

Does Metacognition Matter?

Prompting Students to Think about How They Think

Morgan Luck¹, Erika R. Francis², Stephanie Bernard³,
and Anne Schempp⁴

¹Shenandoah University (mnowak2@su.edu)

²Shenandoah University (efrancis11@su.edu)

³Shenandoah University (sbernard2@su.edu)

⁴Shenandoah University (aschempp@su.edu)

Abstract

This writing assignment, titled Metacognitive Analysis, prompts awareness of metacognition in learners early in their medical disciplines as they critically evaluate their process for making medical decisions. The Metacognitive Analysis assignment is completed by first-year graduate health profession students in a master's level physician assistant (PA) course focused on the development of critical thinking and clinical decision-making. Throughout the semester, patient teaching cases are discussed and dissected by the students in small-group, problem-based learning sessions. In the Metacognitive Analysis assignment, students extend this learning by evaluating their own individual decision-making process in relation to concepts of intuitive and analytic reasoning.

Background and Introduction

The Metacognitive Analysis assignment is a one- to two-page reflective essay focusing on concepts of intuitive and analytic reasoning in the context of a clinical diagnostic decision-making process. The Metacognitive Analysis assignment elicits reflections on evidence that supports or refutes a clinical decision and incorporates implications for future clinical practice.

As educators in a master's level health profession program, we are responsible for imparting an extensive amount of medical, ethical, and practical information to physician assistant (PA) students during the 18-month didactic phase before their clinical rotations. Although these students arrive to the didactic phase with a shared background of prerequisite science coursework, their undergraduate disciplines, as well as their maturity and professional and life experiences, can vary widely. With our support, each student learns how to transform themselves into highly efficient diagnosticians responsible for the health and well-being of future patients.

Beyond their ability to memorize medical content for examinations, these students must hone their skills in critical thinking and application of foundational knowledge. The concept of metacognition is important to introduce to medical learners as it informs their ability to critically think and make patient-related decisions (Colombo et al., 2010). They must synthesize information gathered from an initial patient history into the development of an appropriate physical exam, endorse an approach to diagnostic testing, diagnose the patient, and negotiate an optimal patient treatment and management plan, with numerous decision-making points along the way. In our program, students are prompted to metacognitively analyze their thinking as they work through their decisions. The importance of their decision-making abilities cannot be understated, as a wrong decision could result in an unnecessary financial burden or medical error, such as a patient's delayed diagnosis, or worse, patient harm (Croskerry, 2013).

To prepare the next generation of healthcare providers for this immense responsibility, many graduate education programs have incorporated problem-based learning (PBL) into curricula

prompt

a journal of academic
writing assignments

Volume 9, Issue 1 (2025),
pages 46–51.

DOI: 10.31719/pjaw.v9i1.201
Submitted November 1, 2023; accepted
October 5, 2024; published February
25, 2025.

© 2025 The Author(s). This work is
licensed under a Creative Commons
Attribution- NonCommercial 4.0
International License.

and decreased reliance on traditional lectures for content delivery. Characteristics of PBL include problems as a trigger for learning, small-group collaboration, and the guidance of a tutor (Schmidt et al., 2011, p. 793). In our classes the role of “tutor” is filled by faculty facilitators.

Our cohort-based PA program includes a three-semester PBL course sequence entitled Clinical Integration Seminar I, II, and III. Faculty facilitators work through a different patient case every one to two weeks with small groups of eight to ten PA students. As they do so, the facilitators break the process of clinical decision-making down into digestible chunks of information and application within our medical systems-based curriculum design model. Knowledge gaps are identified by the students themselves, small-group peer members, and faculty facilitators.

Evidence-based practice is reinforced during group sessions by pushing students to locate recommendations from national professional organizations and current medical literature (for example, guidelines for the treatment of ear infections published by the American Academy of Pediatrics). Evidence-based practice is the gold standard for clinical diagnosis and treatment today. This approach to medicine entered its modern era in the 1970s, along with advances in technology that facilitated practitioners’ access to research (Claridge & Fabian, 2005). Our students learn to identify and vet evidence through this PBL course sequence as they critically consider and integrate knowledge in a setting of patient case studies. This approach is supported by academic literature which has shown the effectiveness of PBL in facilitating student application of evidence-based practice prior to clinical exposure (Lusardi et al., 2002).

In general, students in this three-course sequence can reliably navigate a patient case and its complexities by the conclusion of the second course. By this time, the process of working through a simulated medical appointment from patient intake to disposition has become more natural to these developing clinicians, as has the application of clinical guidelines and medical literature. The students are primed to understand and incorporate concepts of intuitive (automatic, reflexive) and analytic (deliberate, controlled) reasoning as applied to their own decision-making (Croskerry, 2013; Senelick, 2013). The Metacognitive Analysis assignment actively engages students in the concept of clinician self-awareness (metacognition) at this optimal point in the curriculum. The maturing diagnostician is mindful of the balance between reflexive and deliberate reasoning and prevents one or the other from coloring their choices (Croskerry, 2013). For this reason, the Metacognitive Analysis assignment has been situated in the students’ second semester for five successive cohorts (approximately 60 students per cohort).

Assignment Overview

Our program’s curriculum scaffolds assignments in academic writing throughout the student experience. In the first semester of the curriculum, students are guided through interpretation of evidence-based medical literature and familiarized with applicable search engines. They confirm peer review status and timeliness of articles and guidelines, and they practice citing these resources according to academic style guidelines. Students submit four introspective reflective essays in fulfillment of professional seminar requirements prior to the Metacognitive Analysis assignment. In these essays, students reflect on personal and interpersonal growth as well as significant moments they have encountered while engaged in their PBL course learning. Students are provided faculty feedback on each of these reflections.

The prompt for the Metacognitive Analysis assignment brings these skills together toward a next step in academic writing. This assignment is introduced at the conclusion of the students’ final collaborative session of the second-semester PBL course. The students are instructed to complete the assignment independently and outside of class time. As an introduction to the concept of metacognition in medicine, students are required to read the article “Teaching

Doctors how to Think” by Richard Senelick (2013). They are then encouraged to use principles of metacognition to reflect on their own balance of intuitive and analytical reasoning in the context of a clinical case by completing a single reflective writing assignment in essay form. By encouraging students to analyze evidence from the course and to interpret their own critical thinking behavior, the Metacognitive Analysis serves as a writing to learn activity (Bazerman et al., 2005).

After we assign the Metacognitive Analysis and related reading, we take 15 minutes of class time to help students understand how to identify examples of intuitive and analytic thought processes. During this class time, we coach students on how to identify their analytical thought process by asking them to think of a peer-reviewed resource they consulted in making a diagnostic decision they made while working through a case. For example, clinical guidelines may recommend that a certain diagnostic test is appropriate when specific findings are present on the physical examination portion of the encounter. Considering the clinical guidelines as evidence, did the students make correct decisions given their physical exam findings? The students are asked to demonstrate how their newfound knowledge of this evidence may affect their future decision-making. Then, we help them understand that intuitive decision-making would be a reflexive, immediate decision to pursue a particular diagnostic plan without purposefully considering the clinical guidelines. We believe this in-class explanation helps students identify specific details and processes to focus on in their Metacognitive Analysis.

By engaging students in these reflections, the Metacognitive Analysis assignment allows us to assess two instructional objectives: (a) During the problem-solving process, recognize when additional knowledge is needed to better define and understand the patient’s problem(s), needs, and diagnostic/treatment management, and (b) Incorporate principles of evidence-based practice. As an example, one student chose to reflect on a case study involving a patient with abdominal pain. In the essay, the student wrote that they recognized using intuitive thinking, which they referred to as “pattern recognition,” when they initially jumped to ulcer disease as the most likely diagnosis. They recognized the use of analytic thinking when they expanded their list of possible diagnoses to include more rare conditions. The student indicated that this awareness would help them brainstorm less likely but important alternate diagnoses in future clinical settings.

After students complete and submit the Metacognitive Analysis, we return the assessed work to students, providing individual feedback through a detailed rubric along with specific responses to their submission. Feedback includes a determination of the student’s ability to apply evidence-based medicine to support or refute their clinical decision-making. A strength of the Metacognitive Analysis assignment is early identification of students’ incorrect interpretation of intuitive and analytic thinking. Feedback provides an opportunity for remediation and encourages development of the skill of critical thinking. For example, feedback to one student included this clarification: “You seem to be associating analytical reasoning with interpreting test results. An example of analytical reasoning would be when the group debates which test is best for a given situation. It is a slow and deliberate way of thinking.” Faculty responses also address the student’s skill in following the rules of professional academic style writing, in this case American Medical Association style.

Experiences and Outcomes

Faculty Experiences and Approach

As faculty, our experiences with this Metacognitive Analysis assignment have been positive. Faculty facilitators are responsible for answering clarification questions pertaining to the Metacognitive Analysis assignment when it is introduced during a small group session. Prior to this

assignment, students are provided many opportunities to collaborate with their small group members for clinical decision making. This assignment builds on those experiences through an individual submission, as each student now must rely on their own skill set. From a faculty load perspective, the course coordinator is responsible for grading the essays (approximately 60 total). The grading rubric and relatively short length of the essay (one to two pages) are helpful to keep grading efficient and consistent.

As previously mentioned, this Metacognitive Analysis assignment provides one of many touchpoints used to emphasize the use of primary literature and research when practicing evidence-based medicine. We can measure growth and development in our students in a concrete way through this assignment, demonstrating how far the students have come since matriculating into the PA program.

Students' Experiences

Students historically perform well on this Metacognitive Analysis assignment. However, a few students from each cohort voice concerns with interpretation and reach out for clarification prior to submission. The common challenge has not been with the assignment itself, but with the greater concept of critical decision-making within the practice of medicine. This realization has led to discussions with faculty about the “art of medicine” or the “practice of medicine” concepts, which reflect the nuanced opinions and interpretations of practitioners within the context of science.

The Metacognitive Analysis has been effective for our needs, with over 300 students in a six-year period demonstrating proficiency by meeting or exceeding the 80% benchmark grade. This grade is earned through evaluation against a standardized rubric that requires graduate-level analysis and writing. Students in the cohorts that have completed this assignment have ranged in age from 21 to 56 years old and identified as approximately 70% female and 30% male. Average cumulative undergraduate GPA of the students is 3.6 on a 4-point scale.

Because students have overwhelmingly achieved benchmark on this assignment, the faculty have not explored trends in terms of weaknesses. However, the use of this assignment has been helpful as a formative instrument and also serves to identify learners in need of additional support and remediation prior to their exploration of research methods in following semesters. The students are evaluated in a summative fashion on their critical-thinking skills in a subsequent research course and through their summative capstone projects.

Student experiences are gathered from a combination of formal channels including course evaluations and informally through small-group faculty facilitator interactions with their student group members. Additionally unsolicited positive feedback from student leadership has been shared with the faculty course coordinator.

Limitations

The Metacognitive Analysis assignment is difficult conceptually for some students because they are being asked to switch from scientific thinking to an introspective exploration of their own decision-making process. The assignment requires the students to engage with only one supplementary reading on the background of intuitive and analytic thought processes when they might benefit from more exposure to these concepts. Similarly, there is no supplementary reading on metacognition. We do not provide a focused lecture or reference on metacognition but instead incorporate it into practice.

Future Applications

In the future, elements of the Metacognitive Analysis assignment could be introduced in a longitudinal fashion applying the concepts of metacognitive thinking and decision-making processes throughout the course sequence. An initial video or reading introducing the concept of metacognition could be placed in the first semester. Subsequently, faculty facilitators could integrate further discussion regarding metacognition into PBL class time to supplement the introductory material. As a result, students would engage in this particular type of thinking more than once. This approach may address the difficulty students have occasionally reported with interpretation of this assignment. Reinforcement of the concepts of a balanced intuitive and analytical approach to clinical decision-making would be helpful to maintain the students' self-awareness throughout their learning.

Although the Metacognitive Analysis assignment was created specifically for the developing medical diagnostician, the concepts of intuitive and analytic reasoning are applicable to other student populations and professions that must blend evidence-based practice research with intuitions based on contextual experience. Faculty in other disciplines could build on this work by modifying this prompt to fit those populations. This assignment could also be integrated into a single course in any context in which differentiating analytic from intuitive thinking is applicable. Aligning the Metacognitive Analysis assignment with a case study or small-group discussion that requires decision-making could provide a similar opportunity within one semester.

ASSIGNMENT

Metacognitive Analysis Assignment

The Metacognitive Analysis assignment is designed to examine the process of clinical decision making and reasoning. The purpose of this assignment is to guide you in examining your own behaviors when making clinical decisions and to introduce the concept of using evidence-based data to justify or refute diagnostic decisions.

Students are to complete this assignment individually.

1. Read the following article regarding clinical decision making and reasoning:
Teaching doctors how to think by Richard Senelick
2. Recall a clinical patient case that we have worked through in CI seminar. Reflect on your personal use of intuitive and analytic processes throughout the case.
3. Investigate one diagnostic decision made in the case. Search for and choose one peer-reviewed journal article that provides evidence to support or refute that decision. Articles must be recent and published within the past 5 years.
4. Write a one-to-two-page paper addressing the following components:
 - a. Identify two instances in the case that you used analytic reasoning to make a decision.
 - b. Identify two instances in the case that you used intuitive reasoning to make a decision.
 - c. Summarize the data from the evidence (#3 above) and describe how it is pertinent to the initial diagnostic decision you identified (#3 above).
 - d. Discuss how having this evidence (#3 above) might influence the way you approach similar patients in the future.

5. Submit paper and supporting article.

The Metacognitive Analysis assignment will be graded using the rubric attached to this assignment in the PA 636 course.

Guidelines for paper:

- One to two pages
- Double-spaced
- Arial or Times New Roman 12-point font
- One-inch margins
- Cite source using AMA style (within the text of paper and in references)

Supplementary Material

For supplementary material accompanying this paper, including a PDF facsimile of the assignment description formatted as the author(s) presented it to students, please visit <https://doi.org/10.31719/pjaw.v9i1.201>.

References

- Bazerman, C., Little, J., Bethel, L., Chavkin, T., Fouquette, D., & Garufis, J. (2005). *Reference guide to writing across the curriculum*. Parlor Press & The WAC Clearinghouse.
- Claridge, J. A., & Fabian, T. C. (2005). History and development of evidence-based medicine. *World Journal of Surgery*, 29(5), 547–553. <https://doi.org/10.1007/s00268-005-7910-1>
- Colombo, B., Iannello, P., & Antonietti, A. (2010). Metacognitive knowledge of decision-making: An explorative study. In A. Efklides & P. Misailidi (Eds.), *Trends and prospects in metacognition research* (pp. 445–472). Springer. https://doi.org/10.1007/978-1-4419-6546-2_20
- Croskerry, P. (2013). From mindless to mindful practice: Cognitive bias and clinical decision making. *The New England Journal of Medicine*, 368, 2445–2448. <https://doi.org/10.1056/NEJMp1303712>
- Lusardi, M. M., Levangie, P. K., & Fein, B. D. (2002). A problem-based learning approach to facilitate evidence-based practice in entry-level health professional education. *Journal of Prosthetics and Orthotics*, 14(2), 40–50. <https://doi.org/10.1097/00008526-200206000-00005>
- Schmidt, H. G., Rotgans, J. I., & Yew, E. H. J. (2011). The process of problem-based learning: What works and why. *Medical Education*, 45(8), 792–806. <https://doi.org/10.1111/j.1365-2923.2011.04035.x>
- Senelick, R. (2013, July 8). Teaching doctors how to think. *The Atlantic*. <https://www.theatlantic.com/health/archive/2013/07/teaching-doctors-how-to-think/277555/>