimilates reviews and either accepts, rejects, requests major changes (requires new review process), or minor modifications.



- TISE publishes on a 'rolling' basis with one issue per year.
- Authors own all copyrights and retain all rights to their work, which they can modify as they choose.
- Published by e-Scholarship of UC.
- <http://tise.stat.ucla.edu>

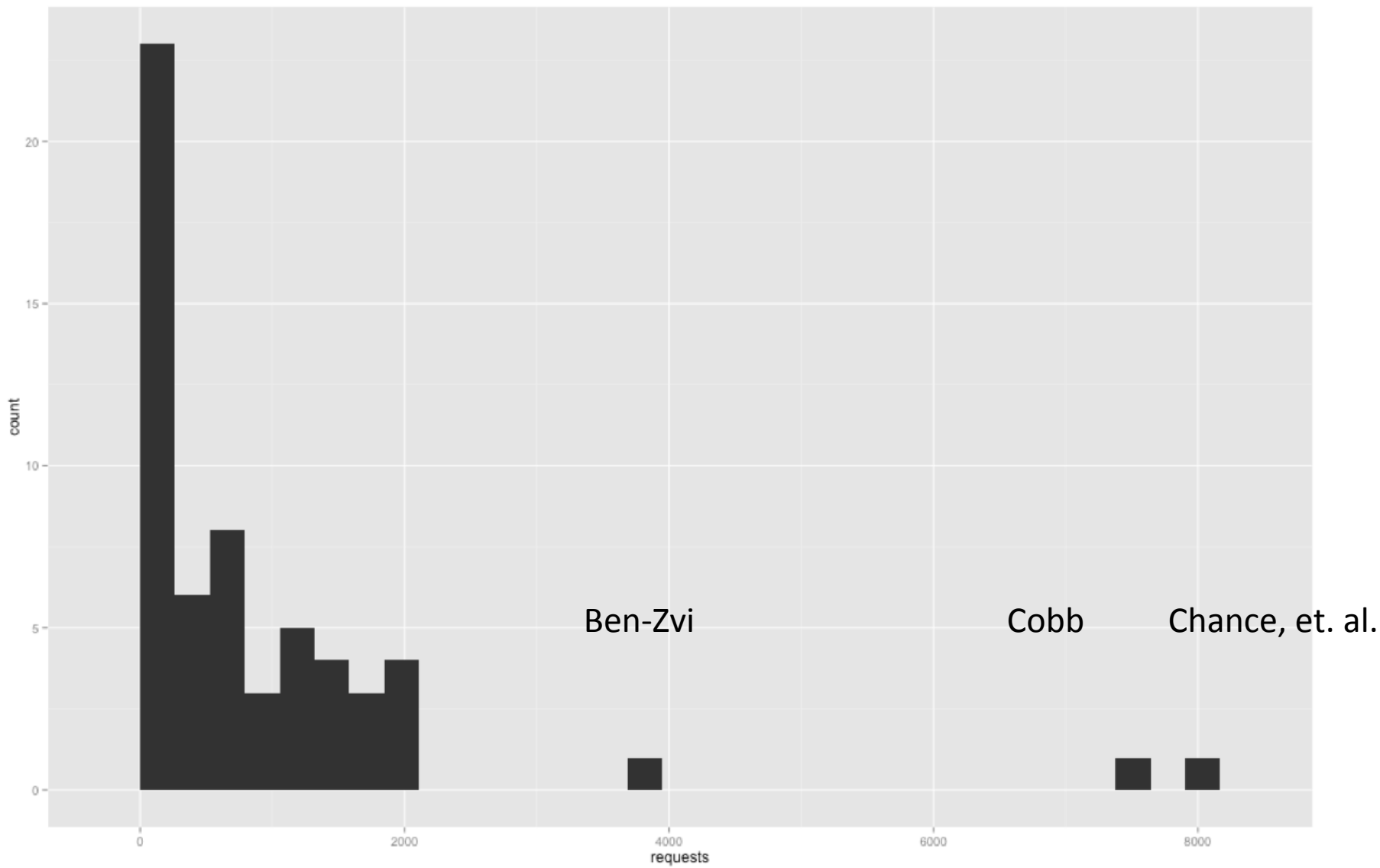
publishing rate

- In last 12 months, 13 submitted
- 1 published, 1 pending publication
- 5 under review
- 6 rejected or withdrawn





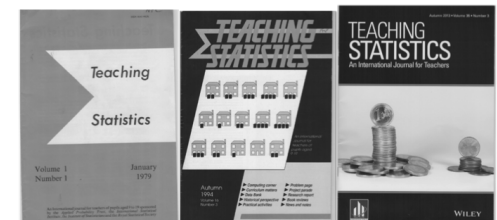
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Submission/review

The submission and review process

- Articles are submitted online www.teachingstatisticsonline.org
- We would be very grateful if more reviewers signed up at this website
- The global acceptance rate is about 1 in 3





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Common Problems

Study is Not Appropriate for SERJ

- Author did not read the SERJ Author Guidelines
- SERJ does not publish manuscripts that are solely:
 - Modifications of statistical methods
 - Applications of statistical methods
 - Development of statistical theory
 - Statistical or mathematical proofs
 - Not related in any way to the teaching and learning of statistics

Common Problems

Nothing New or Topic Not of Interest to Stat. Educ.

- AE or referees may suggest the topic will not be of interest to the statistics education community
- Often due to an idiosyncratic topic of research, or a too narrowly defined research topic
- Study may be judged to not extend current knowledge about a topic
 - Theoretical perspective or findings are not new (literature review not exhaustive)
 - New ideas are not substantial extensions
 - Does not extend knowledge to a new population of students

Common Problems

Lack of a Theoretical Framework for Design & Analysis

- None or sparse review of related literature
- Inappropriate or misspecified data analysis design
 - Use of two-sample t-test instead of factorial ANOVA
 - Use of separate factorial ANOVAs instead of longitudinal, repeated measures, or hierarchical linear modeling analysis (linear mixed effects)

Common Problems

Lack of a Theoretical Framework for Design & Analysis

- Qualitative Research: Need for an analysis framework
- **Special Issue:** Qualitative Approaches in Statistics Education Research (SERJ Volume 9 No. 2, November 2010)
 - Situating Qualitative Modes of Inquiry within the Discipline of Statistics Education Research (*R. E. Groth*)
 - On Conceptual Analysis as the Primary Qualitative Approach to Statistics Education Research in Psychology (*A. Petocz & G. Newbery*)

Common Problems

Validity & Reliability of Measurement Instruments - 1

- **Reliability:** evidence that the instrument consistently produces that same score or measure for an individual
- **Validity:** an evidence-based argument that the instrument measures the intended construct
- Instructor developed assessments (e.g., Midterm and Final exam scores, surveys) typically lack evidence of reliability and validity
- Evidence:
 - External review of instrument by statistics education experts
 - Measures of reliability (Cohen's alpha or IRT parameters)
 - Use of instruments with established reliability and validity

Common Problems

Validity & Reliability of Measurement Instruments - 2

- All or primarily anecdotal evidence (validity and generalizability)
- Transcript analysis or ratings by one person (reliability and validity)
- Referees and AE identify confounding factors (valid conclusions)

Remedies

- Learn about and apply valid methods of measurement design, qualitative methods, transcript analysis, inter-rater agreement
- Carefully frame and design the study prior to conducting the study and gathering evidence – Anecdotal, post hoc observations useful for research ideas, but rarely represent sound research
- Ask others to review plans



Common Reasons for Rejecting

- Papers do not address both technology and statistics education.
- Alleged innovations not innovative
- Statistical analyses inappropriate
- Claims of success over-reach provided evidence

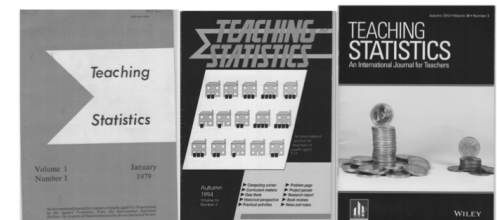
Tips

- Do a thorough literature review and use this to justify that your innovation is both innovative and useful.
- Empirical studies should be as carefully planned as those you do consulting for (I'm speaking to statisticians here!)
- Rigorous statistical support not required for case studies/technology innovations but readers should have some idea whether the innovation will work for them.

What causes articles to be rejected

Quick rejections

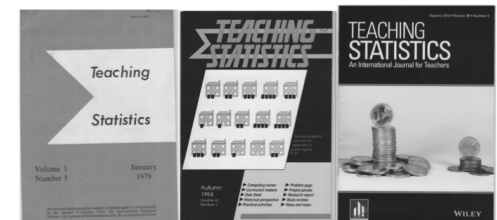
- Out of remit (e.g. Masters level courses, adult education)
- Mathematical papers (we would suggest such material is suited for University Math students and their teachers)
- Technological solutions (knowing how product x lets you do y isn't of interest; whereas showing that doing y gave you different insights is of interest. An Excel macro doing a randomisation test on a contingency table would be rejected; being shown how this randomisation test helped learning would be considered).
- Pedagogic research (better suited to other journals)



What causes articles to be rejected

Common areas for improvement

- Neglecting wider aspects of statistical literacy.
- Focussing on the "top level" problem (sometimes a great practical activity lends itself to some formal statistical procedure only appropriate for 19 year olds, but the underlying activity raises issues that can be appreciated much earlier)
- Negative articles (we wish to inspire teachers, not tell them how much they do wrong)
- We are very short of space in the journal
- Lack of critical reflection





Tips for Publishing in JSE



- Read carefully through the JSE Mission Statement and look through the journal to make sure you understand the types of papers we typically publish.
- Follow the author guidelines.
- Situate your research within extant literature and indicate how your work contributes to the extant literature.
- Design your experiment/data collection procedures so that you can answer your research questions.



More Tips for Publishing in JSE



- If you are describing new teaching or curricular innovations, include details about the ways you have assessed these teaching/curricular innovations.
- Be concise – Give your paper a careful proofread (or have someone else proofread) to be sure ideas are expressed clearly and concisely.
- Don't assume the audience of JSE consists only of statisticians who have PhDs.
- If your paper is rejected but a revision is requested, be sure to write a point-by-point response to the comments in the reviews.

Common Reasons for Rejecting

- The paper is not at all appropriate for JSE
 - Paper is technical in nature or very theoretical
 - Paper is not grounded in any literature relevant to statistics education
 - Paper has nothing to do with the teaching and/or learning of statistics
- Alleged innovations are not really innovative or do not appear to add to the existing literature
- Statistical analyses are inappropriate
- Claims of success do not fit with the provided evidence (e.g., no information or data is provided about how “success” was evaluated)



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Name two or three take-home points that you would tell potential authors are of the utmost importance

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Take-home Points

- Serve as a referee--if not, pass the buck and name names.
- Statisticians: don't ignore educational psychology literature.
- Educational Psychologists: take care to explain experimental design and role this studies plays in the grand scheme.



Take-home Points

- Currently, our use of technology far outstrips our understanding of how students think with and use technology.
- Acknowledge this gap, or even better, make the gap smaller.

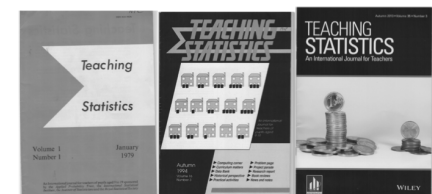
Key take home points

Help share good practice

Ultimately, we want articles that can *inspire* what happens in the classroom, treating statistics as a core epistemological activity. We want:

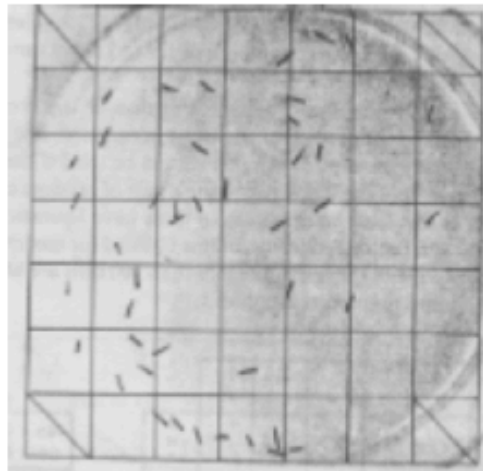
- Articles that are evidence based (there is a scholarly context)
- Articles that reflect on practical implications - for practical activities this should be based on classroom experience of the activity
- Articles which are relevant to as wide an audience as possible - often this can be achieved by careful writing

"Statistical thinking will one day be as necessary for efficient citizenship as the ability to read and write" (H.G Wells)

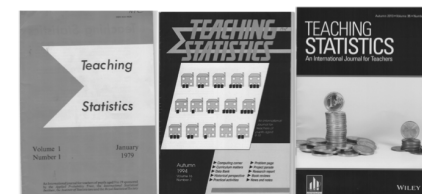


Some exemplars

- “Do sticklebacks cluster?”



- Are statisticians cold-blooded bosses? A new perspective on the ‘old’ concept of statistical population
- Exploring students’ intuitive ideas of randomness using an iPod shuffle activity
- Using the five practices model to promote statistical discourse
- A bicycle crash inspires an inquiry-based learning activity



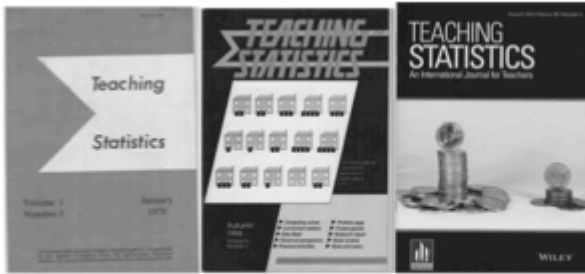


Key Ideas to Take Home

- If you want to publish in JSE, determine your research questions and study design prior to data collection, and tie the results you obtain back to your research questions.
- Follow the author guidelines and make certain that JSE is the best fit for your work.
- Be concise and complete. Have someone read over the paper who is not intimately familiar with the research or topic.

SERJ – Take-Home Points

- In addition to points made by other journal representatives
- Plan the study well in advance so that you can
 - Conduct a thorough search of the literature
 - Develop a theoretical framework
 - Collect reliability and validity evidence for assessments



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Questions?

