

The Case for Writing Critical Thinking Reports as a Teaching Strategy on Today's Hospital Wards

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ABSTRACT: I review some of the challenges in teaching medical students and housestaff on today's hospital medicine wards, including increasingly limited time for dedicated teaching. Tapping into the extensive literature of "writing to learn" or "writing-across-the curriculum" in non-medical educational settings ranging from elementary school to college classes, I urge consideration of writing concise critical thinking reports (CTRs) by medical students and housestaff in response to questions raised during patient rounds as a means of enhancing their ward-based learning experience. Several potential reasons for writing CTRs are offered: (1) Nurtures curiosity; (2) Demands self-directed search for and encoding of new knowledge; (3) Emphasizes metacognition and conceptualization crucial to meaningful learning; (4) Provides opportunity for learners to teach and share newly-assimilated material with a broader web-based audience; (5) Encourages the concept of narrow but more in-depth learning related to a specific clinically relevant subject matter; (6) Nudges learners toward clear and succinct writing as an important general skill to develop in their everyday professional activities, including electronic medical record documentation; and (7) Reduces work-related burnout. Barriers to writing CTRs, including lack of general appreciation for explanatory writing as a potential teaching strategy in medical education and allowing sufficient time for medical students and housestaff to engage in this activity among other competing demands, are discussed. Writing CTRs is a potentially powerful pedagogical tool in ward-based learning that deserves consideration and formal evaluation by properly designed studies.

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It's by writing about a subject we're trying to learn that we reason our way to what it means.

William Zinsser

It's no secret. Teaching on today's hospital medicine wards can be challenging.¹ Factors such as increasing demands of charting in the electronic medical record (EMR), ongoing efforts to reduce the length of hospital stay, and observance of restricted hour rules for physicians-in-training in recent years have meant fewer opportunities for dedicated teaching times during a typical day on the wards.¹⁻³ This means less time to fully explain answers to great questions brought up during rounds by medical students and housestaff. "Why does eating a lot of carrots make your skin yellow but your eyes don't turn yellow?" is an intriguing question but explaining its mechanism in any detail risks decelerating the pace of rounds and, among other things, delaying patient discharges. Even explaining why melena does not necessarily indicate upper gastrointestinal bleed⁴ may take longer than time allows. Postponing more detailed discussion of the subject at hand to a later time or date may be an option, but whether it will ever materialize is another question given the inherent vagaries of patient care demands on the wards.

To help bridge the gap between what I covered during clinical rounds and what I wished to have discussed as teaching faculty, in 2016 I began to supplement my teachings by tapping into an open-access educational website (www.Pearls4Peers.com, P4P) that I created a year before.⁵ The idea for this site was conceived as a response to great questions that I fielded while serving as a

"senior clinical advisor" to hospitalists on our medicine wards but did not have adequate time to fully explain or needed more time to find the answer.⁶ P4P follows a simple format consisting of a specific clinical question followed by an evidence-based response of usually no more than 200 to 300 words supported by key literature citations. The 200 to 300-word limit was based on informal feedback from hospitalists preferring more in-depth discussion than that allowed by "tweets"⁷ yet not so detailed as to require more than 1 minute to read.⁵

When a question like another already posted on P4P was asked during teaching rounds, I discussed the topic briefly and instead of hurriedly compressing the rest of my message and risk slowing down the tempo of rounds, I followed it by emailing a related link on P4P to my team later that day. In the absence of an existing post related to the question asked, I created a new one whenever possible. Feedback from medical students and housestaff for using this "e-teaching" strategy was very positive.⁵ They welcomed the brief, concise and evidence-based nature of the posts, as well as the freedom to access them "any time, any place"⁸ under less frenzied conditions of morning rounds and without the need to read bulky emails. Of course, purveying pearls that can be conveniently accessed as a means of supplementing ward teaching is one thing and imparting a more meaningful and durable learning experience while caring for patients on the wards may be another. "Am I doing everything I can to maximize learning during the short couple of weeks that I spend with my team on the wards?", I wondered.



Writing to learn or writing-across-the-curriculum concept

In exploring ways to enhance the learning experience of my trainees on the wards, I found an extensive body of literature that examined explanatory writing—aimed to communicate existing information or ideas—as a potential tool for meaningful learning.^{9,10} Explanatory or “informational” writing should be distinguished from “exploratory” or “expressive” writing which may be better characterized as a “voyage of discovery into the self.”^{10,11}

The concept of writing to learn or writing-across-the-curriculum has been reported to have a positive impact on learning in a variety of educational settings, ranging from elementary school to college classes, although the results have been mixed at times.^{9,11-15} A meta-analysis of school-based writing-to-learn interventions on academic achievement involving 48 studies in elementary, middle and high school as well as college classes found a small but positive impact on conventional measures of academic achievement (eg, final grades and performance on standardized tests), with 75% of the studies favoring writing to learn over traditional teaching of the same content.¹¹ Of interest, the great majority of studies included in this meta-analysis involved explanatory or informational writing, with science demonstrating the highest positive impact compared to other subjects such as mathematics and social studies.¹¹ In a study involving undergraduate students in a psychology class, those who were randomly assigned to write about a topic attended classes more often and performed better on factual and conceptual multiple-choice exam questions.¹⁴ In another study involving an introductory psychology class, students completing brief, ungraded writing assignments performed significantly better on exam questions relating to the content of the writing assignments compared to those covering unrelated contents.¹⁶ Further studies are clearly needed to assess the impact of explanatory writing on more meaningful and durable learning in aforementioned educational settings.

However, despite frequent reports of a positive impact of writing on learning in many non-medical educational settings, writing as a tool in enhancing the learning experience of medical students and trainees on hospital wards is generally overlooked, much less formally studied. This is unfortunate since explanatory writing assignments nicely capture the “4 E’s” model of effective teaching (ie, Encouraging interest, Encoding important information, Elaborating meaning of learned material and Evaluating progress) as popularized in teaching psychology.¹⁷ A notable advantage of ward-based writing over typical classroom settings is that hospital wards provide a ready context in which medical students and housestaff are challenged and can be encouraged to ask probing clinical questions that may favorably impact medical management of their patients. Under such circumstances, generating interest in a clinically relevant topic should not be difficult. Encoding

important information and elaborating the meaning of the learned material (ie, conceptualization and critical reasoning and thinking) are, in fact, requisite steps in explanatory writing. Progress in learning as a result of this writing exercise may be assessed through a variety of means, including evaluation of the content and quality of submissions and observation of the learner teaching the newly-assimilated material on the wards.

The invitation to write: what I found

To explore writing as a teaching strategy on the wards (detailed elsewhere⁵), I invited members of my ward team to write scholarly “pearls” of their own, based on clinical questions that they themselves often raised during the care of patients (Figure 1). More specifically, they were asked to follow the existing P4P format that is, a specific clinical question followed by a concise response and supported by a short list of key journal citations. By design, acceptance of my invitation required a deeper dive into the literature, critical thinking, conceptualization, and a final distilled explanatory piece; supportive references to other blogs or online summary sources (eg, UpToDate) were not accepted. I routinely informed potential authors to expect to spend a minimum of 4 hours in writing a CTR (not including the time spent on literature search), based on the average time it took me to write a CTR. I reviewed all submissions, gave feedback on their content and structure and asked for revision when needed before posting them online. The work of each contributor was acknowledged at the end of each post. As an added incentive, I encouraged authors to list their work on their curriculum vitae as an online scholarly activity. An example of a piece submitted by a medical resident and posted on P4P is shown (Figure 2).

I was pleased by frequent positive feedback on the educational value of writing CTRs from medical students and housestaff, with comments such as “Thanks for encouraging me to write something up on this topic”, “Love, this! Extremely helpful for my internship”, and “very educational”.⁵ However, despite favorable feedbacks and creation of what I considered an exciting opportunity to learn about a specific topic, share newly-found knowledge with others and be recognized for it, participation in this voluntary activity fell way short of my expectations. More specifically, 30% of medical students and 90% of the housestaff never contributed a pearl during a 2 year period.⁵

Barriers to writing to learn on the wards

In explaining a less-than-enthusiastic response to my writing assignments, particularly among housestaff, I identified several potential barriers. First, to the best of my knowledge, the very activity that I tried to promote—that is, write a concise, scholarly piece addressing a specific clinical question that requires critical thinking and distillation of knowledge—has never been given a formal name. To distinguish such works from other more loosely defined “pearls” that may not require critical

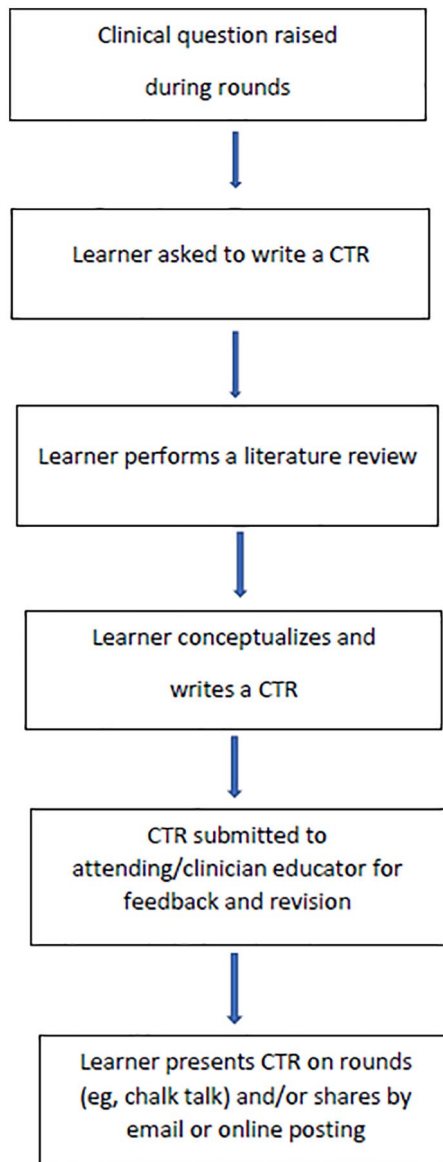


Figure 1. Steps in the creation of critical thinking reports by medical students or housestaff based on clinical questions raised on ward rounds.

thinking or are often just “passed along”, I would like to call them “critical thinking reports” or CTRs.

The similarity in terminology between CTRs and “critical incident reports” widely used as a tool in self-reflection and learning in medical education is not coincidental. Critical incident reports are short narratives of events judged to be particularly meaningful by participants in the events.¹⁸ They have been used in medical and nursing education by students and trainees as a means of gaining detailed understanding of an incident often involving patients or interaction with a faculty member.¹⁸ The concept of writing a narrative about one’s experience in an event is, of course, as old as civilization itself but it wasn’t until this activity was given a formal name that its potential was realized, its impact on educational outcomes was evaluated, and many medical schools adopted it as a means of

enhancing the learning experience of trainees.¹⁸ I hope that a similar path can be explored for CTRs as part of the learning experience on the wards, if not medical education curriculum as a whole.

Another reason for the lukewarm response to my invitation to contribute a CTR was likely the lack of appreciation for such self-directed learning exercise as a valuable tool in critical thinking and reasoning on the wards. In their essay entitled “Medical education reimaged: a call to action”, Prober and Khan identify “personalized deeper dives” as one of key elements of medical education (in addition to the foundational lectures and interactive exercises).¹⁹ Bowen highlighted the importance of encouraging useful reading habits as a means of promoting clinical diagnostic reasoning and proposed that clinical teachers “encourage reasoning that promotes conceptualization rather than memorization, provide learners with an opportunity to share what they have learned, testing what has been understood well enough to be explained” and reinforcing the importance of self-directed learning.²⁰ The process of writing a CTR reflects these important elements of learning every step of the way.

Unfortunately, writing does not seem to be on the radar of ward-based learning strategies. In fact, among new strategies that have been suggested to overcome challenges in teaching on today’s hospital wards (Flipping the wards, Using documentation to teach, Technology-enabled teaching, Using guerilla teaching tactics, Rainy day teaching and Embedding teaching moments into rounds-FUTURE), writing is never mentioned.¹ A FUTURE activity that could theoretically result in writing a CTR is the “rainy day teaching” component which the authors believe can be exercised during “low census times” when individuals can be directed to search the literature to address clinical questions the team may have during rounds and report back.¹ Unfortunately, “low census times” may be too far and in-between for clinician educators to count on for teaching on the wards. Writing as a means of clinical teaching was also overlooked in a handbook on medical education.⁸ Interestingly, the Medical Schools Council of U.K. lists writing as 1 of 4 skills (along with reading, listening and speaking) all medical students should possess as future doctors but does not provide any specifics or guidance on how this should be accomplished.²¹

Time constraint—either perceived or real—was likely another obstacle to writing a CTR. Utilizing a word cloud audience participation tool during PowerPoint presentations on scientific writing for the web, I found that medical students and housestaff considered “learning” as the main reason to engage in such activity, while at the same time citing “time” as its main hindrance (unpublished observations). The juxtaposition of these findings suggests that medical students and housestaff perceive lack of time as a major obstacle to learning through writing. The increasing number of competing demands on the trainees’ time to maximize their ward experience during

CAN A SEIZURE CAUSE ABNORMALITIES ON THE BRAIN MRI?

Yes it can, and the MRI abnormalities could represent seizure's effects on the brain, not the seizure's structural cause. Seizure-related MRI changes are often associated with status epilepticus, but have also been reported in complex partial status epilepticus.^{1,2}

T2-weighted MRI images may show increased signal intensity at the cortical gray matter, subcortical white matter, or hippocampus. The MRI changes are unilateral about one-half of the cases, while in about 8% of patients leptomeningeal contrast-enhancement may be observed. Partial simple and complex seizures are associated with hippocampal involvement.³

The increased signal intensity following seizures is thought to be due to increased metabolism at the epileptogenic area, which in turn results in increased oxygen consumption, hypoxia, hypercarbia, lactic acidosis, and ultimately vasodilation and edema.

Reversibility of MRI changes following seizures has been noted between 15 and 150 days (average, 62 days). A structural abnormality is more likely the cause of a seizure when the MRI changes do not resolve during this period.³ Therefore, seizure-induced brain-MRI abnormalities remain a diagnosis of exclusion.

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Figure 2. An example of a critical thinking report written by housestaff and posted on www.Pearls4Peers.com.

their rotations (eg, palliative care, simulation training, trauma-informed care, and point-of-care ultrasound training sessions, among others), all jostling for more time and attention should be recognized. Perhaps we should revisit the entire set of obligations of trainees during their ward rotations and prioritize those with potential for higher learning value. In my view, nurturing proper writing skills as a strategy to maximize learning on the wards may need equal consideration, if not more. Low participation in writing CTRs might have also been related to lack of formal talking points and generally poor “salesmanship” skills on my part (there was a reason why I pursued a career in medicine!).

The adoption of writing CTRs as part of ward-based learning also requires a buy-in by clinician educators. More specifically, they need to be familiar with the potentially positive impact of explanatory writing on the learning experience of medical students or residents. This requires investment in time in “teaching the teachers” about the writing to learn concept as well as general guidelines on how to write a CTR. They will also need to be afforded the time to evaluate CTRs and provide adequate feedback to learners (Figure 1). In my view, such barriers to writing to learn strategy on the wards can be overcome with proper departmental support and guidance.

Table 1. Potential reasons for writing critical thinking reports as part of ward-based learning.

Nurtures curiosity as a key element of learning
Demands self-directed search for and encoding of new knowledge
Emphasizes metacognition and conceptualization as important elements of meaningful learning
Provides opportunity for learners to share what they have learned by teaching others either in person or through web-based media
Encourages the concept of narrow but more in-depth learning related to a specific subject matter (“learn best by learning less”)
“Nudges” learners toward clear and succinct writing as an important skill to develop in their everyday professional activities, including electronic medical record documentation
Reduces work-related burnout

Promoting critical thinking reports on the wards

I propose the following “talking points” to help promote CTRs on the wards as a potential teaching tool (Table 1).

1. By necessity, the process of writing a CTR encourages curiosity with the learner posing a specific clinical question relevant to patient care. Curiosity is an integral part of learning and clinical reasoning²² and posing questions remains a cornerstone of education.^{23,24}
2. The CTR writing strategy requires a self-directed “journey” that serves as a basis for encoding new knowledge and meaningful learning.²⁰ As a result, writing CTRs rekindles and nurtures the passion for learning. “People don’t simply have passions; they develop them”.²⁵
3. Writing a CTR requires metacognition and conceptualization, an integral part of meaningful learning; “Do I really get this idea? How can I best explain my answer to a friend?”.²⁶ The importance of conceptualization over memorization to learning has been well recognized.²⁰
4. Writing CTRs challenges learners to share what they have learned by teaching others either in person or through web-based media. Teaching is one of the quickest ways to learn something new.¹⁹ “If you are not teaching, you are not really learning”.²⁷
5. Although the scope of individual CTRs is by design limited to a specific question, its narrow scope is well-aligned with the concept that the most meaningful learning takes place when learners are challenged to narrower issues in-depth, rather than broader and more comprehensive coverage that can only be “skin-deep”.²⁸ “You learn best by learning less”.²⁹
6. Writing CTRs serves as a “nudge” or a positive reinforcement toward the act of clear and concise communication in general, an important skill to be honed as part of a physician’s everyday professional activities, including electronic medical record documentation.²⁹ An “article that makes its case succinctly is the highest form of courtesy to the reader”.¹⁰
7. Learning new information as a result of writing a CTR during ward rotations may reduce burnout in an often

demanding and chaotic hospital ward environment. In fact, compared to relaxation, learning may be a more effective means of reducing burnout at the workplace, even among physicians-in-training.^{30,31}

Conclusions

Writing is a potentially powerful yet under-utilized tool in the today’s ward-based medical education. The process of writing CTRs should nurture curiosity, encourage self-directed assimilation of knowledge, foster critical thinking, and promote clear and concise communication skills, all of which are essential attributes to today’s practice of medicine. Studies are needed to formally assess the impact of writing CTRs on ward-based learning.

Disclaimers

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