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Teaching and Learning Matters

A series of literature evaluation skill development interventions progressing in complexity

Shannon L. Reidt, PharmD, MPH, BCPS[a,*], Jenifer Morgan, PharmD[b,1], Kristin K. Janke, PhD[c]

[a] University of Minnesota College of Pharmacy, Minneapolis, MN
[b] Park Nicollet Clinic, St. Louis Park, MN
[c] University of Minnesota College of Pharmacy, Minneapolis, MN

Abstract

Objectives: The aim of this work was to design and evaluate a series of interactive literature evaluation skill development interventions for pharmacy students that progress in complexity. Related goals for this initiative were to design methods for (1) self-assessment of student abilities and (2) conducting a student-led journal club discussion in a high enrollment course.
Educational activities: Seven literature evaluation skills were targeted. Pharmacy students participated in six in-class article reviews, a written article review, a student-led journal club, and a final written exam. Students rated their skills pre- and post-course using an End-of-Course Self-Assessment. A Journal Club Self-Assessment was conducted after the student-led journal club. Both assessments used a five-point rating system of Novice, Developing, Skilled, Facilitating/Leading, and Educating.
Assessment: A total of 165 students responded to both the self-assessments. In the Journal Club Self-Assessment, 56% of respondents rated their ability in preparing discussion questions as Skilled, and 32% of respondents stated that formulating discussion questions were the hardest component of the exercise. In the End-of-Course Self-Assessment, 46% of respondents reported "describing study design" as their strongest skill, while 23% reported "identifying ways to improve study design" as their weakest skill. All seven literature evaluation skills had statistically significant improvements ($p < 0.001$) pre- to post-course.
Critical analysis: Even after eight carefully constructed exercises with progressing levels of difficulty, all students did not self-assess their ability at the desired level of "Skilled."

Keywords: Literature evaluation; Self-assessment; Pharmacy students; Journal club; Evidence-based medicine

Background

Evidence-based medicine (EBM) is the integration of high-quality evidence, individual provider expertise, and the needs and preferences of the patient when making care decisions.[1] The Ask, Acquire, Appraise, and Apply model has been used to operationalize EBM.[1] The Appraise component of EBM involves the ability to evaluate literature. The Accreditation Council for Pharmacy Education Accreditation (ACPE) Standards require that pharmacy programs include curriculum related to "critical analysis

* Corresponding author: Shannon L. Reidt, PharmD, MPH, BCPS, University of Minnesota College of Pharmacy, 308 Harvard St SE, WDH 7-103, Minneapolis, MN 55455.
E-mail: reid0113@umn.edu

[1] At the time of this work, Dr. Morgan's affiliation was with the College of Pharmacy at the University of Minnesota, Minneapolis, MN.

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and application of relevant health sciences literature and other information resources to answer specific patient care and/or drug-related questions and provide evidence-based therapeutic recommendations to health care providers or, when appropriate, the public." Additionally, students must be able to evaluate scientific literature to advance population health and patient-centered care.[2]

There are a number of challenges in teaching literature evaluation to students; instilling students' confidence in their ability to utilize these skills can be difficult. Lack of confidence in literature evaluation skills can be problematic and has been cited as a barrier to the use of EBM.[3] To become proficient users of the literature, students need repeated opportunities to practice their appraisal skills. Instructors may struggle to provide these opportunities for two reasons. Firstly, intentionally designing learning activities that are repeated, yet still perceived as beneficial and engaging by students, is challenging. Secondly, facilitating learning activities with a large-sized class can be a daunting task for one instructor. Learner-centered approaches, such as utilizing a student response system during lecture,[4] including optional assignments,[5,6] and implementing self-reflection exercises[6] have been examined in drug literature evaluation courses. However, fewer approaches have been reported that focus on authentic application, repetition or the development of a breadth of literature evaluation skills.

Blommel and Abate[7] have addressed application of drug literature evaluation skills by focusing on thorough article reviews. During the development of a rubric to assess pharmacy students' ability to evaluate literature, it was found that student pharmacists were regularly missing key concepts when analyzing and critiquing an article. As a result, a list of questions was developed to help students identify areas to consider as they reviewed an article. Students noted the list of questions improved drug evaluation skills and journal club presentations.

In addition, Burkiewicz and Komperda[8] developed an approach to enhance students' skills through application. They developed an elective course on the evaluation of landmark clinical trials to advance students' literature evaluation skills and improve their application of this knowledge in clinical decision-making. Each student presented an overview of a landmark trial, including two to three examples of interpreting the results and explaining them to health care professionals or students. A post-course survey showed that students perceived an improved ability in determining clinical applicability of trial results and were more comfortable with statistical analysis of drug literature. A course offered at the University of New Mexico used an instructional model of three targeted scaffolds to improve drug literature evaluation. The first scaffold consisted of students reviewing a clinical trial using a standardized evaluation rubric. The second scaffold required students to identify two to three areas of content or vocabulary that were unclear followed by work in groups to discuss and improve understanding in these areas. The final scaffold was instructor-mediated class discussion, followed by student re-evaluation of the study. After completing the three scaffolds, students identified additional weaknesses and discussion points from the articles, while providing better support for their arguments. Unfortunately, students only evaluated one clinical trial and it is unknown whether the improvements in evaluation were due solely to the scaffolding.[9] These studies reported improvement in very focused and specific areas of drug literature evaluation, such as understanding randomization and intention-to-treat analysis.

An example of a classroom-based approach that exercises the diversity of literature evaluation skills, employs repetition, and uses authentic, application-oriented activities is needed. The aim of this work was to employ such an approach by designing and evaluating a series of educational interventions that progress in complexity and build student confidence in drug information and literature evaluation skills. Given the particular design of the college of pharmacy at the university program, it was important to design a series of exercises that would build literature evaluation skills and could be facilitated by one to two faculty members in a dual-campus curriculum using classrooms connected via live videoconferencing.

The series was designed to include two novel components to address some of the difficulties in teaching drug literature evaluation skills. First, this series was deliberately designed to provide students with an opportunity to lead a journal club discussion, focusing on facilitation skills. Elective courses have implemented journal club discussions, but these discussions have focused more on presenting information than facilitating discussion among peers.[8,10] In addition to its focus on facilitation, this initiative sought to design a journal club activity for a required course, conducted via live videoconferencing, using only one to two faculty members. Prior to this initiative, journal club activities were focused on the presentation of article review information and completed in small groups with many instructors serving as facilitators.

Second, the series was designed to pilot a different approach to student self-assessment ratings. While an important skill to build in student pharmacists, self-assessment is problematic.[11,12] In particular, prior to an educational intervention, students may rate themselves high, which may interfere with the ability to capture growth over time.[13,14] For example, when using a five-point strongly agree to strongly disagree system to rate confidence in a skill, students may rate themselves at the mid to high end not wanting to "disagree." However, when this occurs in a pre-measure, there is little ability to understand change in confidence over time; there is not much room for ratings to move up. A more descriptive rating system, acknowledging some presence of skill at all levels (e.g., novice–expert), may permit students to feel more comfortable rating themselves on the lower end of the scale and provide a better picture of growth over time. Therefore, this initiative