

Publishing Findings that are Not Significant: Can Non-significant Findings Be Significant?

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Many of us have the privilege of teaching a course focused on research design and/or the critical analysis of empirical research, whether it is quantitative, qualitative, or mixed methods. Inevitably several students, or sometimes the whole class, develop the idea that quantitative results that are not statistically significant are not important and add little to the literature. Perhaps these students do not develop this idea within the course, but actually possessed this conception before registering for the course. Where this idea comes from is unclear. Perhaps it may come from some scientific disciplines. Norman recalls being on a dissertation committee at Oregon State University that included a physicist. The research study was in science education and the results were not statistically significant. During the committee deliberations after the student was excused, the physicist raised the question of whether results that were not significant could result in a decision to pass the student. After all, he said, “In physics if someone is focused on finding a sub-atomic particle or a certain effect and does not, the student has failed.” The logic is understandable, but the view that we do not know the answers to the questions we ask in advance held sway and the student passed the defense. Given that answers are not known in advance leads to the conclusion that either statistically significant or not statistically significant results provides important knowledge to the literature.

The problem is not unique to the committee in Oregon, but rather widespread. Franco, Malhotra, and Simmonovits (2014) investigated publication bias in the social sciences by studying a known population of 221 studies. The research was completed within a program funded by the National Science Foundation and they found that studies with statistically significant results were 40 % more likely to be

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published than those studies supporting the null hypothesis. Furthermore, studies with statistically significant findings were 60 % more likely to be written up and submitted. This phenomenon of only selecting studies with statistically significant findings to write up and submit for publication is known as the “file draw problem.” This problem is recognized as increasing the likelihood that published results are a reflection of Type 1 errors rather than true population parameters, and it has also been documented in the various disciplines of the biomedical sciences (Berlin, Begg, & Louis, 1989; McAuley, Pham, Tugwell, & Moher, 2000). In addition to the technical issues surrounding the “file draw problem” the varied meanings of the word “significance” certainly contributes to the confusion of the neophyte. Words often get in the way of understanding and this is also a problem with the concept of “practical significance” (i.e., are the results of practical value?), which students often take to mean “practically significant.”

Returning to the title of this editorial, please be assured that our editorial decisions are not based on whether the manuscript reports statistically significant results. However, an important concern that we and our reviewers dutifully address is whether the manuscript makes a significant contribution to the literature.

Being the Editors of *JSTE* is a daunting task and we are well aware that how we are viewed varies predictably among those whose manuscripts have been accepted and those who have not had successful submissions. Although we enthusiastically accept the responsibilities typically associated with journal editors, we are also committed to making our decisions with maximum input from our Associate Editors and Editorial Review Board members. We are also committed to decreasing the time authors are expected to wait for the editorial process to wind its way to completion. We are proud to say that the *Journal of Science Teacher Education* consistently boasts one of the shortest review and publication timelines of any print journal in science education. We are also convinced that the review process for the journal is as fair as is humanly possible and the result is a product that best represents the interests of the membership of the organization. Total transparency is a serious goal. Consequently, this is the third year that our June editorial is dedicated to a detailed description of the editorial review process and a delineation of acceptance rates and reasons for the rejection of manuscripts. We sincerely believe the process of publishing in a scholarly journal should have utmost integrity and be as transparent as possible.

Receipt and Logging of Manuscripts

All manuscripts are processed through the Editorial Manager website. An email is sent to the primary author immediately after the manuscript is uploaded. This email contains the manuscript identification number. Within 48 h, an Editor-in-Chief looks at the manuscript and will render one of three options; assigns an Associate Editor to the manuscript, manuscript is Withdrawn, or Revise before Review. A manuscript can be issued a label of “Revise before Review” because it does not follow APA guidelines, where the author has an opportunity to revise the manuscript to comply with APA. A manuscript will be Withdrawn because it is not

related to science teacher education. If the manuscript is a science teacher education manuscript and follows APA an Associate Editor is assigned. No matter what decision is reached by the Editors in Chief, a letter is sent to the primary author informing them of the Associate Editor assigned to his/her manuscript or the issues that have caused the manuscript to be Withdrawn.

Approximately 40 % of submitted manuscripts are Withdrawn or Revise before Review upon receipt because they do not comply with our submission guidelines or do not follow APA guidelines. Common problems include inappropriate citation and reference format, no abstract, no running head, no page numbers, tables/figures in wrong location, and single-spaced text instead of double spaced text. When manuscripts with problems are received, a letter is immediately sent back to the primary author stating that the manuscript has been withdrawn and must be revised to adhere to APA style before it can re-submitted. About 10 % of the manuscripts we receive are NOT specifically related to science teacher education and are sent back to the author without further review. Alternate journals for submission are often recommended.

Assigning Reviewers

Associate Editors and Editorial Review Board (ERB) members are vital to our journal. Their discriminating reviews help us meet our goal of publishing research-oriented articles and theoretical articles with implications for research to improve the quality of science teacher education. A list of current Associate Editors and ERB members is included on the inside of the front cover and the following journal page of each issue. Anyone wishing to become an ERB member should write the co-editors at the address listed on the inside front cover. A call for ERB members is also posted on the organization listserv each Fall and Spring. Each term on the ERB is 3 years and members can choose to re-apply when their term is completed.

The Co-Editors assign an Associate Editor to each manuscript and the Associate Editor assigns two ERB members to each manuscript, based upon its substantive focus. A “blind” review process is used. Every attempt is made to select Associate Editors and ERB members whose expertise and interests are most closely aligned with the focus of the manuscript. Within 3 days after being received by an Associate Editor, each manuscript is sent to ERB members. Reviewers are urged to complete their reviews within 1 month. At present, ERB members have been taking an average of 4 weeks to complete their reviews.

The Review Process

Keeping in mind the guidelines specified on the Reviewer Form, each ERB member completes a detailed review of the strengths and weaknesses of each manuscript. These strengths and weaknesses, along with a recommendation concerning publication, are communicated in writing to the Associate Editor. The Associate Editor reads the reviews and also reads the manuscript. The Associate Editor synthesizes the ERB

comments and his/her own comments and makes a recommendation to the journal Co-Editors (Norman Lederman and Judith Lederman). As reviews are received by the editorial office, the managing editor enters the information into the database.

The Co-Editors consider the recommendation of the Associate Editor and render a decision. It is our policy to accept the decision of the Associate Editor, given their expertise and prominence in the field. Only under rare circumstances would we consider overturning the decision of the Associate Editor and the ERB members. We have never overturned the decision of an Associate Editor during our term as Editors. The various decision options are: Accept, Minor Revisions, Major Revisions, Reject, but encourage to re-submit, or Reject.

The logic of the aforementioned process is quite simple. The Co-Editors make every effort to respect the opinions of our Associate Editors and ERB members. We fully accept the responsibility of making decisions when there is a clear difference of opinion, but we do not think it is valid to override clearly reasoned decisions by our expert Associate Editors. Using such a process, we can avoid problems sometimes noted with respect to other journals; that is, the journal becomes a reflection of the personal professional preferences and biases of the editor(s).

What Do Authors Receive?

Immediately following an editorial decision, the author is notified in writing. At this time, the process from submission to author notification of editorial decision is approximately 3 months. The author receives anonymous copies of the Associate Editor's and ERB members' comments regardless of the manuscript's disposition.

For rejected manuscripts, authors are informed that they may revise and resubmit their manuscript to the full review process, if desired. This is true for both manuscripts receiving a Reject or a Reject, but encourage to re-submit decision. For manuscripts that receive a decision of Major or Minor Revisions, the authors are notified that, contingent upon certain revisions, the manuscript will continue to be considered for publication. Typically, if revisions are made the manuscript is accepted. However, the co-editors maintain the right to deny publication if the suggested revisions are not made at a satisfactory level.

Authors are given 30 days in which to make revisions and return the manuscript. Before removing a manuscript under revision from our active files, the author is sent two warning notices. It is possible for extensions in the revision time to be granted, if there are extenuating circumstances.

What Happens After Revisions are Made?

Revised manuscripts are sent to the Associate Editor and the original ERB members who reviewed the manuscript. If it is decided that revisions have been made at a satisfactory level, the author is informed that the manuscript has been officially accepted for publication.

Once a manuscript is accepted, it goes through a copy editing process at Springer and page proofs are sent to the author for revision. The author is responsible for making requested copy edits and returning the revised manuscript to Springer within 30 days. If there are delays in this final editing process, it is likely the publication of the article will be delayed to a later issue than planned.

Once the manuscript has been satisfactorily revised the author is sent a final or galley proof. As we are approaching printing deadlines at this point, turnaround time is often tight for reviewing proofs. The author is requested to read the manuscript carefully for any errors or necessary changes. If no response is received from the author within the allotted deadline, we assume the manuscript requires no changes. It is important to note that authors can e-mail or call us if they have any questions about the status of their manuscript in the review process.

How Can You Improve the Quality of Your Manuscript?

The *Journal of Science Teacher Education* remains one of the most respected international journals in science teacher education because of its high standards. In this report, we present a number of outcomes and measures generated from the database of the Springer Editorial Manager system. These items of information about *JSTE* span the period since our June, 2015 editorial, May 1, 2015 to May 8, 2016.

In this time period, 206 new manuscripts were submitted to *JSTE*. Of the 206 new submissions, about 40 % of the manuscripts received are sent back because of APA issues or they are not related to teacher education. Of the manuscripts that are given an Associate Editor Decision, 9 % received an Accept decision, 18 % received a Reject but Encourage re-submission decision, 30 % received a Reject decision. Our acceptance rate for this time period is 9 %. Authors will hear from the editors in an average of 1 day after submission. Currently it takes an average of 30 days for a decision to be reached on a manuscript.

Most manuscripts are rejected for publication because authors have inaccurately anticipated the focus of reviewers. This means that many, but not all, manuscripts could be made more acceptable for publication if the authors were more experienced with the review process. Table 1 presents the reasons and associated descriptive statistics reviewers have given for rejecting manuscripts during our

Table 1 Reasons *JSTE* manuscripts have been rejected during our editorship

Overall manuscript	(%)	Manuscript sections	(%)
Not appropriate for SSM journal	10	Unclear purpose for study	19
Too lengthy	7	Weak literature review	23
Weak organization	9	Weak methodology description	19
Use of poor grammar and spelling	5	Weak instrument description	9
Does not contribute new information to the field	29	Weak data analysis description	16
Unclear appendices, tables, and figures	5	Conclusion not supported by evidence	15
Weak connections to K-16 instruction	8	Incomplete description of the study	16

tenure as co-editors. Please note that articles typically are rejected for numerous reasons. A manuscript rarely is rejected for a single reason (i.e., the infamous “fatal flaw”). Consequently, the percentages included in Table 1 total in excess of 100 %.

The manuscript weaknesses cited by our reviewers are quite similar to those encountered by reviewers for other journals in science and mathematics education. It should be noted that, although a manuscript is rejected because it is considered inappropriate for the journal, it may be perfectly acceptable for another professional journal. Remember, our journal and our organization are dedicated to research and theory in science teacher education.

Even the briefest perusal of the items listed in Table 1 indicates a clear pattern, specifically related to research investigations. The categories of “Weak methodology description” and “Incomplete description of the study” clearly overlap, with the latter more inclusive than the former. Combined, these two categories are mentioned for a third of the rejected manuscripts. Conceivably, many authors could easily correct this problem by simply including a more detailed description of the research procedures and design. For investigations that have not considered important details, the advice here would be of little help. The category “Conclusions not supported by evidence” seems to be relevant to those studies in which important design details have not been considered.

Throughout our tenure as co-editors, the category of “Unclear purpose for the study,” has been among the most common reasons for rejection of a manuscript. Norman remembers, while delivering a plenary talk at a “research school,” hearing the following comment, “I have collected my data, I have analyzed my data, but I do not know what my question is.” We have not seen anything this extreme in any submitted manuscript. The reasons “Does not contribute to the field,” and “Weak literature review” have also been commonly noted problems cited by reviewers. One of the often-cited problems with educational scholarship, research or otherwise, has been the lack of coherence across sub disciplines and/or the building upon prior knowledge. In particular, authors consistently “reinvent the wheel” because they have not carefully examined related literature in their own discipline or a closely related sub discipline. If our scholarship and research is to progress, we must build upon the findings of previous research, and we must attempt to become familiar with the literature in clearly related fields. If science teacher educators want to remain knowledgeable about teaching and learning, we must explore the literature in psychology journals, learning science journals, and generic teacher education journals, instead of remaining solely wedded to the journals dedicated to science education.

Country of Origin of Manuscripts Received

One of our primary goals as editors has been to increase the journal’s international presence. A stronger international presence will facilitate our efforts to achieve ISI indexing for the journal. Of the 206 new manuscripts submitted in this time period, 94 (45 %) are from authors at institutions outside of the U.S and represent 36 different countries. Last year 33 countries were represented. These numbers represent the growing international presence of JSTE. The countries that

Table 2 Manuscript submissions by country

Country	Submission	Country	Submissions
Armenia	1	Netherlands	3
Australia	5	Nigeria	3
Canada	6	Norway	1
China	2	Palestine	2
Cuba	1	Portugal	1
Egypt	3	Saudi Arabia	1
Finland	4	Singapore	2
Germany	4	South Africa	2
Greece	2	Spain	2
India	1	Sweden	3
Israel	4	Switzerland	2
Jordan	2	Taiwan	1
Korea	1	Tanzania	2
Lebanon	1	Thailand	2
Malaysia	4	Thailand	2
Morocco	1	Turkey	14
		UAE	1

submitted papers during the time period reported here are Armenia, Australia, Canada, China, Cuba, Egypt, Finland, Germany, Greece, India, Israel, Jordan, Korea, Lebanon, Malaysia, Mexico, Morocco, Netherlands, Nigeria, Norway, Palestine, Portugal, Saudi Arabia, South Africa, Spain, Sweden, Switzerland, Taiwan, Tanzania, Thailand, Turkey, and the United Arab Emirates. Below, Table 2 provides a breakdown of manuscripts submitted by country.

An argument can easily be made that of all the people working on a refereed journal, the easiest job is that of the Editor. As is clear from our description of the review process, the overwhelming workload is on the shoulders of our Editorial Review Board members and our Associate Editors. We and ASTE can not thank them enough. Finally, we wish to acknowledge the efforts of our Managing Editor, Selina Bartels. She is tasked with coordinating the efforts of all involved in the editorial process. Her work, at times, can be akin to herding.....Never mind, let's just leave it as a Strong Thank You!

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