

## Guest Editorial: Sharing our Work\*

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As science teachers and science educators, we belong to a unique group of individuals. We strive to improve education by talking critically about ideas related to science education, making observations about teacher and student learning, and collecting data that we hope will shed light on the learning and teaching process of teachers and students. As we communicate with each other, we suggest innovations and confirm existing practices. Communication occurs in different venues and includes participating in informal discussions, conferences, and meetings, as well as writing e-mails, posting our findings on web pages, and publishing our work. This last venue of communication--the publishing of our work--is the focus of this editorial.

Academics and educators are often funded by public dollars. We share our work with each other in order to advance the field, but also because we have a responsibility to do so. By communicating frequently, we can build upon the knowledge base in science education, identifying and exploring ideas as they are put forth. The sharing of our work is an important component of our job, and in certain fields we can obtain long-term employment (tenure) that ensures the exploration and dissemination of novel ideas.

One of the most common ways that we share our work is through our publications. Many of us publish in notable journals such as the *Journal for Research in Science Teacher Education*, the *International Journal of Science Education*, or the *Journal of Science Teacher Education*. However, we may have also published in electronic journals such as the *Electronic Journal of Science Education* (<http://ejse.southwestern.edu>) or *Contemporary Issues in Technology and Teacher Education* (<http://www.citejournal.org>). While all of these journals contain research in science education, the last two are published electronically and are designated as open-access journals. Open-access electronic journals provide us with new opportunities in the field that we have not experienced with traditional for-profit publications. Unfortunately, our perceptions about electronic publishing sometimes limit our participation in this venue. In an effort to initiate a dialogue about the potential of open-access publications, I would like to explore some “myths” about electronic and open-access publications.

Let me begin with the first Myth, which stems from our lack of understanding of electronic publishing.

### *Myth 1 - Electronic journals have limited capabilities*

Actually, electronic journals are unlimited in what they offer authors and readers. John Cannon, founder and editor for ten years of this journal, has often reminded authors that they can post pictures, video and complex graphics on the electronic web-site. While paper journals are well suited to tables, black and white pictures, simple graphics and text, it is difficult, expensive and sometimes impossible to place multiple color pictures, streaming video, or audio in a paper document. For those of us in science education,

seeing or hearing data enhances our understanding of the author's point. For example, instead of reading about a teaching event in India, we can watch streaming video and audio of the teacher in order to understand her use of STS in the classroom. Transcripts that show how we analyzed the collected data can follow. Instead of a textual description, the reader can now access every aspect of the teacher's practice and the method of analysis. With such opportunities, our understanding of science education can move to a new level.

I especially enjoy the easy access to the electronic journals that I read. After a few strikes on the keyboard, I can summon a peer-reviewed article and all of the supporting documentation to the screen in front of me. I can find a copy of an article that was submitted just two months earlier, which means I have access to some of the most current work available. But it doesn't stop with just viewing the article. I can now download the paper onto my palm pilot and read it at my leisure. Staying current in the field is no longer tied to my ability to walk to the library and read or copy articles, which may have been in queue for over a year and in review for another year. In this venue I get information as soon as it can be reviewed and posted electronically. More importantly, I don't have to pay a fee to view an article if my library doesn't subscribe to this journal.

While more for-profit publishers are providing electronic articles with supporting documentation, their articles are still published on a set cycle, conforming to some degree to the guidelines for publishing in paper (e.g., length). Additionally, one often has to pay (e.g., \$10, \$20, or \$25) for access if one does not subscribe to the journal or if the journal is not in the holdings of the local library.

With most open-access electronic journals, articles can be posted or retrieved quickly without cost. Such articles can be linked to additional resources, are not limited by length, and can have various forms of information attached. They can even be modified easily for those with disabilities. This is just a short list, as open-access electronic publishing is limitless, not limited.

### *Myth 2 - Electronic journals lack rigor*

What makes a journal rigorous is the quality of articles published and the process by which articles are selected. A journal published electronically can be just as rigorous as a paper journal.

The American Educational Research Association (AERA) has a Special Interest Group (SIG) for editors or those associated with scholarly, peer-reviewed, open-access electronic journals (<http://aera-cr.asu.edu/ejournals/index.html>). A quick look down the list reveals some notable electronic, open-access publications. More importantly, the number of journals is substantial (over 150) and increasing yearly.

Perhaps these journals are not considered as rigorous as paper journals when it comes to promotion and tenure decisions or merit allocations. But that is changing. While I can't speak for other universities, I do know that electronic journals are considered for promotion, tenure and merit in some departments at the University of Texas and in my current department in Arizona State University. Top e-journals, like *Educational Policy Analysis Archives* (<http://epaa.asu.edu/epaa/>), which was edited by Gene Glass and belongs to the above-mentioned AERA SIG, are certainly equivalent to top paper journals. Just as a point of reference, *Educational Policy Analysis Archives* gets over

3,500 hits per weekday, which translates into 17,500 hits per week. Furthermore, one article that is not even seven years old is over a million downloads! What for-profit paper journals get looked at 3,500 times a day? What recent for-profit journal article has been looked at close to a million times?

Rigor is about the work and the process by which it is reviewed, not the medium in which the work is published.

### *Myth 3 - Electronic journals are difficult to maintain*

If you haven't talked about paper journals and for-profit publishing with your local librarian lately--you should. Your librarian will more than likely tell you about the escalating cost of for-profit journals, the housing constraints associated with paper journals, and the number of for-profit, paper journals that have been canceled over the years. In education, our journals are not as expensive as those in sciences. However, our journals are increasing in cost and can easily contribute to a strained library budget. For example, the *Journal of Science Teacher Education* was initially managed by the Association for the Education of Teachers of Science (now, Association for Science Teacher Education). As an association owned journal, a library would pay \$45 for a subscription. When the journal was moved to a for-profit publisher, the journal price increased over twelve years to a current library rate of \$245 for four issues. This price is what a library would pay for our journal--if they wanted to expand their holdings. Most libraries, however, have contracts that allow them to select a number of journals for a set price over several years. The "bundling" practice purports to lower the overall cost of journals and give libraries more journals. Unfortunately, this does not always happen.

In 1988, nineteen years ago, The University of Texas paid approximately \$2.3 million for the journals in the library system. In 2005, The University of Texas paid approximately \$7.3 million for the journals in the system. In the last fourteen years, The University of Texas library has cancelled approximately 7000 journals, and there is a small cancellation project of 500 journals underway. To avoid the reduction of additional journals for just this year, the library was given special one-time funding totaling \$1.2 million (totaling \$8.5 million for the year). Needless to say, these funds may not be available in upcoming years, which will result in additional paper/publisher-based journals being placed on the "UT periodical reduction plan."

The expense of journals has forced universities to support electronic publishing. It's ultimately cheaper for a university to pay for technology support staff to oversee electronic journals than to purchase more journals. Several library and university-based groups actually support electronic publication and provide paper options, and make these options available to associations, organizations, or people wanting to start their own journals. These groups include HighWire press (<http://highwire.stanford.edu/>), The Berkeley Electronic Press (<http://www.bepress.com/alljournals.html>), or even SPARC (<http://www.arl.org/sparc/>). The attractiveness of these no- or low-cost publishers has resulted in significant increases in the journals they produce, thus reducing some of the additional costs libraries have each year.

More importantly, electronic journals don't require much space or maintenance. Gene Glass published his journal from a computer on the floor of his office. In contrast, most universities face a shortage of space with their ever-expanding collection of paper

journals. One computer can easily hold all of the journals that would ordinarily fill the floor of a library with compact shelving. When I asked Gene Glass about the difficulty of accessing and maintaining his journal, he indicated that his computer was low maintenance and that he could easily access any of the articles he had published over the last 10 years. In addition, he can easily monitor the number of visits to his journal and the activity of article downloads. According to Gene, there have been no major computer problems and no problems with computer hackers. After all, as Gene said, “Who wants to hack into a scholarly open-access journal on educational policy?”

Electronic journals are not difficult to maintain. They cost less, occupy less space and give more people access to information.

#### *Myth 4 - Electronic journals hurt organizations*

Organizations become stronger with electronic publishing. Instead of relying on the profits of the journal, associations have to rely upon the quality of their work and the participation of their membership. Members, for example, join the organization because of the visibility of the work and the benefits of belonging to the association. Organizations that have turned from organized publishers to open-access publications are making money by increasing their membership. Additionally, these organizations are increasing their international readership. Ultimately the association can cost less to join, which makes it more affordable for new and international members.

More importantly, it is clear that the international community wants access to our work in education. Unfortunately, the cost of our journals can be excessive to our counterparts in developing countries. For instance, in some countries \$200 could cover the costs of materials in a laboratory as opposed to a journal subscription. Gene Glass has evidence that our international colleagues are eager to access our knowledge base. When he made one change in his electronic journal--he used a downloadable pdf file format--his international readership increased to 30%. Every day, over a 1,000 hits come from international educators. I should add that the two other journals that Gene “competes with” –the main journals in his field –have approximately 500 yearly subscriptions.

The international community wants to engage with us in educational scholarship, but we are not yet accessible to our colleagues in other countries. You may have recently heard about the memorandum written by members of the faculty senate at Stanford. This group passed a resolution stating that their libraries should support affordable journals and acquire journals on a title by title basis. The change would move the libraries away from the practice of bundling, which can actually cost a library more over time. If the Stanford action is a sign of the times, associations with no-cost or low-cost journals will be given preference when it comes to adding a subscription to a library. As associations turn to low-cost methods for publishing, their work will be more affordable for those with limited budgets.

Expensive journals limit the dissemination of information by faculty and staff from associations and universities or colleges. Associations or universities/colleges support faculty and staff so that they may contribute to the knowledge base in teacher education; when they publish in for-profit journals, they are only reaching those institutions who can afford to purchase the journals.

*Myth 5 – The best way to share information is through publisher based journals*

Well not quite. Published journals are only accessible if libraries have them in their holdings. Open-access electronic journals are available to anyone who can access the internet. More importantly, most publishers hold the copyright on the contents of the journal and the associated electronic forms, which means the publishers own the copyright of the work that was produced by authors who were funded with public dollars. A typical publishing contract gives the publisher sole and exclusive right to publish their material throughout the world during the term of the copyright. Some publishers will allow academics and researchers to post their work on their own web-page, but there are often restrictions on the posting of this work (e.g. format, length, duration). Most publishers prefer authors not to post published work, as it takes away from the revenue associated with article downloads. This is revenue that goes primarily to the publisher, with little or none going back to the author, university, or association. Ultimately, if we want to share our work, we have to ask for permission from the publisher or pay the publisher to use our work. This is not difficult, but why do we have to ask to share our work, or be told by the publisher that we can share our work, when our work was funded by public dollars with the intent of advancing the profession? When I give my copyright away, the publisher owns my work, not the institution or organization that supported my work.

Ultimately, sharing our work requires that we find venues that allow for the greatest access to our work in the most affordable manner. By sharing our work broadly, we will continue to impact science education.

As a tenured faculty member at a research university, I am convinced that we need to share our work in ways that increase access and that support the building of knowledge in our profession. In the upcoming years, more of my work will be found in open-access journals, and I will be joining the editorial boards of open-access journals or association-owned journals. Additionally, I will continue to work with my colleagues to raise their awareness about electronic options. In doing this, my contributions to research and service, which are supported by public funds, will have the greatest possible reach. Finally, instead of giving the copyright of my work to a publisher, which limits the circulation of my work, I will ask that the copyright of my work go to my institution or back to myself, so that I can post my research in an accessible location.

I hope that we will all consider how we share our work and the ways in which we can enhance the circulation of our work to impact teachers, schools, and policy. After all, we academics and educators have a responsibility to disseminate our work.

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