

TEACHERS' TOPICS

An Interdisciplinary Collaboration to Improve Critical Thinking Among Pharmacy Students

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This interdisciplinary teaching collaboration allowed students to develop effective critical thinking and collaborative problem-solving skills and to learn parallel thinking concepts and techniques and apply these to ethical dilemmas faced in pharmacy. P-4 pharmacy students participated in a 3-hour session that focused on Edward de Bono's Six Thinking Hats Method for critical thinking. Students were assigned to teams and ethical dilemmas were assigned to each team. Each team was required to agree upon a solution for each dilemma. The students' approaches were examined before and after learning the Six Thinking Hats Method. Unstructured problem-solving approaches emphasized information gathering and brainstorming. The Six Thinking Hats Method provided a structure so groups would evaluate benefits and risks associated with proposed solutions to the dilemmas. The Six Thinking Hats Method provided a structure for group problem solving and provided a useful approach to ethical dilemmas confronted in pharmacy.

Keywords: interdisciplinary education, critical thinking, ethics

INTRODUCTION

As educators, we value the importance of bringing fresh and different perspectives to our work with students. As pharmacy educators, we recognize and value the importance of interdisciplinary collaboration throughout our curriculum. This value of interdisciplinary collaboration was recognized in the American Association of Colleges of Pharmacy's (AACP's) Strategic Plan, approved by the House of Delegates in July 2004,¹ and further emphasized by the AACP President in the Incoming President's Address at the 2004 AACP Annual Meeting.²

As educators and colleagues from 2 different disciplines, pharmacy practice and psychology, we have come to appreciate that using different conceptual lenses when viewing our work allows us to see our respective disciplines more clearly; furthermore, we have come to appreciate that such collaboration can inform the teaching-learning process. In fact, we often find ourselves comparing and contrasting our observations about classroom pedagogy. And through discussions about classroom pedagogy, we noted a common need for the promotion of critical thinking in our students. It is this area of mutual interest that served as the impetus for this collaboration.

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Recently, much has been written about fostering critical thinking skills in college students.^{3,4} Much of this attention is owed to the recognition that critical thinking skills are of increasing importance to one's ability to adapt to an ever-changing and information-rich environment.⁵ Indeed, a review of objectives at both program and course levels, regardless of discipline, will most likely include an expected outcome for students in this area. This is especially true in the practice of pharmacy where pharmacists are often faced with practice-based problems and difficult decisions associated with these problems. Using a systematic approach to such complex circumstances could afford more carefully thought-out solutions.

Definitions for critical thinking may vary. However, they most often place emphasis on, for example, the ability to analyze arguments; draw logical conclusions from evidence; generate alternatives and consider their consequences; identify appropriate courses of action; formulate effective problem-solving strategies; and so forth. Of primary importance for this effort, was to identify what instructional method would be most likely to promote such critical thinking abilities. A particularly useful method in this regard is Edward de Bono's *Six Thinking Hats* described below. The author suggests that critical thinking skills can be explicitly taught.⁶

While there are many approaches to teaching critical thinking skills, we especially like the *Six Thinking Hats* approach.⁶ While many of the approaches to developing

critical thinking skills are indirect, de Bono says in his approach, that critical thinking is a skill that can be directly taught. Also, the *Six Thinking Hats* approach is a fairly concrete one because of the use of metaphor (ie, colored hats as metaphors to describe different kinds of thinking). Briefly described, the 6 hats used by de Bono are as follows: (1) blue hat: thinking about thinking (metacognition); (2) white hat: information, data, facts; (3) red hat: feelings, hunches; (4) yellow hat: benefits, values, positives; (5) black hat: cautions, risks, negatives; (6) green hat: creativity, ideas, possibilities.

The Six Thinking Hats Method has come to be widely recognized as useful with applications ranging from K-12 education to corporate board rooms. We believed this approach would be especially helpful to our fourth-professional year (P-4) pharmacy students as they confront ethical dilemmas faced by pharmacists because this approach relates to needs of the students. We also believed that application of the principles of parallel thinking advocated by de Bono would be useful to ensure that students learn to approach ethical problems from shared perspectives.

The interdisciplinary collaboration described in this article involved students in a 1-credit hour jurisprudence and ethics in pharmacy course required for P-4 pharmacy students. The purpose of the course is to provide students with a review of federal, state, and local drug laws. The course also provides for review and application of ethical principles associated with the practice of pharmacy. Specifically, this collaboration encouraged students to develop effective critical thinking skills, develop effective collaborative problem-solving skills, and learn parallel thinking concepts and techniques, and to apply these to ethical dilemmas faced in pharmacy.

DESIGN

The participants included 37 students (22 females and 15 males) enrolled in PHPR 8260, *Jurisprudence and Ethics for Pharmacy*. The students took part in the activities described herein as part of a planned course experience. The basic design provided for pre- and post-analysis of a 3-stage approach. Students were randomly assigned to 8 groups, each of which consisted of 4-5 members.

In the first stage, groups engaged in an unstructured problem-solving task (problem-solving task 1) and each group was instructed to document all group activities associated with problem solving. At the conclusion of this task, students individually completed a questionnaire to assess their perceptions of the quality of their group's activities. In the second stage, the class was introduced to de Bono's Six Thinking Hats Method and

provided with a problem-solving sequence (generated by *TurboThink* software, *Advanced Practical Thinking Training Release 2.0.6*, The McQuaig Group, Inc, DesMoines, Iowa 2004). In the third stage, groups actually employed the Six Thinking Hats Method in a problem-solving task (Problem-Solving Task 2) and each group was instructed to again document all group activities. Individual students then completed a second group evaluation questionnaire.

The design provided an opportunity for groups to share their solutions to the problems with the class at 2 separate times, immediately following Task 1 and Task 2. Individual student comments were collected at the end of the session and the content analyzed to determine the types of critical thinking used (as defined by de Bono). Additionally, at the end of the semester, students were asked to provide their personal definitions of critical thinking. Data were analyzed using *SPSS 11.5.0*.

Problem-Solving Task 1. You are a chain community pharmacist and you have been working at your current location for 5 years. You have good rapport with the neighboring doctors' offices. A nurse from one of the neighboring doctors' offices telephones your pharmacy at 8:30 PM on a Friday night. Your pharmacy closes at 9:00 PM. The nurse is requesting that you fill an emergency prescription for a C-II pain medication morphine sulfate. In the course of the conversation, the nurse informs you that the patient is bedridden, has cancer, and is in a lot of pain and really needs the medication. Furthermore, she states that the physician is not available, nor is the physician who is "on call" available. How will you respond?

Problem-Solving Task 2. You're a new graduate! Your first position is as a staff pharmacist working in a chain community pharmacy. Eight technicians and 3 interns are also employed at this pharmacy. All of the pharmacists, technicians, and interns were hired by the pharmacy manager and report to the pharmacy manager. You have been working at this pharmacy for 3 weeks. The pharmacy manager is well liked by the patients; however, you recognize that he is very strict with the pharmacy technicians. One night you are working with one of the technicians named Joanne. Joanne has worked at this pharmacy for 2 years. Joanne tells you that she saw the pharmacy manager remove prescription medication from the pharmacy shelf for personal use without a prescription. She thought the drug taken was Tylenol #3. How will you respond?

RESULTS

Students' responses to questions about their individual experiences with the group problem-solving processes and ultimate decision, as well as how well they worked

Table 1. Comparison of Students' Perceptions of Group Performance in Problem Solving Using an Unstructured Approach vs a Structured Approach

Item	Mean* (SD) N = 37		
	Unstructured Approach	Structured Approach [†]	Mean Difference
The members of my group worked on the assigned task in a collegial manner	4.97 (0.16)	4.94 (0.23)	0.03
The members of my group were interested and involved in the assigned task	4.84 (0.44)	4.62 (0.76)	0.22
The members of my group were respectful of the ideas and opinions of others	5.00 (0.00)	4.95 (0.23)	0.05
My group worked in an efficient and task-oriented manner	4.95 (0.23)	4.93 (0.28)	0.02
My group was able to define the problem accurately and completely	4.97 (0.16)	4.84 (0.44)	0.13
The conclusion/solution reached by my group is consistent with my personal conclusion/solution	5.00 (0.00)	4.89 (0.32)	0.11 [†]

*Questionnaire scale: 1 (strongly disagree), 2 (disagree), 3 (neutral), 4 (agree), 5 (strongly agree)

[†] Based on the Six Thinking Hats Method from the book, *Six Thinking Hats*⁶

p<0.05

Table 2. Comparison of Student Thinking Activities Using an Unstructured Approach vs. a Structured Approach

Hat Color	Thinking Activity	Unstructured Approach % n = 37	Structured Approach*% n = 37
Blue	Metacognition	7	14
White	Fact finding	60	27
Red	Affective response	5	0
Yellow	Evaluation of benefits	1	17
Black	Evaluation of risks	6	18
Green	Brainstorming	22	22

*Based on the Six Thinking Hats Method from the book, *Six Thinking Hats*⁶

with their groups, were positive whether they were using an unstructured method or the Six Thinking Hats Method. However, a significant difference was observed in the responses for unstructured approach vs. the Six Thinking Hats Method with an item about how well students' individual solutions compared with their groups' solutions (Table 1); individual student solutions were less consistent with the group solutions with the Six Thinking Hats Method. When using the Six Thinking Hats Method, the groups were required to evaluate the benefits and risks of their proposed solutions. This evaluative step was rarely used in the unstructured approaches (Table 2).

Findings were mixed with respect to students' recognition of the value of this particular model. Students' opinions about the Six Thinking Hats Method were almost evenly divided 3 ways: the exercise was not needed; the exercise was needed, but earlier in their program of study; and the exercise was useful in their present situation.

Students believed they had already established strong group relationships with their classmates because they have been together for 6 years. Thus, the full value of this method might not be recognized until the students are in a different setting with less familiar colleagues. Qualitative examination of the groups' activities for the unstructured approach suggests some groups may have intuitively incorporated some of the thinking principles included in the Six Thinking Hats Method. Unstructured problem-solving approaches emphasized information gathering and brainstorming, while the Six Thinking Hats Method included more emphasis on critical reflection of possible options for benefits and risks associated with each alternative.

While students believe they are good critical thinkers, the data suggest that they may overestimate their ability to apply critical thinking skills to real-world problems. Conceivably, this model may be more useful if included earlier in their professional education.

SUMMARY

In this article, we have described an interdisciplinary collaborative effort between a professor of pharmacy practice and a professor of psychology to enhance the critical thinking skills of P4 pharmacy students enrolled in a jurisprudence and ethics course.

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