Envisioning the Future of Academic Writing

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February 10, 2030. I sit at my kitchen table, with one hand resting on a mug of coffee. I have blocked out 30 minutes to download the medical education scholarship I plan to read and respond to this week.

How will we access education scholarship in 2030? What strategies will medical educators use to document and disseminate their work? In celebration of the *Journal of Graduate Medical Education*'s (*JGME*) 10th anniversary, the *JGME* editors are writing a series of special articles that look forward. In this editorial, we imagine the future of academic writing and how this writing will be consumed by readers.

Keeping Up to Date With Education Scholarship in 2030

Using my voice, I open the MedEdCurator app on my tablet, which displays the icons for my favorite web-based medical education journals, blogs, podcasts, videocasts, and virtual communities of practice. I select the "best of" feature, and a window with the highest-rated publications from the past week appears, factoring in my preferences based on my scholarly dossier, prior ratings of all digital media, highest-used search terms, and most viewed media from my closest collaborators. Scrolling through the list, I zero in on a recent publication in JGME *on the impact of artificial intelligence on competency-based assessment. With a tap on the screen, I open the interactive visual abstract, which presents the primary aim of the study and the most meaningful results in an infographic. A banner below the abstract provides options to download to my MedEdCurator Cloud the author screencast, the current crowd-sourced bibliography of most relevant publications on time-variable, competency-based assessment, the most highly rated podcasts, and the MedEdCurator Community, an online platform where medical educator scholars discuss literature. I also download the original* JGME *article, which is available either in the original form or as an annotated version that contains animations to help demonstrate the revisions that have been made based on community discussion and feedback since the first publication date.*

DOI: http://dx.doi.org/10.4300/JGME-D-20-00006.1

Hard Trends in Education

In order to explore how current trends in communication and technology might affect what academic writing, publishing, and dissemination look like in 2030, we searched the literature and posed questions to a variety of medical education groups. From these questions and our literature search, we identified a variety of *hard trends* that have been and will continue to affect the future of academic writing. Burrus et al define hard trends as up-and-coming, predictable developments about transformations in education.[1]

Hard Trends Impacting Academic Writing

Modes of creative expression are evolving in medical education scholarship. While tradition is rooted in text-heavy, peer-reviewed manuscripts, which evolved from dissertations and research formats in the fields of medicine and the social sciences, there is a trend toward shorter articles that include more tables, figures, graphs, and infographics. Written language is increasingly supplemented with audio, visual, and other dynamic content.[2,3]

Costs and author concerns associated with achieving publication in journals continue to escalate. As authors seek to share their work with their community of peers, prepublication and open access manuscripts are becoming more available. At the same time, the costs of journal access continue to rise, and institutions and authors question the traditional model of academic publication.[4]

Reader preferences and habits of acquiring knowledge are evolving as well. Readers who used to stockpile paper journals and read through an entire issue, highlighter in hand, can now view individual article content online. Readers can supplement an article with podcasts, blogs, and subscription services. They also follow scholars virtually or use applications that help them review, curate, and assess the literature.[5,6]

With the evolution of clinician educators' roles and exponential growth of medical education scholarship, primary literature cannot be screened and reviewed,

by an individual, in its entirety. Readers must pick and choose what to read, and curation is essential to staying up-to-date on the medical education research and practice that is most relevant for each individual.[7–9]

The digital age will continue to transform. Technology will evolve continuously with new ways to access, share, and interact with literature.[10]

Crowd-Sourced Vision for the Future

We asked the following 3 questions of the medical education community via Twitter, the *JGME* Editorial Board, the Society of Directors of Research in Medical Education listserv, an additional closed academic medicine leadership virtual community of practice, and the November 14, 2019 #Med EdChat[11]:

1. What will academic writing look like in 2030? How will trends in communication and the digital age impact the way scholarly work is created and disseminated in written format?
2. What writing resources do you recommend for those who aim to be successful academic writers over the next decade?
3. What writing tips or advice do you have for those who wish to be cutting-edge academic writers?

Our community's predictions for what academic writing may look like in 2030 fell into the following categories:

Decreased emphasis on words, increased emphasis on visual and auditory media. A generation of scholars has learned to summarize their work in one-sentence Facebook updates and 280-character tweets. They have also learned to communicate with their virtual community using images on Instagram. As these scholars produce and consume an increasing share of medical education scholarship, media will become richer. Authors will acquire and apply abilities to express complex ideas in visually creative and succinct ways. The written manuscript will move from center stage to supplementary data. Infographics, virtual abstracts, podcasts, and videocasts will be the main way that readers interact with the primary literature. Writing styles will become more concise, and text will serve as a framework to scaffold the presentation of ideas, results, and conclusions in alternate formats.

Emphasis shifts from the primary literature to curated content. The number of medical education journals and opportunities to publish and disseminate work in digital venues continue to expand. It will become increasingly difficult for educators to sift through the literature to identify the work that is relevant to them and can positively influence their practice. Question responders commented on the current emphasis on scholarship curation, which manifests as "top articles of the year" podcasts and sessions at national meetings, critical appraisals, review articles, and blogs and subscription services that review and rate top articles in a given niche. The science of curation is a niche in itself and the future will see increasing rigor in critical appraisal methods, as well as scholars who build their careers on the scholarship of synthesis.

> *Publication and dissemination will be 2 distinctly different endeavors. A journal will publish peer-reviewed studies, but as the amount of new knowledge exponentially grows, individuals can no longer afford to be their own filterers across various journals. You'll need smart, trusted, aggregative educators who aren't as biased toward increasing one particular publisher's subscriber count.*
>
> **–Michelle Lin, MD Editor-in-Chief, *Academic Life in Emergency Medicine*[12]**

Interactivity: the concept of peer review prior to publication, followed by the dissemination of a static final product will evolve and build on current innovations in post-publication peer review and crowd-sourced rating systems. These processes will highlight how findings or ideas are useful in practice, such that scholarly works will be dynamic digital documents prompting discussion in a virtual space. Interactive visual abstracts will allow readers to access details and supplementary content with a touch of the screen or voice command. Transparency will increase, with a trend toward publication of full datasets and protocols, and community ratings and critiques will prompt ongoing revision of work. As multiphase studies present ongoing results, each subsequent step will be added into the original publication, to minimize salami-slicing and data-splitting.[13] Digital publication will allow the reader to interact with expanded digital media that moves beyond tables and figures to include animations, infographics, and videos that illustrate complex methods and conceptual frameworks. Readers may even use technology to reanalyze available data to check conclusions or calculate additional statistics. Commentary and dialogue will occur within the digital publication in threaded community virtual discussions.

> *I wonder if investigators will get a personal Yelp-like rating of trustworthiness over time with positive real-world impact factored in. Also I think*

transparency will increase. Publishing raw deidentified datasets for fact-checking and alternative analyses by others, or even artificial intelligence, or unseen or contradictory trends.

–Michelle Lin, MD

Gregg Wells @Wells_GB8 hours ago
@MedEdChat T1 Interactive multimedia is ever more impressive. Commentary by readers & replies by authors mean online pubs are actively growing documents with dialogs between readers & authors & among readers. Sharing raw data allows other researchers to confirm & extend findings. #mededchat

Change in structure of medical education journals. Journals will continue to exist to meet educators' needs for curated content. However, they will likely be emblems of virtual communities of practice as opposed to paper magazines. Medical education journals will be online-only and open access. Because nearly all journal content will be freely available to readers, the need for curating will be even more pronounced. Advancement in artificial intelligence programs will allow first-pass manuscript screening, formatting, and copy editing to be automated. Journals will decrease reliance on volunteer reviewers and editors for many publication decisions and prepublication revisions, in favor of computer algorithms. Peer review will become more valued as well as integrated into the writing process, and the trend toward group peer reviews will strengthen.[14–16] Editorial boards will be more diverse, and contribute creativity and conceptual guidance to the vision of the journal. Time from submission to publication will decrease. The medical education community will engage in post-publication review, with reviews assessing quality and applicability as part of the virtual community. Documentation of review activity and quality will be automatically downloaded to each scholar's publically available digital dossier. Metrics of quality will include not only citations, metrics that measure the degree to which research is shared and discussed online, including by the public, but also measures of impact on educational practice, through new application metrics.

The democratization of platforms for disseminating work may also result in refreshed approaches to quality assurance that reach beyond the typical peer review strategies, meaning that writing that is clear, persuasive, and understandable will be more salient than ever.

–Chris Watling, MD, PhD, Schulich Centre for Education Research & Innovation[17]

As our society grows more enlightened we will have fewer in person academic meetings to share research findings, in order to spare fossil fuels and the environment! So early dissemination via other modalities will become more important.

–Nathan Kuppermann, MD, MPH[18]

Katherine Chretien @MotherinMed8 hours ago
T1 open peer review on pre-prints, not arbitrary, closed system. Data availability. Multimedia. #MedEdChat

BOX Crowd-Sourced Advice for Those Who Aim to be Cutting-Edge Writers in 2030

- Write a lot. Writing begets writing. Write in different styles.
- Read a lot. Avid readers make better writers.
- Block out time to write and make writing a habit.
- Become a consistent journal reviewer. Consider reviewing as a group.
- Think about the message you want to convey before you start writing.
- When you sit down to write, don't self-edit or try to make the first draft perfect. Just get it down on paper.
- Find or create a writing group. Groups can keep you accountable, inspire you, and allow for consistent feedback.
- Enlist the help of a mentor or writing coach.
- Consider formal training to enhance your general skills as a writer. Take a course or workshop in creative writing, narrative medicine, grammar for writers, poetry, or journalism.
- Learn to navigate the digital space and become familiar with alternative metrics that assess article dissemination and impact.
- Enlist the help of a research librarian.
- Train in graphic design and learn effective strategies for visual representation of data and results.

Writing competence. The quality of academic writing will be even more important as the forms, word counts, and styles for writing change. Authors will need to be skilled in writing cogently in various styles, with intended audiences in mind, whether those audiences be educators, clinicians, administrators, or researchers. Collaborative writing practices will increase and become more efficient. Like all types of competency development, better writing will require courage, deliberate practice, and resources (TABLE and BOX).

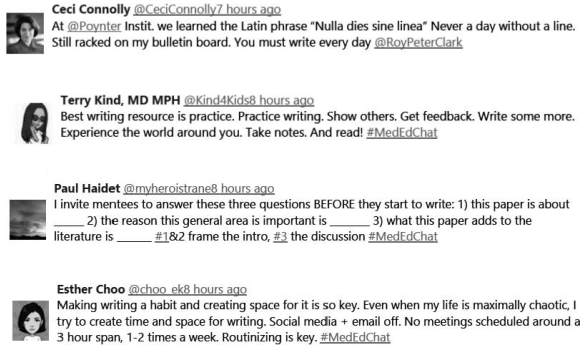
Academic writing must evolve. The products of our writing will be more widely available in the future than ever before accelerating our understanding of challenging research problems if we write in accessible ways. For too long, academic

TABLE
Top Resources for Future-Oriented Writers

General writing resources	*Elements of Style* by Strunk and White[19] *Steering the Craft* by Ursula K. Le Guin[20] *Writing Down the Bones* by Natalie Goldberg[21] *Bird by Bird: Some Instructions on Writing and Life* by Anne Lamott[22] *On Writing* by Stephen King[23] Stories that work by Anjali Jain[24] *Stylish Academic Writing* by Helen Sword[25] *Air & Light & Time & Space: How Successful Academics Write* by Helen Sword[26]
Academic writing resources	*How to Write a Lot: A Practical Guide to Productive Academic Writing* by Paul J. Silva[27] The writer's craft by Lorelei Lingard[28] Association of American Medical Colleges Review Criteria for Research Manuscripts[29] It's time for academic writing to evolve—a professor explains why and how by Lucy Goodchild van Hilten[30] Joining a conversation: the problem/gap/hook heuristic by Lorelei Lingard[31] The future of academic writing[32]
Visual/graphic writing resources	Visual abstract primer by Andrew M. Ibrahim[33] *Storytelling with Data: Let's Practice!* by Cole Nussbaumer Knaflic[34] *Graphic Medicine Manifesto* by Czerwiec et al[35] Graphic medicine: use of comics in medical education and patient care by Green MJ and Myers KR[36]
Time management	*WAG Your Work: Writing Accountability Groups: Bootcamp for Increasing Scholarly Productivity* by Kimberly A. Skarupski[37] Johns Hopkins Medicine WAGs Resources[38]
Digital media	Digital tools in academic writing by Mirian Schcolnik[39]
Other resources of interest	The Scholarly Kitchen[40] The needless complexity of academic writing by Victoria Clayton[41]

writers have been content to write for insider audiences only, cramming their work with off putting jargon that keeps others out. I hope that writers in the future will embrace simplicity and accessibility in their work . . . academic writers have an obligation to communicate in ways that illuminate their ideas to audiences beyond their usual cadre of insiders.

–Chris Watling, MD, PhD



Final Thoughts

From conceptualization to synthesis of this editorial, we engaged in some of the above future trends, such as interacting with our audience during the writing process and considering visual representation. As we imagine what medical education writing could be in 2030, we realize there are opportunities for our own growth as authors and as a journal. We are inspired to question how we can:

- Share data and results in a way that is transparent, useful, and promotes interactivity;
- Improve our own writing and visual representation skills, and support development of these skills in our authors;
- Incorporate more diverse media and improve platforms for communication among readers and authors;
- Begin to develop more accurate measures of scholarly impact on educational practice; and
- Ensure credibility and accuracy—quality—as dissemination venues and revision practices expand.

JGME aims to be the best source for cutting-edge practical literature that will improve graduate medical education (GME). Join us on this journey by submitting relevant GME work, from high-quality research with innovative graphics and media to personal essays and graphic medicine reflections.

Offer your suggestions and resources to improve scholarly writing and dissemination by tweeting to @JournalofGME.

Back to the Future

After reading in the MedEdCuratorCommunity about how some of my favorite competency-based assessment scholar gurus have applied the results of this study to their ongoing research and educational practice, I download the podcast, my annotated document, and videocast. My tablet buzzes to alert me that my prescheduled time period for literature curation has ended. I power off with a double blink of my eye (a preprogrammed command), and head out for a run, excited about listening to the podcast as I hit the trails.

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The authors would like to thank the following individuals who contributed to our vision of the future of academic writing: Mohammed Alkhalifah, Kathy Andolsek, Sateesh Arja, Louise Arnold, Maik Arnold, Dorene Balmer, Teresa Chan, Margaret Chisholm, Esther Choo, Katherine Chretien, Jorie Colbert-Getz, Ceci Connolly, Tom Cooney, Jim Dahle, Gary Beck Dallaghan, Kristina Dzara, Aimee Gardner, Paul Haidet, Ilene Harris, Daniela Hermelin, Doug Jones, Terry Kind, Nathan Kupperman, Edward Lew, Michelle Lin, Lauren Maggio, Erin N. Marcus, Chris Merritt, Emily Methangkool, S. Muehlschlegel, Joanne Mundua, Erica Nelson, Candace Norton, Daniel Pham, Daniel Ricotta, Janet Riddle, ShwneeLgcy (@ShwneeLgcy), Jung Hoon Son, Lonika Sood, Sparkles the OA Dog (@oa_dog), Javeed Sukhera, Aubrie Swan Sein, Iris Thiele Isip Tan, Christopher R Thomas, Robert Trevino, Tom Varghese, Christopher Watling, and Gregg Wells.

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