



Practitioner Journals: An Integral Component for Advancing Research, Knowledge, Practices, and Discussion in STEM Education

TYLER S. LOVE 

PERSPECTIVE



ABSTRACT

Peer-reviewed practitioner journals in P-12 science, technology, engineering, and mathematics (STEM) education, especially P-12 technology and engineering education, reach a broad array of educators and play a unique role in advancing P-12 STEM teaching and learning. However, with rising expectations in research productivity and greater emphasis on journal and publication metrics to achieve promotion and tenure (P&T) at higher education institutions, practitioner journals have become increasingly undervalued. In this article, the author presents a case for why higher education institutions and P&T committees should place greater value on publishing in peer-reviewed P-12 STEM education practitioner journals. These journals are critical for sharing research-informed recommendations in a practical manner so that they can be implemented in a broad range of P-12 STEM education contexts.

CORRESPONDING AUTHOR:

Tyler S. Love, Ph.D.

Professor, Director of Career and Technology Education Studies, and Coordinator of Technology and Engineering Education, University of Maryland Eastern Shore at the Baltimore Museum of Industry, Baltimore, MD 21230, US

tslove@umes.edu

KEYWORDS:

Teacher preparation programs; STEM education; promotion and tenure; technology and engineering education; science education

TO CITE THIS ARTICLE:

Love, T. S. (2024). Practitioner Journals: An Integral Component for Advancing Research, Knowledge, Practices, and Discussion in STEM Education. *Journal of Technology Studies*, 49(1), 1–7. DOI: <https://doi.org/10.21061/jts.414>

INTRODUCTION

With the rising expectations in research productivity and greater emphasis on journal and publication metrics to achieve promotion and tenure (P&T) at higher education institutions, practitioner journals have become increasingly undervalued, especially at research focused universities (Hermann & Miranda, 2016; Nygaard & Bellanova, 2017; Stevens, 2004; Taylor et al., 2023). As Stevens (2004) described, practitioner publications in educator and administrator focused journals are “devalued as less scholarly, and often disparaged in promotion and tenure decisions” (Stevens, 2004: 393). Love and Maiserouille (2021) found that there were approximately 70 institutions offering P-12 technology and engineering (T&E) teacher preparation-related degrees and coursework in the U.S., of which 19% had a Carnegie classification of very high research activity (R1). It is clear that P-12 science, technology, engineering, and mathematics (STEM) teacher preparation faculty, especially those in T&E education, undertake a multidisciplinary role, requiring themselves to balance the duties of teaching (including courses with labs), advising, engaging in outreach, conducting and publishing research, obtaining program accreditation, and other tasks as assigned to them. Given the unique nature of teacher preparation, these programs inherently have strong ties to service and outreach-oriented activities, which are directly connected with P-12 stakeholders. This partnership between teacher preparation faculty and P-12 educators is one that cannot be ignored and is the cornerstone for preparing successful P-12 educators who will advance these professions. Collaborations among teacher preparation programs and P-12 stakeholders also provide unique and invaluable opportunities for teacher preparation faculty to investigate new theories and emerging issues by applying research in authentic practitioner contexts (Entress, 2020; Taylor et al., 2023).

Peer-reviewed practitioner journals, such as the *Technology and Engineering Education* journal published by the International Technology and Engineering Educators Association (ITEEA), serve as a conduit for sharing research-informed recommendations in a practical manner that can be implemented by a broad range of P-12 educators, administrators, and teacher preparation faculty. Therefore, higher education institutions should place greater value on publishing in peer-reviewed STEM education practitioner journals due to the key role they play in disseminating knowledge and enhancing P-12 STEM teaching and learning experiences (Hermann & Miranda, 2016; Petronio, 1999; Taylor et al., 2023). However, this perspective is unique from many other fields that do not have peer-reviewed practitioner journals published by their main professional association(s), or are more research-focused without heavy service and outreach responsibilities directly tied to their faculty responsibilities (e.g. observations and

student teaching internship supervision, developing and delivering professional development workshops for P-12 STEM educators). Given that P-12 educators and administrators are some of the main end-users that benefit from research produced by teacher preparation faculty members (Stevens, 2004), practitioner journals are a critical outlet for sharing practical knowledge learned through valuable service and outreach efforts — in other words, where the rubber meets the road.

DEMYSTIFYING P-12 STEM EDUCATION FOCUSED PRACTITIONER JOURNALS

Hermann and Miranda (2016) described practitioner journals as “often misunderstood, and at times, undervalued” (Hermann & Miranda, 2016: 1). This misunderstanding often leads to teacher preparation faculty having to explain the value of their service and practitioner-oriented responsibilities to higher education colleagues and administrators, who are generally not as well-versed in teacher preparation, or who come from fields without the same level of embedded service and outreach requirements for program accreditation (Hermann & Miranda, 2016). Within science education, Hermann and Miranda (2016) found that practitioner journals were often misconstrued as an alternative to publishing in prestigious research journals. They stated, “practitioner articles were also perceived by some faculty in our college as being extremely easy to write because they were shorter in length compared to research manuscripts” (Hermann & Miranda, 2016: 1). Similar concerns have been echoed regarding the misconception that practitioner publications are less scholarly. Hence, less credit is often awarded for peer-reviewed practitioner publications during the P&T process (Stevens, 2004; Taylor et al., 2023).

From the author's experiences, similar criticisms have been raised by P&T committee members, questioning why faculty would publish in a P-12 T&E education focused journal with lower metrics compared to certain professional engineering and technical-focused research journals. In many cases, teacher preparation faculty have demonstrated they are capable of publishing in prestigious research journals with higher metrics; however, their work does not always meet the scope of those journals. As Petronio (1999) noted, it is important that scholars find avenues for their work that will provide the greatest benefit for the target population to translate that information into practice. That is where P-12 focused journals, including practitioner journals, provide a niche outlet for sharing P-12 focused work that otherwise might not get published to advance the field (and subsequently, not be implemented in P-12 schools to benefit various career fields and post-secondary programs [e.g., engineering] where students matriculate after P-12).

PRACTITIONER JOURNALS PROVIDE A UNIQUE VOICE FOR ADVANCING P-12 STEM EDUCATION

Many parallels can be drawn between T&E teacher preparation faculty and those from other STEM teacher preparation fields regarding the challenges they encounter to justify publishing in peer-reviewed practitioner journals. These challenges have been well-documented in the science education literature, which is applicable within the context of T&E education. Science education scholars have highlighted that peer-reviewed practitioner-focused journals, (examples listed in Table 1), are critical for providing a unique outlet to share ideas within the peer-review process, such that:

“the ideas are innovative, engaging, and of broad interest to science educators...It is critically important that we have an outlet to share how we teach, design lessons and programs, implement professional development programs, and assess our progress as science educators. Practitioner journals provide a place to do so” (Hermann & Miranda, 2016: 1).

Apart from the *Science Activities* journal, examples selected in Table 1 reflect practitioner journals published by professional P-12 educator associations from different STEM content areas. In addition to the journals displayed in Table 1, some professional P-12 educator associations also produce broadly circulated editor-reviewed publications. Examples specific to P-12 STEM education include *Prism* (published by the American Society for Engineering Education [ASEE]), and *Techniques* (published by the Association for Career and Technical Education [ACTE]). School leadership and administrator organizations also produce a range of editor-reviewed publications that reach a broad array of education professionals. While editor-reviewed journals like *Prism* and *Techniques* do not undergo a formal peer-review process, they can play a valuable role in disseminating scholarship and ideas to audiences that differ from the readership of research journals, helping to elicit further discussions to advance their relevant fields.

It is important to note that some peer-reviewed research journals publish articles focused on applying research in practical contexts. For example, the *Journal of Technology Studies* publishes pedagogical and applied research articles, and the journal *School Science and Mathematics* publishes innovation to practice articles. These journals were not included in Table 1 because they are viewed as research journals, and the majority of their publications are research-focused articles involving data and analyses tailored toward a different audience in comparison to practitioner journals.

TEACHER EDUCATION: BALANCING INHERENTLY HIGH SERVICE RESPONSIBILITIES WITH TEACHING AND RESEARCH

Hermann and Miranda (2016) proposed that teacher preparation faculty must find a unique balance between preparing teachers for the classroom and meeting their institution's research and publication expectations:

“The preparation of science teachers is arguably as important as developing and reporting on grant-funded research programs...The results of this type of work are not only applicable to research journals but the details of the program are important to other practitioners” (Hermann & Miranda, 2016: 1).

They further elaborated that practitioner journals “serve as a unique niche in helping other science educators reflect upon their work with preservice and inservice science teachers and incorporate innovative practices in their curriculum and professional development programming” (Hermann & Miranda, 2016: 1). This unique balance between teacher preparation and research is also reflective of the responsibilities of faculty in T&E teacher preparation programs and other STEM teacher education programs. Faculty members in these fields are expected to successfully integrate emerging technologies and pedagogical practices into their courses, as they prepare future educators through

JOURNAL TITLE	PUBLISHER	STEM EDUCATION FIELD
<i>Technology and Engineering Education</i>	ITEEA	T&E education
<i>Science and Children</i>	National Science Teaching Association (NSTA)	Science Education
<i>Science Scope</i>	NSTA	Science Education
<i>The Science Teacher</i>	NSTA	Science Education
<i>Science Activities</i>	Taylor & Francis	Science Education
<i>Mathematics Teacher: Learning and Teaching PK-12</i>	National Council of Teachers of Mathematics (NCTM)	Mathematics Education

Table 1 Examples of P-12 STEM Education Practitioner Journals.

modeling innovative teaching methods. Moreover, teacher preparation faculty members' scholarly work often has direct connections to the broader impacts and practitioner outreach efforts associated with grants, such as providing professional development opportunities for inservice STEM educators, which requires significant time and attention. These efforts collectively reflect what Petronio (1999) believed was an indicator of successful scholarship — the ability to translate scholarship into practical uses that help improve the lives of others (e.g. students and teachers). Petronio (1999) proposed that teaching, developing and delivering workshops, and developing curricula could each demonstrate a practical translation of scholarship.

The practitioner-focused nature of teacher education programs reflects a critical component of teacher preparation faculty members' duties as described in the literature by Hermann and Miranda (2016): "it seems that one would be derelict in their duties not to try to enhance their instruction by learning more about innovative teaching strategies or sharing their own innovative teaching strategies" (Hermann & Miranda, 2016: 2). The importance of peer-reviewed practitioner publications and translating scholarship into practical applications, especially at land grant institutions and within service-oriented programs (e.g. teacher preparation), has been described by Boyer (1990) as the scholarship of application, where "...theory and practice virtually interact, and one renews the other" (Boyer, 1990: 23).

Luft et al. (2004) described the prestige that universities place on research and grant productivity compared to applied practical research, other forms of scholarship, and teaching performance. Luft et al. (2004) believed that greater value should be placed on a broader range of scholarship during P&T decisions for teacher preparation faculty. Similarly, Stevens (2004) described the importance of educational researchers publishing practical manuscripts geared toward P-12 teacher and administrator audiences. However, Stevens (2004) also acknowledged that there are challenges related to the accessibility of some journals and how less value is placed on practitioner publications in P&T decisions. These can discourage higher education faculty from publishing in practitioner journals.

PRACTITIONER JOURNALS PROVIDE OPPORTUNITIES FOR COLLABORATION AND MENTORING

In addition to disseminating valuable work that may not fit the scope of a research journal, peer-reviewed practitioner journals offer many other benefits for scholars and practitioners. Practitioner journals can have a broader circulation and readership in comparison to prestigious research journals tailored toward niche

research areas and higher education faculty (Hermann & Miranda, 2016; Stevens, 2004; Taylor et al., 2023). Additionally, some practitioner journals provide open access to their articles, post read-only open access versions of their articles online, or allow authors to immediately post the accepted version in public repositories, such as ResearchGate. Conversely, many prestigious research journals have historically required a subscription, which creates a barrier of inaccessibility for most P-12 educators and school systems (Stevens, 2004; Taylor et al., 2023). While there have been increasing calls for open-access publishing, access to research journal articles remains a barrier for those who are not affiliated with a university (Taylor et al., 2023). Another barrier imposed by some research journals is the lengthy embargo period, ranging from one to three years before authors can post the accepted version of their article in a publicly accessible repository.

Practitioner journals uniquely encourage collaborations between P-12 educators and higher education faculty members (Entress, 2020; Taylor et al., 2023). It is not common for P-12 teachers to publish in prestigious STEM education research journals because of the practical focus of their job responsibilities. It is more common to see P-12 educators partner with higher education faculty members to publish in practitioner journals; however, studies have found that only 21% to 35% of articles published in P-12 science education practitioner journals included a P-12 educator as an author (Entress, 2020; Taylor et al., 2023). ITEEA and other professional educator associations encourage and celebrate collaborative publishing efforts involving P-12 educators through annual awards. These types of collaborative articles provide a unique perspective on the research, teaching, and learning in authentic classroom and laboratory settings from the insight of a practicing P-12 STEM educator (Stevens, 2004; Taylor et al., 2023). Peer-reviewed practitioner journals also provide unique collaborative mentoring opportunities for higher education faculty members to publish with undergraduate students, graduate students, state department of education personnel, school administrators, community STEM center instructors, industry partners, and other STEM educators (Taylor et al., 2023). Furthermore, peer-reviewed practitioner journals play a critical role in fostering and disseminating collaborative ideas to advance STEM teaching and learning (Entress, 2020; Stevens, 2004; Taylor et al., 2023).

EXAMPLES OF THE IMPACT OF PRACTITIONER PUBLICATIONS

One example that demonstrates the profound benefits of a practitioner journal comes from the work of Dr. Mark Sanders, a renowned scholar in P-12 integrative

STEM education. His most frequently cited article, titled “STEM, STEM Education, STEMmania” (Sanders, 2009) was published in *The Technology Teacher* (the former practitioner journal of ITEEA) and has been cited 2,677 times according to Google Scholar as of March 2024. In contrast, Sanders’s most frequently cited [research](#) article had only 37 citations as of March 2024 (Koch & Sanders, 2011). Similar examples can be seen through online research repositories, such as ResearchGate. Dr. Andrew Hughes’s most read article on ResearchGate is a practitioner article (Hughes & Merrill, 2020) from the *Technology and Engineering Teacher* (the former practitioner journal of ITEEA) which was accessed 8,057 times as of March 2024. The number of accesses to Hughes and Merrill’s (2020) *Technology and Engineering Teacher* article far exceeds the number of accesses to any of the research journal articles posted on Hughes’s ResearchGate profile.

These citation and access statistics should not be misinterpreted; both Sanders and Hughes have also published research in prestigious P-12 T&E and STEM education research journals. Rather, what these statistics demonstrate are that P-12 educators (the key stakeholders and primary end-users of work produced by teacher preparation faculty) are seeking high-quality, practical research-translated work that they can directly apply in their classrooms and laboratories. However, the broader benefits of practitioner articles can often be difficult to quantify and track, unlike metrics collected by many research journals (impact factor, acceptance rate, etc.) which institutions and P&T reviewers often utilize to evaluate the quality and impact of a scholar’s work (Nygaard & Bellanova, 2017). The use and misuse of publication metrics has raised questions about what should count, and how should it be counted? Nygaard and Bellanova (2017) described how higher education institutions that focus heavily on publication metrics can draw attention away from other types of meaningful publications and scholarly activities (e.g. practitioner articles) that are not captured by traditional metric indicators.

A heavy focus on publication metrics threatens to erode diversity in scholarly practices. This type of focus can also systematically disadvantage and marginalize scholars in teacher preparation fields. These scholars often have high service responsibilities and publish in peer-reviewed practitioner journals, which do not conform to the publication metric standards set by higher education institutions and P&T committees (Nygaard & Bellanova, 2017). Peer-reviewed practitioner journals, like ITEEA’s *Technology and Engineering Education*, provide a unique outlet to share research-informed practices and innovative ideas with a broad range of P-12 educators, teacher preparation faculty, and others. Higher education institutions and P&T committees need to earnestly consider the unique

breadth of scholarly activities that are part and parcel of teacher preparation programs. They also need to consider the value placed on various types of scholarly efforts from teacher preparation faculty during P&T decisions (e.g. peer-reviewed practitioner publications). Devaluing peer-reviewed practitioner articles that are published in leading professional educator association journals can deter teacher preparation faculty from diversifying their scholarly efforts. Consequently, this limits the practical translation of valuable research that can inspire practitioners to implement positive changes in P-12 education policies and practices.

RESEARCH AND PRACTITIONER PUBLICATIONS: A DELICATE BALANCE

Teacher preparation faculty have a professional responsibility to disseminate knowledge in a practical form to P-12 educators and administrators, the main end-users of teacher preparation faculty members’ scholarship. Peer-reviewed practitioner focused journals play a critical role in reaching P-12 educator and administrator audiences, and provide a valuable forum for sharing and discussing new ideas (Stevens, 2004; Taylor et al., 2023). However, I caution higher education institutions and STEM teacher preparation faculty that I am not suggesting research publications be undervalued. Instead, I am suggesting that there needs to be a balance between research and peer-reviewed practitioner articles published by STEM teacher preparation faculty, because both play an important role in advancing STEM education. Specifically, practitioner journals are essential for transferring data informed recommendations into practice (Petronio, 1999; Stevens, 2004).

For example, Love et al.’s (2023) national safety study presented a lot of valuable data to help enhance safety in STEM and career and technical education (CTE) courses. The data, however, was best summarized for educators in a more succinct and implementation-focused practitioner article, that is open access for educators to easily view and put into practice. The research article provides the supporting data that administrators, boards of education, state departments of education, and other policy and decision makers want to see to make informed decisions. However, that research journal requires a subscription that makes it extremely difficult for P-12 educators and school systems to access. Additionally, that research journal has a three-year embargo period before the accepted version of the manuscript can be shared through a publicly accessible online repository. This is where practitioner journals play a critical role in disseminating new knowledge and information about emerging practices. Practitioner articles, like Love and Roy’s (2023) follow-up article to their national safety study, often provide easier access

to stakeholders who will implement the research in practical applications and benefit the most from that work. One interesting note is that Love and Roy's (2023) practitioner article was published in *Techniques*, which is an editor-reviewed journal from ACTE. *Techniques* was essential for disseminating this scholarship to a broader CTE readership that could directly apply the research-informed practices in authentic educational settings. As a result of translating the research study into a practitioner article, more educators viewed the Love et al. (2023) research article, further demonstrating how research and practitioner articles can complement each other in unique ways.

Without a delicate balance of a practitioner article for each P-12 research article or project, the information can potentially be overlooked and be underutilized in P-12 STEM education settings. That is why I believe there is a need for higher education institutions to reexamine the value they place on peer-reviewed practitioner journals, especially those journals published by leading professional P-12 educator associations who have R1 faculty members and other reputable educators on the editorial board. These journals serve as a valuable conduit for developing and disseminating new knowledge to the stakeholders that teacher preparation programs serve (P-12 teachers, administrators, and students).

FINAL THOUGHTS

This article highlighted how scholarly P-12 STEM education efforts can be broadly communicated and disseminated through practitioner journals. Some of the publications referenced in this article would have never existed or would not have had a profound impact on P-12 STEM education if the only publication venues available were prestigious research journals. Peer-reviewed practitioner journals, like those listed in Table 1, provide a unique outlet to bridge the gap between research in teacher preparation programs and practice in P-12 STEM education. That is why I believe that for each STEM education research article or project, teacher preparation faculty should strive to publish an accompanying practitioner article.


I am not by any means suggesting that companion practitioner articles be used to increase the expected number of publications required to earn P&T, but I strongly believe a reasonable balance of peer-reviewed practitioner articles and research publications need to be considered and given the appropriate credit during P&T decisions for teacher preparation faculty. Without the accompanying practitioner publications, that research may never be seen or used by P-12 teachers and administrators, thereby limiting the implementation of valuable research-informed practices (Stevens, 2004).

Higher education institutions and P&T committees must acknowledge the unique service-based nature of teacher preparation programs in comparison to other fields. As an initial step, greater value should be placed on the balance between peer-reviewed research publications and peer-reviewed practitioner publications.

COMPETING INTERESTS

The author has no competing interests to declare.

AUTHOR AFFILIATIONS

Tyler S. Love, Ph.D.  orcid.org/0000-0002-1161-1443
Professor, Director of Career and Technology Education Studies, and Coordinator of Technology and Engineering Education, University of Maryland Eastern Shore at the Baltimore Museum of Industry, Baltimore, MD 21230, US

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TO CITE THIS ARTICLE:

Love, T. S. (2024). Practitioner Journals: An Integral Component for Advancing Research, Knowledge, Practices, and Discussion in STEM Education. *Journal of Technology Studies*, 49(1), 1–7. DOI: <https://doi.org/10.21061/jts.414>

Submitted: 20 October 2023 **Accepted:** 30 March 2024 **Published:** 10 May 2024

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