COMMENTARY

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An exercise in scientific writing for physicians in training

Abstract

It is important to strengthen critical thinking and scientific writing abilities during medical training to support trainees in their research endeavors and prepare students for careers in academic medicine. This commentary describes an interactive workshop to encourage student engagement with scientific literature and contribution to scholarly discourse by writing letters to the editor (LTEs). Students in the MD-PhD program at McGill University were asked to identify an article from a high-impact journal and think about ways in which they could address its scientific content. Students completed this preparation on their own time and then attended a 90-minute workshop where their LTEs were finalized and submitted. The LTE workshops were conducted in 2017 and 2019, and student participation and informal feedback indicated that perceptions of the workshops were positive. The workshops provided students an opportunity to strengthen their critical appraisal and academic communication skills while also contributing to the scientific literature. Letters written by aspiring and practicing physicians add valuable clinical insight to the literature and promote physician engagement with research. Strategies to support the adoption of LTE workshops include incorporating them into longitudinal curricula in medical school and integrating them into journal clubs during residency or fellowship.

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Introduction

For an academic physician, the ability to communicate one's work in the scientific literature is central both to advancement of medical knowledge and to professional development. For early and established career researchers alike, the pressure to maintain a strong publication record is greater than ever, but building critical thinking and scholarly writing skills is often a neglected aspect of formal training [1,2]. With a worldwide decline in the number of physician-scientists [3], it is important to foster early and lasting research engagement in medical trainees. Teaching students to critically read scientific papers is crucial to support high-quality scientific evidence through the research and peer-review processes. Journal clubs are a common approach to fostering critical review among students [4]. However, this structure often does not meaningfully engage students in thoughtful critical review and in development of writing skills [5].

To promote student engagement with the literature, we devised and implemented a unique letter to the editor (LTE) writing workshop for students in the joint MD–PhD program at McGill University (Montreal, QC). These sessions have three main objectives: 1) to encourage students to contribute to scholarly discourse through crafting and publishing LTEs; 2) to support the improvement of students' ability to critique scientific methods and reporting; and 3) to provide an opportunity for students to work collaboratively with their peers and improve their writing through receiving critical feedback.

The unique features of writing and submitting an LTE present several benefits to students. First, LTEs allow students to correspond with the authors of original research through formulating a question or criticism, generating new insight or perspective and presenting additional evidence. To do this, students must think critically about what is published in academic journals, with the ultimate aim of strengthening the literature. Second, the format of an LTE is relatively brief, typically with a maximum length of 200–500 words, which requires students to write with clarity and concision—important qualities to develop in all forms of writing. Third, most journals will permit submission of an LTE within several weeks or months of the original article's publication date. Students engage with recently published scientific literature and must write and submit their LTE in a timely and efficient manner in order to meet this pressing deadline, and thus sharpen their ability to work quickly and effectively. Once accepted, the LTE is often indexed alongside the original article and the author's response, displaying the student's ideas on the same stage as highly-cited literature.

An abstract based on this work was presented at the 2019 CSCI–CITAC Annual Scientific Meeting Young Investigators Forum in Banff, AB.

Ethics approval

According to the Tri-Council Policy Statement (2018) definition of research, these workshops are considered educational activities and thus did not require an ethics review (TCPS2, 2018, Article 2.5).

Description of workshops

We have conducted two LTE workshops in our program (2017 and 2019), which we outline here as a demonstration of their feasibility. The workshops took place in the setting of a regular seminar series that was designed to encourage students in both preclinical medicine and doctoral studies phases of the McGill MD–PhD program to meet together and participate in career development discussions and activities. Five students participated in 2017 and nine students participated in 2019; four students took part in both workshops.

Preparation began two weeks prior to the workshop and involved selecting an article and planning an LTE based on the requirements of the selected journal. Students were asked to form groups of two and identify an article from a high-impact journal that interested them and was published no more than two weeks before the workshop. They were instructed to familiarize themselves with the article as well as the author instructions for submitting a letter to their target journal. Students were encouraged to read any accompanying editorials to their chosen article, along with a few published LTEs from the journal to get a sense of the writing style. Students completed this preparation on their own time, leading up to a 90-minute interactive workshop in which their LTEs were finalized and submitted.

At the workshop, students worked in pairs to draft their letters for one hour. During this time, the workshop leader, a physician scientist, circulated among teams to help develop the students' ideas and focus their LTEs. Students were advised to use an appropriate tone while writing their LTEs; for example, they practiced expressing a critique in a diplomatic manner while remaining respectful of the original work. Once the initial drafts were complete, we projected the letters to the entire group for constructive comments. The remaining time was dedicated to final edits and incorporating the feedback provided by the group. To wrap up the workshop, the students were instructed to submit their LTEs to their respective journals before departing.

Lessons learned

We followed up with students at subsequent unrelated program-wide meetings to assess how well the LTE workshops met the three stated objectives. Our workshops served to explore a novel approach to teaching critical appraisal and writing skills and, as such, we did not establish a plan for measuring the workshop's success. Rather, we evaluated student perceptions of the workshops via informal discussion and elected to repeat the workshop on an annual basis in consultation with the students. Should the workshop be prospectively trialed in multiple settings and optimized for scaling to a larger and more general student population, we would design a framework for assessing the degree to which it improves student proficiency in critiquing scientific literature, and ultimately explore longitudinal impacts on student research engagement.

The immediate response from students, in informal discussions, was that they found participating in the workshops to be enjoyable and helpful. In accordance with our first objective, the LTE workshop provided an accessible means for students to contribute to scholarly discourse through writing and publishing. Students described being inspired to practice academic writing aside from original research articles. Some students reported feeling more comfortable with the publishing process and motivated to publish independently.

The process of engaging with the scientific literature through LTE writing allows students to apply their knowledge and experiences to think critically about the research questions, scientific methods and implications of published research. In preparation for the workshop, students had time to read recently published articles in high-impact journals and select articles related to their research or clinical interests, encouraging reflection about their own medical and scientific knowledge as well as application of their knowledge to assess the work of researchers. Preparation allowed students to think about the way in which they would address the contents of their articles, such as requesting clarification, identifying errors or providing alternate interpretation.

Students were also expected to critique the LTEs of their peers and provide constructive feedback on their ideas and writing. These exercises are well suited to address our second objective and pursue a larger educational goal of developing critical thinking and communication skills among medical trainees. Students also described that the low-pressure and collaborative atmosphere of the workshop helped to assuage their anxiety surrounding academic writing. The diverse research interests and experiences of participants of our LTE workshops meant that participants

benefitted from different perspectives on their academic writing through peer-feedback; supporting our third objective.

As academic writing, assessing the literature and providing and receiving feedback are important for all medical trainees, we argue that LTE workshops would be beneficial to medical students regardless of whether or not they are pursuing a PhD. Moreover, the workshops could be implemented at any stage of medical training; from undergraduate education to residency, through fellowship and into clinical practice. Similarly, the workshops could be easily adapted for non-MD research students in graduate programs, and perhaps even conducted in an interdisciplinary manner to provide an opportunity for collaboration between medical and graduate students.

Of the nine LTEs submitted by students during our two workshops (held in November 2017 and January 2019), six have been published in various medical journals, including the *New England Journal of Medicine* [6,7], *Nature Human Behaviour* [8], *Clinical Cancer Research* [9], *British Journal of Cancer* [10] and *AIDS* [11]. The number of LTEs accepted by these highly selective journals speaks to the students' ability to make meaningful contributions to scientific discourse. It is our hope that by encouraging students to participate in critical appraisal of the literature and providing early and sustained exposure to academic writing and publishing, these students will be more inclined to continue their involvement in academia as they build medical careers.

Future directions

LTE workshops show promise for longer term study and more widespread application, and could effectively address the lack of focus on scientific writing throughout medical training and the diminishing number of physicians engaged in research. Teaching students to write LTEs would nicely complement the teaching of evidence-based medicine as a meaningful exercise in critical appraisal, parallel to training in fundamental research methods and lessons on communicating empirical research. Strategies to promote the adoption of these workshops could include incorporating them into longitudinal curricula in medical school and integrating them, on an annual basis, into journal clubs during residency or fellowship. Outcomes should be assessed longitudinally, including surveys of student perceptions of critical thinking and scientific writing skills.

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