UF College of Pharmacy
UNIVERSITY of FLORIDA

Problem-Solving Skill Development for Solving Pharmaceutics Problems and for The Pharmacists' Patient Care Process

Cary Mobley , R.Ph., Ph.D.* and Robin Moorman-Li, Pharm. D.**

*Pharmaceutics Department   **Department of Pharmacotherapy and Translational Research

Background

The American Council on Pharmaceutical Education Standard 3.1 states that "the graduate is able to identify problems; explore and prioritize potential strategies; and design, implement, and evaluate a viable solution"

To meet this standard, we designed and implemented a problem-solving training program for students to engage in team-based problem-solving exercises.

Ill-structured problems were the primary types of problems chosen for skill development, as they represent the types of problems often encountered by pharmacists, including patient care problems. Ill-structured problems tend to exhibit the following properties:

- Information about the existing problem state is unknown, so must be gathered and evaluated to best understand the problem.
- They have no immediately obvious solution, so potential solutions must be generated and evaluated to select the best one to achieve the goal state for problem resolution.

Effective problem solving depends on good knowledge, reasoning, and critical thinking and can often benefit from a systematic process that generally follows the pattern of identifying and understanding the problem, then choosing, implementing and monitoring solutions to the problem.

There are several systematic approaches. We developed an approach called DRAM (Define, Resolve, Act, Monitor) and implemented it various courses in the first-year of our curriculum. This work describes its implementation in a Drug Delivery (Pharmaceutics) course where it was applied in three team-based problem-solving sessions.

Additionally, owing to its similarity to the Pharmacists' Patient Care Process (PPCP), the application of DRAM in the first three-sessions was used as preparation for applying the PPCP in the fourth and final problem-solving session of the course.
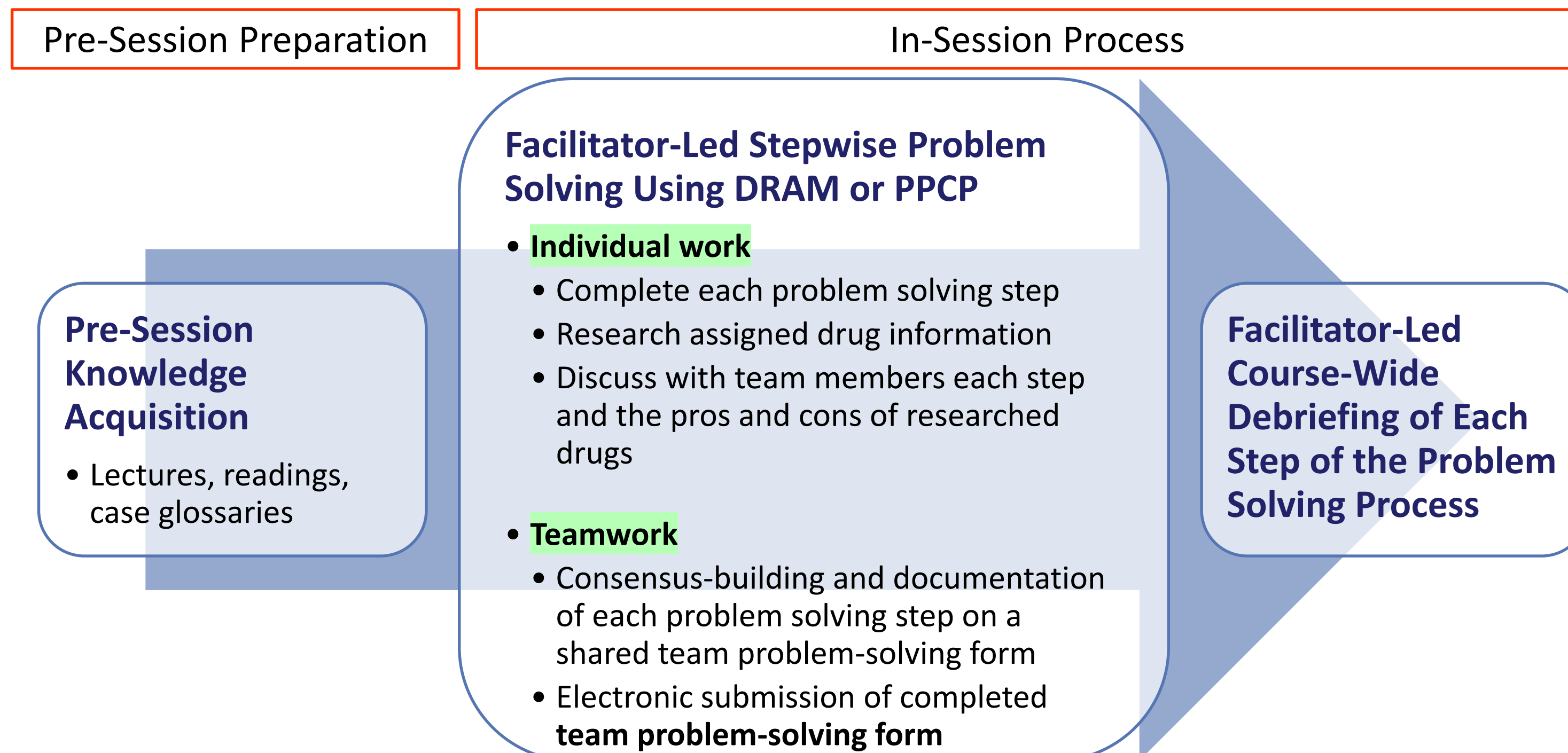
DRAM	PPCP	General Descriptions of Steps
Define	Collect	Collect, evaluate, and provided a summary assessment of factors that contribute to and define the problems
	Assess	
Resolve	Plan	Define the goals for resolution of problems, and generate and select strategies to achieve the goals
Argument	Rationale	Describe reasoning for how the recommended strategies will achieve goals for problem resolution
Act	Implement	Generate and describe the action steps for the plan, including communication
Monitor	Follow-Up	Generate and describe the plan for monitoring effectiveness of the strategies

Course Description and Methods

- Drug Delivery Systems – 4 cr, 10 weeks, 1st semester
- "Flipped" classroom style: All lectures recorded and watched prior to the problem solving sessions
- Problem-solving sessions
  - Four sessions, 2.5 – 3 hr each, spread 2 weeks apart
  - Synchronous sessions across 3 campuses, facilitated independently using a facilitator's guide
  - Students in teams of 5-7 students seated around tables for solving the problems using team-based problem-solving

Problem-Solving Session Flow

Pre-Session Preparation	In-Session Process

Pre-Session Knowledge Acquisition
- Lectures, readings, case glossaries

Facilitator-Led Stepwise Problem Solving Using DRAM or PPCP
- Individual work
  - Complete each problem solving step
  - Research assigned drug information
  - Discuss with team members each step and the pros and cons of researched drugs
- Teamwork
  - Consensus-building and documentation of each problem solving step on a shared team problem-solving form
  - Electronic submission of completed team problem-solving form

Facilitator-Led Course-Wide Debriefing of Each Step of the Problem Solving Process

The Pharmaceutics Problems To Be Solved

Problem Solving Session and Problem		Description of Problem
Session 1: Moving Drugs Through the Approval Pipeline	DRAM	Determine the best of 6 model drugs for Parkinson's Disease Psychosis for an NDA, based on physicochemical properties, then the best Expedited Approval Process based on preliminary clinical results.
Session 2: Helping an Elderly Dysphagia Patient with Her Medications		Determine the best drug delivery related approaches to help an elderly dysphagia patient continue with her oral medications.
Session 3: Helping a Patient With Dysphagia and a Gastrostomy Remain Compliant With Her Medications		Determine the best drug delivery related approaches to help an elderly dysphagia patient with a gastrostomy continue with her medications.
Session 4: Helping a COPD Patient With His Inhaled Medications and Smoking Problem	PPCP	Determine the best pulmonary dosage forms for a patient with COPD and the best OTC products to recommend for smoking cessation.

Team Problem-Solving Forms*
(Completed and submitted electronically)

DRAM

(1) Initial Problem Statement (a concise initial statement of the problem)	Team Members:			(2) Initial GOAL Statement	Team Number:	Date:
(3) Problem Contributing Factors and Causes:	(5) SMART Goals		(7) Argument for Selected Strategies:			
	(6) Solution Strategies		(8) Plan/Monitoring/Follow up:			
(4) Comprehensive Problem Definition:						

PPCP

Team Members:
Team Number:
Date:
Chief Complaint

Just-In-Time Guidance	(1) Collect:
	(2) Assess:
	(3) Plan
	Goals of Therapy
	Therapeutic Alternatives
	Rationale
	(4) Implement
	(5) Follow-up: Monitor and Evaluate

* Note: The forms provided to the students had additional elements:

- Just-In-Time Guidance for each of the problem-solving steps
- Partial Completion: This was to scaffold the problem-solving skill development, whereby certain portions were completed or partially completed to provided examples in early sessions. In later sessions, the "scaffolding" was removed and students completed certain steps without the guidance of examples.

Results

Teams successfully completed each step of the problem-solving process in each session. For the third, and least scaffolded session, the most common error made was inadequate contributing factor identification. For the subsequent PPCP-based session, contributing factor identification (in Collect) improved, and the most common deficit was with the Assess phase.

Implications

Through the application of this problem-solving process, students developed team-based problem-solving skills that were successfully applied to solving ill-structured pharmaceutics problems and that are valuable for patient problem-solving using the Pharmacists' Patient Care Process.