



**OBJECTIVE**

- To evaluate students' perceptions of the redesigned pharmacotherapy recitation course with the inclusion of integrated case-based learning (iCBL) activities to promote student learning

**BACKGROUND**

- The LECOM School of Pharmacy delivers an integrated, Medicinal Chemistry, Pharmacology and Pharmacotherapy (MC-PCoL-PT) lecture-based course series
- A PT Recitation course that uses active learning methods to engage students is provided parallel to the integrated lecture series
- iCBL activities merging material from MC-PCoL-PT have been added to the PT Recitation course to promote higher level learning in students
- The goal of this series is, to prepare students for clinical practice through the use of integrated clinical cases that link theory to practice, through the application of knowledge using inquiry-based learning methods

**CASES**

1. FG is a morbidly obese patient with recurrent cellulitis of the arm that is known to be sensitive to 3rd generation cephalosporins. The patient is currently on ceftriaxone, but the physician would like to transition him to an oral 3rd generation cephalosporin for outpatient treatment. The physician approaches you and asks for your expertise because he would like a drug with high lipid solubility to ensure that this patient is getting appropriate drug concentrations. Which of the oral cephalosporins would you recommend for this patient?

- A. Cefdinir B. Cefpodoxime C. Ceftazidime D. Cefepime E. Cefixime

**MC-PCoL-PT concepts incorporated**

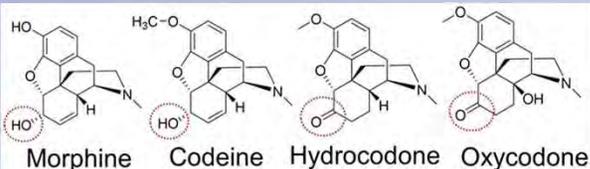
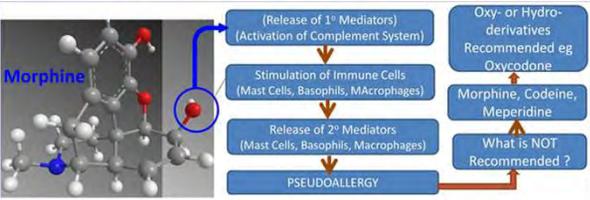
- Bulky Group-Lipophilic, Oral Prodrug, cephalosporin generations, spectrum of activity, beta-lactamase resistance, IC50 values

2. AJ is a 60 YOF admitted to the ICU following multiple surgeries following a motor vehicle accident (MVA). AJ is prescribed a morphine PCA pump and you recognize that she has a codeine allergy that concerns you. You ask AJ what happens when she takes codeine and she tells you that she experiences severe itching and nausea.

- Is this considered a true allergy? What is AJ experiencing and why?
- Is morphine a good choice for this patient? Why or why not? If not, what other medication might you recommend for use with a PCA pump instead?

**MC-PCoL-PT concepts incorporated**

- 6-hydroxyl group, immune system activation, side effects (e.g., histamine release), natural versus synthetic opioids



**METHODS**

- A 12-item anonymous survey instrument was developed to evaluate the students' perceptions and impact of the iCBL activities on their higher order thinking and other benefits and administered using [www.socrative.com](http://www.socrative.com) Pro
- The survey was conducted for the class of 2018 (P4s) and class of 2019 (P3s) from both Florida (FL) and Distance Education (DE) pathways
- To assess perceptions of short-term benefits, the survey was administered to the P3s immediately following the iCBL activities and to assess perceptions of long-term benefits the same survey was administered to the P4s approximately one year after the same iCBL activity was administered
- Primary outcome:** Student perceptions of short & long term benefits of iCBL on Bloom's Taxonomy of learning
- Secondary outcome:** Student perceptions of overall short-term (P3s) and long-term (P4s) course-specific benefits of iCBL activities

**RESULTS**

Figure 1: Student perceptions (P3s and P4s) of how iCBL activities affect their Bloom's Taxonomy of learning and other course-specific benefits

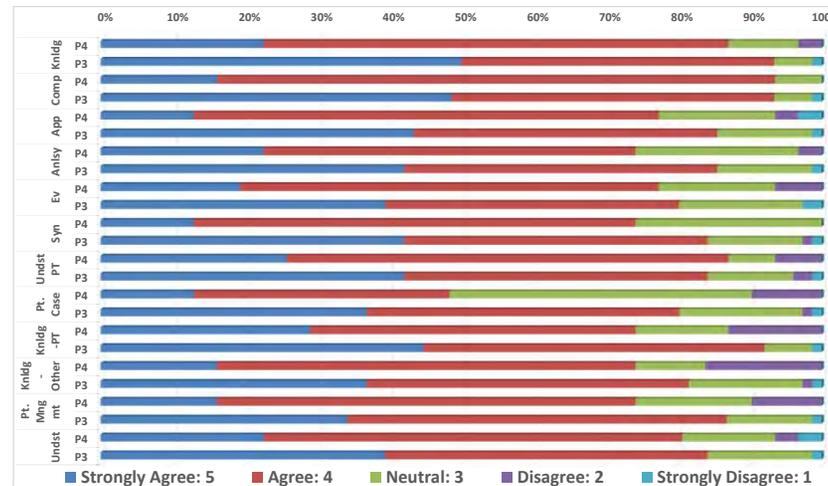


Table 1: Mean student response scores and differences between P3 and P4 students' perceptions

Pain Management iCBL Activity	Mean Responses (SD)		p value
	FL & DE P4s (N=31)	FL & DE P3s (N=76)	
iCBL contributed to my <b>KNOWLEDGE</b> (Ability to recall information)	4.06 (0.68)	4.41 (0.72)	<b>0.0224*</b>
iCBL contributed to my <b>COMPREHENSION</b> (Ability to understand information)	4.10 (0.47)	4.39 (0.71)	<b>0.0389*</b>
iCBL contributed to my <b>APPLICATION</b> (Ability to apply information to a patient case)	3.81 (0.83)	4.26 (0.79)	<b>0.0097*</b>
iCBL contributed to my <b>ANALYSIS</b> (Development of critical thinking skills)	3.94 (0.77)	4.26 (0.79)	0.0583
iCBL contributed to my <b>EVALUATION</b> (Ability to answer quiz or exam questions)	3.89 (0.79)	4.15 (0.88)	0.1567
iCBL contributed to my <b>SYNTHESIS</b> (Ability to put parts together to form a new whole)	3.87 (0.62)	4.22 (0.82)	<b>0.0348*</b>
I believe iCBL was more <b>beneficial in my understanding</b> of the integrated topics compared to other non-integrated activities	4.06 (0.77)	4.21 (0.84)	0.3930
I believe iCBL contributed to my <b>ability to create new patient case scenarios</b> related to the integrated topics	3.50 (0.85)	4.13 (0.83)	<b>0.0006*</b>
I believe iCBL strengthened my <b>knowledge of pharmacotherapeutics</b>	3.90 (0.98)	4.34 (0.72)	<b>0.0115*</b>
I believe iCBL strengthened my <b>knowledge of courses other than pharmacotherapeutics</b>	3.74 (0.93)	4.14 (0.82)	<b>0.0299*</b>
I believe iCBL made me feel <b>more confident in applying this material to managing a patient's therapy</b>	3.79 (0.83)	4.19 (0.74)	<b>0.0160*</b>
I believe iCBL made it <b>easier for me to understand this material</b>	3.92 (0.90)	4.21 (0.79)	0.1012

NOTE: The wording of the original survey questions has been condensed for formatting purposes

**DISCUSSIONS**

- 85% of all students (P3s and P4s) surveyed reported agreement or strong agreement regarding iCBL activities in improving all six Bloom's taxonomy of learning (Figure 1)
- 81% of all students (P3s and P4s) surveyed reported agreement or strong agreement with course specific benefits of iCBL activities (Figure 1)
- Overall, the mean response for P3s was higher for each question compared to P4s, which could indicate that P3s had a higher perceived benefit in the short term compared to the long-term perception of P4s (Table 1)
- The mean response on **knowledge, comprehension, application, and synthesis** levels of Bloom's taxonomy of learning was **significantly higher** for P3s (e.g., **short-term impact**) compared to P4s (e.g., **long-term impact**)
- The mean response on **analysis and evaluation** levels of Bloom's taxonomy of learning were **not significantly different** between P3s and P4s (e.g., **same long-term impact**)
- The greatest perceived benefit among all students was **improved ability to comprehend information** being taught through iCBL activities
- The least perceived benefit among all students was **contribution to ability to create new patient case scenarios** (this may be due to the P3s having opportunities to create new patient case scenarios that were not available to P4s the year before)
- Interestingly, P3s reported a significantly higher mean response to feeling more confident in managing patient therapy compared to P4s
- The overall results indicate that P3s were more receptive to the idea of iCBL compared to P4s suggesting these activities may have a greater short term benefits and impact on learning
- The overall lower mean responses for the P4s may also suggest that the students may not be able to precisely identify or recall the impact and benefits of the iCBL activities that they had participated in the year before

**LIMITATIONS**

- P3s did not have the opportunity to apply information on APPE rotations when the survey was conducted, which may have impacted their perceived benefit
- There were fewer P4s who participated in the survey (possibly because they were on APPE rotations)

**CONCLUSIONS**

- Overall, results suggest that students have a positive view of iCBL activities
- iCBL activities demonstrated a greater short-term impact on student perception of Bloom's taxonomy of learning and course-specific benefits
- The current pilot of iCBL activities are being modified based on the student feedback presented in this poster and additional MC-PCoL-PT topics including cardiovascular disorders and neurological disorders are now being included as iCBL activities
- Plans are being developed to include topics from other courses such as Calculations, Pharmacokinetics and Compounding in iCBL activities

**DISCLOSURES**

- The authors of this poster have no disclosures to report

**REFERENCES**

1) Mohammed A. Islam MA, Teresa A. Schweiger, J Pharm. Pract. 2015 Apr; 28(2): 220-6 doi: 10.1177/0897190014544821. Epub 2014 Aug 11.  
2) Timothy J. Ives, Kimberly H. Deloatch and Khalid S. Ishaq; AJPE Vol. 62, Winter 1998