

Editorial

JRME: A Tale of Unicorns, Mastodons, and Ants

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For the last 4.5 years, I have been immersed in the work of editing the *Journal for Research in Mathematics Education*. I could talk for hours about reading manuscripts and reviews, writing decision letters, interacting with authors, editing manuscripts to prepare them for publication, my reflections on the research that has been published in the journal, and my reflections on the research that has not been published, but this talk is not about me. I want to focus on the journal itself, its past and its future, and what it means to us—the mathematics education research community. Also, I will be talking about unicorns, mastodons, and ants. So bear with me, this will not be a typical math ed. talk (and I might have gotten a little carried away with the mastodons). Let's begin this tale.

Why Unicorns?

Since antiquity, unicorns have been a topic of legends in cultures throughout the world (American Museum of Natural History, n.d.). Although the images of unicorns have varied, there are common elements to the myths that surround them. For example, most myths refer to their strength, spirituality, and magical powers, which include the ability to heal. Unicorns have been characterized as peaceful and elusive creatures, and sighting a unicorn is considered a sign of good fortune. Although most people no longer believe in their existence, we are still beguiled by this mystical creature, and it lives on in popular culture. In fact, the term *unicorn* is used to describe start-ups that are valued at \$1 billion or more, presumably because of the rarity of these companies (Griffith & Primack, 2015).

But, it is the elusive, mythical unicorn that I want to relate to *JRME*. The quest to capture a unicorn could be likened to publishing in *JRME*. From conversations I have heard, some people consider being published in *JRME* as elusive as the unicorn. And just as the unicorn was conceptualized and portrayed in myth differently in cultures throughout history, *JRME* is often perceived differently by the members of the mathematics education community and others with interest in our field.

To determine some of your perceptions or possible myths about *JRME*, I am going to collect data by anonymously polling the audience using the program Poll Everywhere.¹ We'll start with basic demographic data:

As my final editorial, I present to you a slightly modified version of the talk that I gave at the opening session of the NCTM Research Conference in San Francisco on April 11, 2016.

¹ Members of the audience participated in the polling using their cell phone or other smart device to respond to the questions I posed. Their responses are included as percentages in brackets.

- Do you have an individual subscription to *JRME*? [Yes: 57%; no: 43%; $n = 104$]
- Do you typically read *JRME* in digital form or paper form? [Digital: 70%; paper 30%; $n = 100$]
- Do you find at least one article of interest in each issue of *JRME*? [Always: 25%; sometimes: 72%; never: 3%; $n = 105$]
- Have you ever submitted a manuscript to *JRME*? [Yes, many years ago: 11%; yes, within the last 5 years: 24%; no: 65%; $n = 113$]

Now, let's consider perceptions. Have you ever made a conscious decision not to submit a manuscript to *JRME*? If so, which of these reasons contributed to your decision? If not, what are some of the reasons you have "heard on the street"? You may select two of the following:

- Most manuscripts do not get accepted. [40%]
- The publication process is too long. [18%]
- Early career researchers should avoid *JRME*. [9%]
- The methodological approach is not a good fit. [9%]
- The research is not about K–12 mathematics. [4%]
- *JRME* only publishes empirical studies. [8%]
- The research is a better fit for a more specialized journal. [13%]

Let's now consider recent statistics from the journal to see how perceptions align with the reality of what has been submitted to *JRME*. I have narrowed the focus to articles received only during my editorship, 2012–2015, mainly because that data set was manageable (especially because my term marked the beginning of the new online system). However, I believe that some of the data you will see accurately reflect the state of the journal as it has been for quite some time.

Acceptance rates. The acceptance rate for manuscripts submitted to *JRME* in 2012–2015 was 8% for all manuscripts ($n = 628$) and 13% for all manuscripts that received full or editorial review ($n = 381$).

Publication timeline. The mean number of days from receipt of a manuscript to decision letter to author was 121 days and the median was 123 days. Ninety-three percent of the manuscripts were in production within 1 year from acceptance, and 69% of manuscripts were in print within 1 year from acceptance.

Early career researchers. Of the articles published in Volumes 44–47, 27% (15) were based on dissertation studies.

Theoretical perspectives and research methodologies. The following is a list of some of the various theories or theoretical perspectives informing articles that were published during my editorship: constructivism, positioning theory, semiotics, identity theory, activity theory, critical theory, generalizability theory,

transfer theory, SOLO Model, phenomenology, and theory of conceptual change. With regard to research methodologies, 53% of articles reported studies using qualitative methods ($n = 24$), 40% reported using quantitative methods ($n = 18$), and 7% ($n = 3$) used mixed methods.

Focus of the research. Although 53% of articles reporting empirical research focused on K–12 contexts or participants, 20% focused on teachers, 20% were focused at the undergraduate level, 5% focused on preservice teachers, and 2% on graduate students.

Types of articles. A variety of types of articles have been published in *JRME*: empirical research studies ($n = 45$), reports of new analytic methods ($n = 4$), theoretical analyses ($n = 3$), literature reviews ($n = 2$), and rejoinders ($n = 2$).

I recognize that as participants in the Research Conference, you are a well-informed audience. Nevertheless, I suspect that some of these data were surprising and may have challenged or illuminated your perceptions about aspects of *JRME*. These data also relate to points that I will make later in the talk. Let's move now from a fabulous animal—the unicorn—to a real animal that once roamed North America.

Mastodons

According to scientists (e.g., Zazula et al., 2014), the ancestor of the American mastodon came to North America about 15 million years ago, crossing the land bridge that existed in the area surrounding what we know as the Bering Strait. For millions of years, these mastodons roamed North America from the arctic coast of Alaska to Florida and as far south as Honduras. Mastodons subsisted on leaves, conifer needles and cones, twigs, and stems from shrubs and trees. They lived in forested areas and also frequented lowland swampy habitats. Over the glacial periods, they migrated north or south as the climate dictated. Their extinction more than 10,000 years ago remains a mystery but was likely the result of a confluence of events.

The mastodon has played an interesting role in history beginning in 1705 with the discovery of a 5-pound tooth in the Hudson River Valley in New York (Conniff, 2010; Semonin, 2000). The “giant's” tooth (as it was referred to) was sent to London and was the object of great speculation among scientists and laypersons alike. For example, because of its shape, many thought the tooth had come from a meat-eating beast. Over the decades, other bones, teeth, and tusks were discovered, and in 1801, Charles Willson Peale (a portrait artist) reconstructed a mastodon skeleton from fossilized bones (again, from the Hudson River Valley). As Conniff wrote in the *Smithsonian* magazine, “Peale filled in missing parts in papier-mâché and wood, scrupulously indicating these substitutions. But the showman or patriot in him exaggerated the size of his *incognitum* slightly, yielding a skeleton 11 feet high at the shoulder. Later, he corked the joints, adding extra

‘cartilage’ to make it even bigger” (p. 3). This was only the second known skeletal reconstruction from fossils in the world, and it became a national sensation (essentially mammoth mania—the mastodon species had yet to be named).

Conniff (2010) referred to Peale’s exaggeration of the size of the mastodon as perhaps a reflection of his patriotism because, beginning in the latter part of the 1700s, there was a widely held belief in Europe that America was innately inferior, that its flora, fauna, and people were stunted and weak. This was known as the Theory of American Degeneracy. Pride notwithstanding, this perception was problematic for a new nation fighting for its independence and establishing its identity while seeking financial support and credit in Europe. Thus, our Founding Fathers (most notably, Thomas Jefferson) capitalized on every opportunity to refute this perception, and the mighty mastodon and other North American megafauna were touted as examples of the vitality of the New World (Semonin, 2000). According to a historian of science, Lee Dugatkin (2011), over time, a counternarrative was established of “America as beautiful, vast, resource-rich region filled with robust individualists. The American identity to this day—and the rest of the world’s reactions to that modern self-image—can thus be partly traced back to the vigorous debunking, by Jefferson, his peers and his followers, of the accusation of American biological degeneracy” (p. 87). I have certainly oversimplified these events for my story here, and I encourage those of you who are interested to pursue these readings.²

The mastodon also played a more direct role in history. In 1796, Georges Cuvier (known as the founder of modern paleontology) addressed France’s National Institute of Science and Arts and proposed a theory of extinction (Kolbert, 2013; Semonin, 2000). He used a mastodon molar to make his case. First, Cuvier explained how the two modern-day elephants—the Asian elephant and the African elephant—represented different species. One of the distinguishing characteristics that he noted was the formation of the animals’ molars (wavy ridges for the Asian elephant and diamond-shaped ridges for the African elephant). He then went on to explain that he had identified two new species that differed from both of the elephants. These were the mammoth and the Ohio animal—that is, the mastodon, which he did not name until 1806. Again, it was the formation of the molars that supported his claim of distinct species. More importantly, he argued that both of these creatures had vanished from the face of the earth, which challenged the doctrine of the time that held to the permanence and unchanging heritage of species. The belief that a previous world could have existed, different than the current one, was untenable at that time. Conniff (2010) noted: “In fact, mammoths and mastodons shook the foundations of conventional thought. In place of the orderly old world, where each species had its proper place in a great chain of being, Cuvier was soon depicting a chaotic past in which flood, ice and earthquake swept

² The following books were presented on a slide: *Mr. Peale’s Museum: Charles Wilson Peale and the First Popular Museum of Natural Science and Art*, by Charles Coleman Sellers; *Mr. Jefferson and the Giant Moose*, by Lee Alan Dugatkin; and *American Monster: How the Nation’s First Prehistoric Creature Became a Symbol of National Identity*, by Paul Semonin.

away ‘living organisms without number,’ leaving behind only scattered bones and dust” (p. 2).

I can draw some similarities between the mastodon’s role in history and the founding and growth of *JRME*. First, just as the mastodon was perceived as a symbol of American might and power as the new republic was establishing its identity, the founding of *JRME* served to support the development of mathematics education as a fledgling professional community and to distinguish research on the teaching and learning of mathematics as separate from general educational research or psychological research. In writing about the origins of *JRME* for the 25th anniversary issue of the journal in 1994, Johnson, Romberg, and Scandura reported:

By the mid 1960s there was a growing number of scholars conducting research on the teaching and learning of mathematics. In fact, mathematics education began to be recognized as an important area of scholarly inquiry. However, research in the field lacked coherence, and investigators lacked professional identity. It became apparent that if scholars were to flourish, they needed to be able to share their ideas and the results of their investigations. Thus, suggestions were made by several individuals to initiate research-reporting sessions at conferences, hold meetings to summarize research, and to start a journal that would report their research. (p. 562)

Second, like the discovery of the mastodon, the founding of *JRME* was not without controversy. Some members of the NCTM Board of Directors had concerns about the Council taking on the responsibility of a research journal (in addition to the established journals, *Arithmetic Teacher* and the *Mathematics Teacher*). These concerns centered around four topics (again I am drawing from the Johnson et al. piece):

- **Cost:** Would there be a sufficient number of subscriptions to make the journal financially viable? The purchase of subscriptions was essentially voluntary and there was a sentiment that “the typical teacher should not be expected to support the journal” (Johnson et al., 1994, p. 566).
- **Catering to a special interest group:** Should the Council sponsor a publication that was “oriented to the interests of a small group of persons, many of whom were not even members of NCTM” (p. 566)?
- **Interpreting research for teachers:** Would the research articles that were currently published in the *Arithmetic Teacher* and *Mathematics Teacher* be replaced with interpretive articles for teachers? There was a suggestion that research articles should be published only when the author had submitted an interpretive article of the research to one of the teacher journals.
- **Challenges of managing a research journal:** Some members were unfamiliar with the standard practices and style of refereed research journals, and some wondered whether there would be a sufficient number of “good” articles to sustain the journal.

With these concerns on the table, a proposal was presented to the Board of Directors in January of 1968 seeking authorization of the publication of a *Research*

Quarterly in Mathematics Education. There was a motion that the Board accept the recommendation for the journal on a 3-year trial basis. Interestingly, the Board vote was evenly split. However, President Donovan Johnson cast the deciding vote, and the motion was passed. And perhaps, as they say, the rest is history.

It is interesting to note, however, that many of the concerns raised in 1968 are still pertinent today: concerns about subscriptions, the journal's acceptance rate, and the relationship between research and practice. Nevertheless, I believe we all would agree that the founding of *JRME* was a watershed event in the cultivation of the field of mathematics education. As the discovery of the mastodon contributed to advancements in paleontology and a significant shift in scientific thought about the phenomenon of extinction, *JRME* has contributed to the development of research in mathematics education.

Of course, when drawing similarities between the journal and the mastodon, the elephant in the room (sorry, I could not help myself) is that the mastodon is extinct. Mind you, I am not forecasting doom and gloom for *JRME*, but there is a cautionary message here. A combination of events likely contributed to the mastodon's demise, and I can identify two that are relevant to our tale—increased competition for food sources and climate change.

The connection to food sources pertains to the rapidly increasing number of ways to share research. In the field of mathematics education, there has been a proliferation of journals. In 1970, when the first issue of *JRME* was published, there were only two other research journals focused specifically on mathematics education: *Educational Studies in Mathematics* (founded in 1968) and the *Journal of Children's Mathematical Behavior* (also founded in 1970 and renamed in 1986 as the *Journal of Mathematical Behavior*). Today, there is a vast selection of mathematics education journals worldwide (see Figure 1). I know, you cannot read all the names on the slide—that is the point. I hope that this explosion of publication venues is an indication of the growth of mathematics education as a research domain and the need to accommodate a diversity and abundance of research that is being conducted around the world—a positive indicator of a vital research community.

There are a number of prevailing conditions impinging on academic publishing; this is what I mean by climate change. Consider the following trends:

- Online-only journals,
- Open access journals (gold, PLOS ONE),
- Open access repositories (green),
- Social networking platforms (ResearchGate, Academia.edu),
- Social media (blogs, twitter),
- Pay to publish,
- Paid peer review (Rubriq),
- Journal-independent peer review (Publons),
- Post-publication peer review (e.g., F1000 Research, PubPeer), and
- Impact factor ratings.

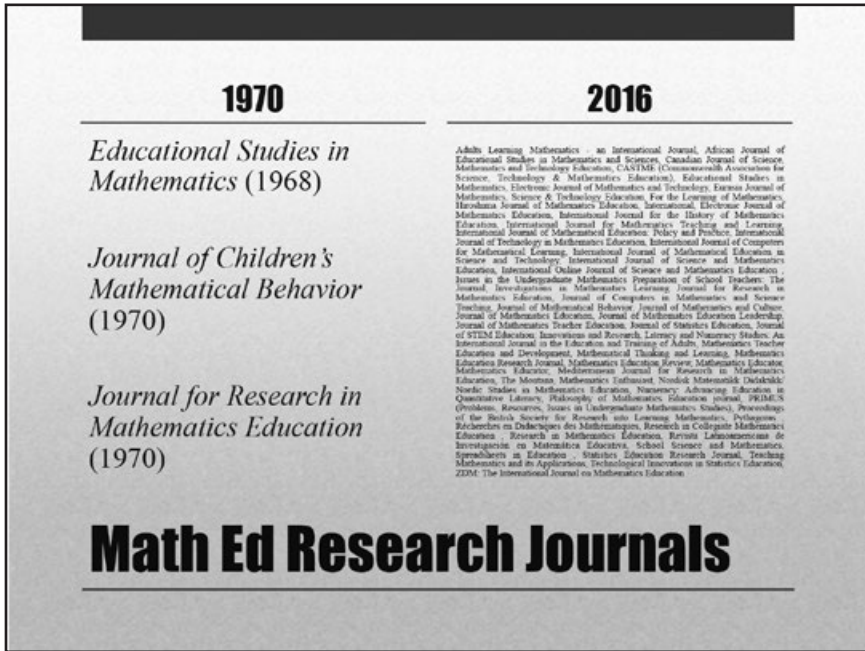


Figure 1. Mathematics education research journals.

And I could go on. These trends raise critical issues for the research community and prompt questions that warrant our careful attention. The issues are far too weighty to be tackled in a talk such as this one, but I am sure they are on the agendas of editorial boards and publishing committees worldwide—including those of *JRME* and NCTM.

Because of competition for food sources and climate change, we need *JRME* now as much as we did at the time of its founding but for quite different reasons. *JRME* began because mathematics education researchers needed a forum for sharing their research. Today, it is the abundance of forums that creates the need for *JRME*. Consider the following comment that was given in response to a question about why scholarly journals endure. Dingwall (a sociologist and editor of the journal *Symbolic Interaction*) refers to the notion of journal branding:

In a world flooded with content, the journal brand signals the quality, relevance and importance of the papers to which it is applied. As such, it constrains the search costs to readers of finding and evaluating content, both in their own research niche and, in particular, in maintaining broader contextual knowledge of a discipline or field of study. These functions become even more critical as less selective outlets proliferate and new discovery tools generate an increasing volume of possible reading. Journal branding helps to dam the torrent to a rate that leaves space for a scholar's own research—and for a life outside the lab or the library! (Meadows, 2015, para. 4)

These points highlight the importance of *JRME*'s reputation—its brand. The

consistency of the quality of articles published in the journal is a reflection of the quality of the peer review and editorial process that the journal has established and maintained over the years. This brings us to the ants.

Ants Are Amazing!

We have all seen the tenacity of ants. They are real-world problem solvers! They work collaboratively and support each other, and they are amazing when they are not in my kitchen. A few months ago, my husband showed me a YouTube video of a team of robotic ants pulling a vehicle. It was remarkable. As typically happens, I then started looking at other YouTube videos and found one produced by National Geographic called “How Crazy Ants Carry Heavy Loads.” I want to show this 1-minute clip because it has some important messages for us. (Please watch the video clip at <https://youtu.be/fjyTkagc8BI> before you continue reading.)

Fascinating, right? This clip sent me in search of the research study, which was conducted by a group of researchers at the Weizmann Institute of Science in Israel. It was published in *Nature Communications*, an online, open-access journal, and I can say that this publication illustrates the promise of this medium. Supplemental data sets and figures are accessible, and even some of the data videos (like we just saw in the clip) are available. Granted, one has to acknowledge the differences in our fields—ants do not have to sign consent forms! Concerns aside, the future does look interesting as we consider the affordances of digital technologies for sharing our own work.

Although this quote from the article is about ants, it should speak to us as mathematics education researchers:

Contrary to some species that rely on the information and guidance of a single or few leaders . . . , we show that cooperative transport in *P. longicornis* ants is more distributed. Small amounts of information continuously enter the system as carriers detach from the load and make room for the attachment of informed individuals that correct the steering. (Gelblum et al., 2015, p. 7)

We should think of this as a characterization of an effective research community. It is all about inclusiveness and collaboration and the infusion of new ideas to help us achieve our goals. This certainly applies to *JRME*. The journal’s reputation must not be considered one of exclusion; rather, its reputation should be one of quality. We each have a role to play in making *JRME* inclusive, scholarly, and relevant.

Of course, many of us conduct research that might be considered specialized in focus, and we should support the conferences and publication opportunities associated with special interest groups, other professional societies, and focused research forums. I, myself, find great support among the statistics education research community. But, our work in those contexts also needs to be shared with the broader community of mathematics educators and researchers. Do not discount *JRME* as a forum for doing so.

Also, I encourage all of us to read some of the articles that *JRME* publishes that are not within our specific research domain. Our tolerance for diverse theoretical



Figure 2. Names of the 805 people who have shaped *JRME* during the term of Cynthia W. Langrall's editorship.

perspectives and research methodologies will grow only if we take the time to familiarize ourselves with one another's work. Remember, as members of a profession, we share a common goal—to improve the teaching and learning of mathematics.

Closing Thoughts

I close with two requests. First, I ask that you help to dispel whatever myths you encounter about *JRME* and help to convey a positive perception of the journal, that it is open to all researchers who are interested in improving the teaching and learning of mathematics for students everywhere. One way to do this is to lead by example—submit a manuscript to *JRME*.

Second, I ask that each of you think critically about sessions you attend at conferences and your interactions with colleagues from the perspective of *JRME*. If the research being shared would make an important contribution to the field, let the presenter know. But, go a step further; let them know why you think their work is worthy of publication in *JRME*, talk about what aspects of the study make a contribution to the field, aspects of the study that raised questions for you, or what you think will need to be elaborated on in a written research report. This is the kind of critical feedback and support that we all need.

There is no doubt that *JRME* has shaped the field of research in mathematics education, but do not doubt that the field also shapes the journal. *JRME* exists because of you—because you contribute your research, because you contribute your expertise in reviewing manuscripts without knowing who the author is, and because you provide criticism and support for your colleagues to strengthen their research and their reporting of that research. With a healthy mix of individual and collective focus (like those ants), we can assure that *JRME* continues to make significant contributions to the field of research in mathematics education.

If you look closely at Figure 2, you will see the names of the people who have shaped *JRME* during the term of my editorship—805 of them! The majority of

these names belong to people who have reviewed for the journal during this time, but there are also all of the authors who were published in Volumes 44–47; colleagues who served on the *JRME* Editorial Panel and International Advisory Board; the editorial teams from Penn State, Illinois State, and University of Delaware; and the folks at NCTM who pull it altogether. This is *JRME*.

Langrall out!

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