

"MORTAR & PESTLE" CONCORDIA UNIVERSITY WISCONSIN SCHOOL OF PHARMACY STUDENT WRITING CLUB:

# The Importance of Building Upon Critical Thinking in the Setting of Patient Care

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Critical thinking is an important skill for pharmacists and all members of the patient care team. To understand how vital critical thinking is, we need a comprehensive definition that applies to pharmacists and pharmacy students. One review defines critical thinking as “a purposeful and self-regulatory judgment which results in interpretation, analysis, evaluation and inference.”<sup>1</sup> Many other definitions exist, but most include key words like “interpretation,” “analysis,” “evaluation,” and “inference.” We highlight this particular definition because it applies to the daily activities of a pharmacist and a student during experiential education.

The four key components of critical thinking are interpretation, analysis, evaluation, and inference. Without pharmacists using these skills throughout their day, errors would negatively impact patients. An example of critical thinking in pharmacy is determining what medications a patient should receive, even if all online resources do not show a contraindication. In one instance, a pharmacist had received a new prescription for dextroamphetamine and amphetamine (Adderall®) extended-release to be taken at bedtime, along with the patient’s previous zolpidem (Ambien®) and morning dextroamphetamine and amphetamine (Adderall®) extended-release prescription. No online clinical resources showed a clinical contraindication between an extended-release stimulant taken twice a day and a sedative hypnotic taken at bedtime. The provider who sent the new prescription was adamant that the prescription be filled, and there were no documented contraindications to prevent this prescription from being filled. The

## Abstract

Critical thinking skills are vital in creating a safe and effective healthcare environment. Currently, there are very few studies that show how critical thinking is utilized in the patient care setting or the academic setting. The research that has been conducted shows a lack of examining critical thinking at the depth that it needs to be, especially in the medical field. Despite this, there are known benefits to critical thinking in healthcare, including improving profits, increasing the mental capabilities of employees, and bringing innovative ideas to a work environment. Some ways to teach critical thinking include having students debate, having students evaluate problems that do not have one definitive answer, and allowing students to be creative in their education. The best next steps include conducting studies on the amount of critical thinking pharmacists use and giving students the opportunity to foster and grow their critical thinking skills throughout experiential education.

pharmacist, while using critical thinking to evaluate potential harm to the patient, determined that adding on an extended-release stimulant later in the day was not beneficial to the patient. The patient already had trouble sleeping at night, and adding on another stimulant later in the day would not help the patient’s sleeping issues. Without this use of critical thinking, there likely would have been a downward spiral in the patient’s conditions. The act of critical thinking facilitated safe and effective healthcare. How is it possible to determine the importance of critical thinking skills and build upon the ones pharmacists are taught?

## Didactic Education

The first step for evaluating critical-thinking education is to determine the backbone of a core curriculum that is being taught to pharmacy students. It is important to assess whether pharmacy students’ classes will propel them to be



critical thinkers with every patient they interact with. The Accreditation Council for Pharmacy Education (ACPE) sets accreditation standards for all pharmacy schools. In its most recent accreditation standards from 2016, the organization lists the necessary classes needed and the student accomplishment standards for which schools must provide evidence.<sup>2</sup> Critical thinking is only mentioned once in these standards, under standard three. The standards include, “outcome data from assessments of student achievement of problem-solving and critical thinking capabilities.” ACPE also outlines specific classes that are necessary for a pharmacy school to become accredited. Most of the classes and requirements listed are built on basic pharmaceutical knowledge and knowledge of the healthcare system. There are very few classes focused on social and behavioral sciences, and no requirements on how to teach critical thinking to student pharmacists.

## Experiential Education

In addition to didactic learning, ACPE also focuses on experiential education, or introductory and advanced pharmacy practice experiences (APPEs). ACPE states, “APPE ensures that students have multiple opportunities to perform patient centered care and other activities in a variety of settings.”<sup>2</sup> ACPE also states, “APPE hones the practice skills, professional judgment, behaviors, attitudes and values, confidence, and sense of personal and professional responsibility required for each student to practice independently and collaboratively in an interprofessional, team-based care environment.” With experiential education (vs. in the classroom), there is a higher focus on building patient-centered skills, which can include critical thinking. One benefit to having an experiential curriculum is that students are often placed in uncomfortable situations and forced to think on their feet. Pharmacy students are forced to start using clinical judgment while also building relationships with other important members of the healthcare team. These aspects are what truly help foster critical thinking skills. Unfortunately, APPEs only occur in the last year of pharmacy school. There are opportunities to build critical thinking skills during introductory pharmacy practice experiences (IPPEs) throughout the first two years of school, but IPPEs are relatively

short in duration. Students may not have enough time through IPPEs, or they may not have enough clinical knowledge to build their critical thinking skills throughout this period, since it typically occurs earlier in the curriculum.

## Literature Review

Few studies have evaluated critical thinking in the healthcare setting regarding patient care (Table 1). One systematic review conducted by Brudvig and colleagues in 2013 sought to determine whether critical thinking skills in healthcare professionals changed after they participated in a professional healthcare program.<sup>3</sup> This review concluded that there were mixed results regarding whether healthcare workers could improve critical thinking after completing professional programs, based on the small number of studies that were conducted. The authors also mentioned that there are a limited number of high-quality studies in medical fields where patient care is the top priority. Critical thinking is an essential skill, and it is not currently being studied with an appropriate depth. Not being able to examine critical thinking as a skill gives us a lack of information about how often pharmacists use it to deliver competent patient care. Without examination, it is hard to know how well pharmacists are interpreting, analyzing,

evaluating, and inferring.

Another meta-analysis conducted by Reale and colleagues was able to show more development in how students in health professions were able to improve critical thinking skills.<sup>4</sup> According to the authors, critical thinking is part of foundational thinking, which starts with creating habits of mind. Habits of mind are traits that can be developed and used by critical and self-regulatory thinkers.<sup>5</sup> The goal of habits of mind is to help students learn on their own at any point in their life. Traits that fall into habits of mind include being open-minded, seeking clarity, restraining impulsivity, and being aware of one’s own thinking. After creating foundational thinking, you are able to build upon more clinical skills, such as problem-solving, clinical reasoning, moral reasoning, and meta-cognition.<sup>4</sup> With critical thinking, you are able to build upon clinical reasoning while also using moral reasoning. This combination of creating positive habits of mind and using higher-order thinking leads to a more intense focus on patient care. The authors concluded that while some educational programs seem to somewhat improve critical thinking, many of the successful applicants are already very good critical thinkers.<sup>4</sup> Without daily use and continuous building upon critical thinking skills, pharmacists may lose them. This meta-analysis determined that to

**TABLE 1. Summary of Literature Evaluating Critical Thinking in Health Professions**

<i>Study Conducted</i>	<i>Type of Study</i>	<i>Population</i>	<i>Intervention</i>	<i>Outcome</i>
<b>Brudvig<sup>3</sup></b>	Systematic Review	Nursing, physical therapy, occupational therapy, pharmacy, and medicine	California Critical Thinking Skills Test (CCTST) and Watson-Glaser Critical Thinking Appraisal (WGCTA)	Measurements of acquisition of critical thinking skills are scarce
<b>Reale<sup>4</sup></b>	Meta-analysis	79 studies containing 6884 students	CCTST, Defining Issues Test (DIT), Health Science Reasoning Test (HSRT)	The CCTST and DIT demonstrated significant increases in total scores, but the HSRT did not show improvement
<b>Persky<sup>6</sup></b>	Systematic Review	Pharmacy students	Types of interventions to help develop critical thinking skills	Developing skills requires a 4-step approach. The first step is learning the skills of critical thinking. The second step is developing a tendency to create a pattern of effortful thinking. The third step is directing the learner to activities to increase application and transfer of skills. The final step is making the critical thinking process visible by instructors.
<b>Walker<sup>8</sup></b>	Literature Review	MEDLINE and Educational Resources Information Center (ERIC) search from 1933 to 2002 for any literature related to critical thinking.	Exercises to promote critical thought	Thought develops with consistent practice and evaluation over time using multiple strategies, and faculty should be aware of course goals and learning objectives to promote higher order thinking.

help good critical thinkers become great critical thinkers, each school would need to increase financial and human resources. Increasing those already-finite resources is not a possibility for most schools. Instead, this meta-analysis focused on creating admissions tests that would sort out critical thinking abilities. The authors concluded that educational resources may be prioritized better in helping learners improve problem solving and moral reasoning, and vetting only candidates that have a high tendency to critically think.

One last study conducted by Persky and colleagues demonstrated the impact of barriers and sought to provide evidence-based recommendations to encourage the use and development of critical thinking, specifically in pharmacy students.<sup>6</sup> This study determined that critical thinking skills are not fixed; they can always be developed and grown. Persky and colleagues determined that critical thinking skills can be developed by attitude alignment, absorption of knowledge, learning new thinking skills, and learning to combat roadblocks such as bias. One of the key ways to grow critical thinking skills is to have a growth mindset, which is a difficult concept to teach.

## Implications for Practice

Before determining the next steps for pharmacists and pharmacy students, the benefits of critical thinking need to be outlined. The Department of Education produced a text in 2014 to show all benefits of critical thinking, specifically in the workplace.<sup>7</sup> Using critical thinking skills helps to limit biases that are potentiated by close-minded thinking. Critical thinking encourages every employee to weigh all viable options in a certain situation and pick the best one. Critical thinking can also improve profits in a workplace and increase the mental capabilities of employees. It causes employees to improve culture between themselves and their upper management. Another benefit of critical thinking is that it often brings innovative ideas and processes to a work environment. Critical thinking is also a vital skill during the current age of artificial intelligence. It will help healthcare workers, especially pharmacists, stand out and in their healthcare settings. In summary, increasing critical thinking in the workplace

can improve workflow and increase deeper thinking about issues and current workplace culture.

The next crucial step is to incorporate critical thinking into APPEs and IPPEs for all pharmacy students. A study by Walker in 2003 outlined ways to teach critical thinking.<sup>8</sup> One important method is to introduce students to various ways of teaching, and help students understand that there may be more than one answer to each problem. Another way to increase critical thinking is to incorporate higher-level thinking questions that use key words like “explain,” “compare,” or “why.” These questions cause students to think at a higher level and build upon critical thinking skills. While asking these questions, it is important to give students adequate time to promote thinking. Discussion and debate are also important, because they help students to examine other reasoning processes. Ethical issues are one of the best ways to promote critical thinking, because it is understood that there is no “correct” answer, and each student needs to have reasoning behind each answer. This causes thought and understanding to flourish, which is the best way to increase critical thinking. Creativity is another segue into critical thinking. When a student is allowed to write creatively, they can open their mind to other ideas and promote their own critical thinking. All these options can also be utilized by experiential preceptors in the patient care setting.

## Conclusion

Although there are many steps to take to improve critical thinking, it can be accomplished. The first step is to conduct more studies on the use of critical thinking skills and the benefits to patients, including normal usage by pharmacists in daily practice. Student pharmacists should be given more opportunities to problem solve, debate, and evaluate issues, especially with their preceptors while on experiential rotation.

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