

INTRODUCTION

- Student pharmacists are tasked with learning an overwhelming amount of infectious diseases (ID) material to be prepared for practice^{1,2}
- One approach to improve learning and retention of ID material is the utilization of quizzes or test-enhanced learning
- Previous studies have shown that quizzes can be used as both formative tools to enhance learning and summative tools when designed appropriately^{3,4}

OBJECTIVE

- Describe the implementation of quizzes in an ID pharmacotherapy course
 - Primary endpoint: determine whether the number of practice quiz attempts differed between students who met competency versus those students who did not meet competency for each assessment
 - Secondary endpoint: assess the utility of the practice quizzes on perceived student performance

METHODS

- Practice quizzes were created for Pharmacotherapy IV (required didactic course, 4 credits, offered during fall of the 3rd professional year)
- All students enrolled in Pharmacotherapy IV during 2021 were eligible to participate in both the practice quizzes and the survey
- Course content includes predominately ID with liver disease and oncology
- Course structure utilizes an active-learning, flipped classroom model
- Practice quizzes:
 - Objective based and contained ~5 questions per quiz of varying type
 - Available on learning management system throughout the semester
 - Optional with unlimited attempts - did not contribute to overall course grade
- Survey instrument was developed using Qualtrics and offered twice
 - 1st survey released after the first examination (mid-point of the semester)
 - 2nd survey released after the second examination (end of the semester)

Test-Enhanced Learning Benefits Can be Seen in Low-Stakes Settings

RESULTS

Figure 2: Student Attempts per Quiz and Average Attempts per Student

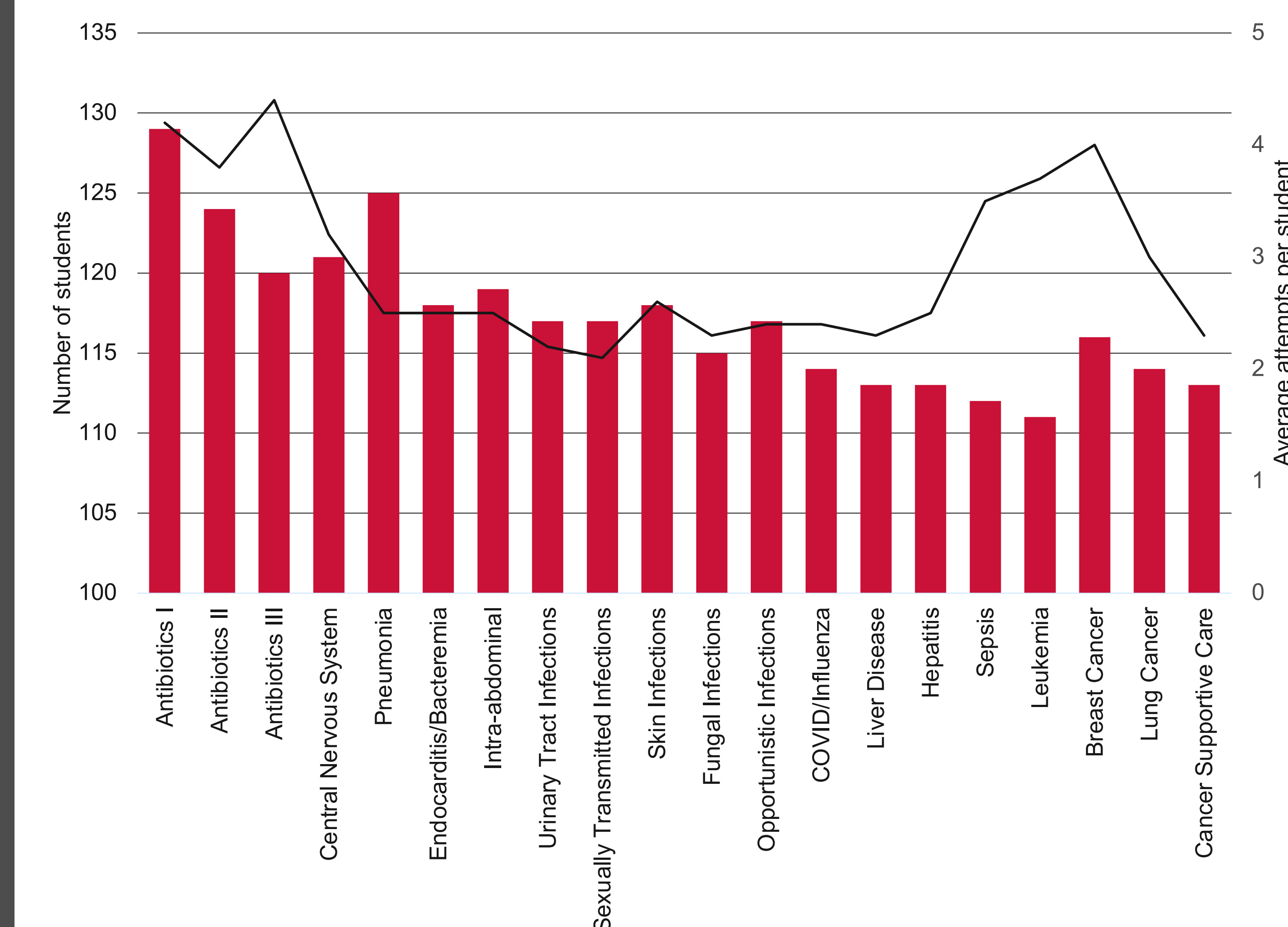
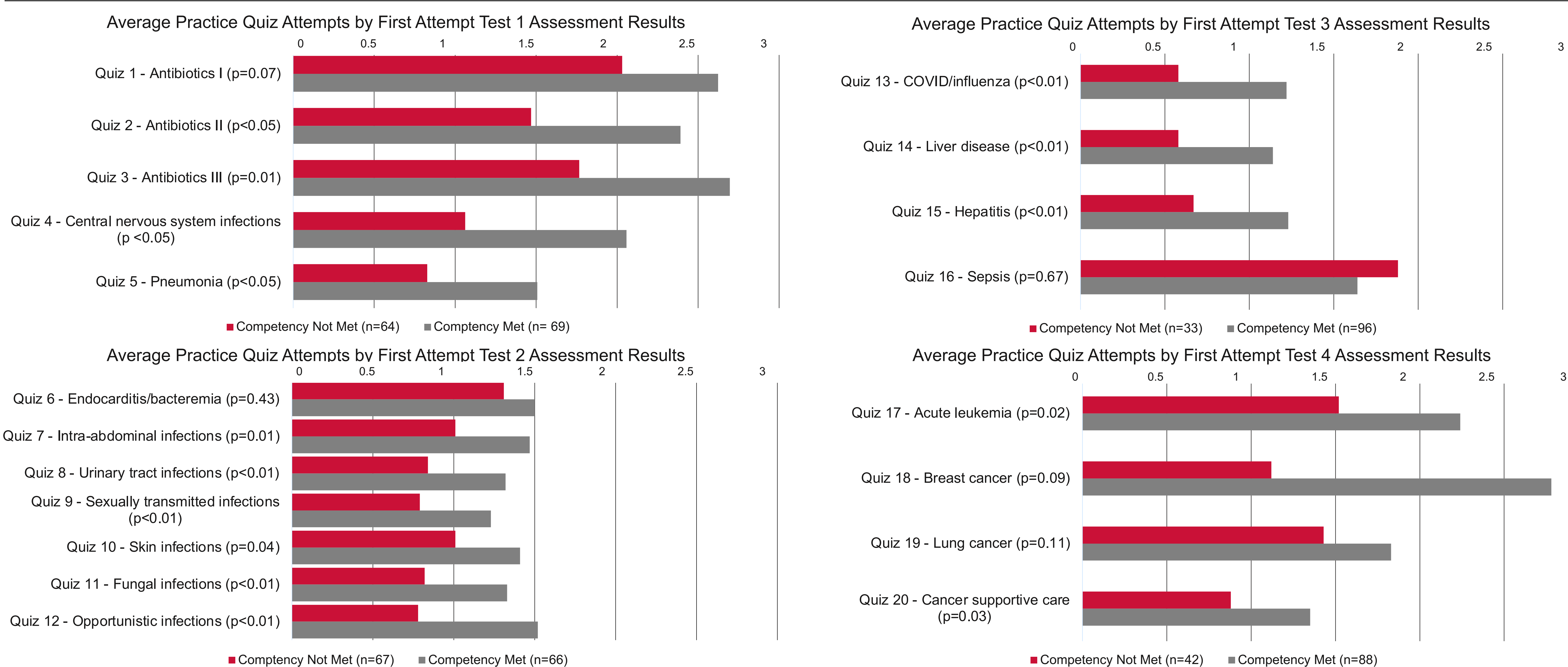


Table 1: Student Responses to Likert-Scale Survey Questions

Question	Survey	Strongly Agree N (%)	Agree N (%)	Neutral N (%)	Disagree N (%)	Strongly Disagree N (%)	p-value
After taking the practice quizzes, I studied differently for the exam.	Mid-point	35 (38%)	35 (38%)	14 (15%)	7 (8%)	1 (1%)	0.23
	End	21 (38%)	27 (48%)	7 (13%)	1 (2%)	0 (0%)	
I feel that the taking practice quizzes enhanced my performance on examinations.	Mid-point	57 (62%)	28 (30%)	5 (5%)	2 (2%)	0 (0%)	0.77
	End	36 (64%)	14 (25%)	4 (7%)	1 (2%)	1 (2%)	
I had more confidence in my ability to take the examination after the practice quizzes.	Mid-point	51 (55%)	32 (35%)	7 (8%)	1 (1%)	1 (1%)	0.64
	End	30 (54%)	20 (36%)	3 (5%)	2 (4%)	1 (2%)	
The practice quizzes accurately reflected materials tested for on the examination.	Mid-point	29 (32%)	38 (41%)	11 (12%)	10 (11%)	4 (4%)	0.08
	End	27 (48%)	16 (29%)	9 (16%)	3 (5%)	1 (2%)	
I would recommend other students take the practice quizzes in the future.	Mid-point	69 (75%)	20 (22%)	3 (3%)	0 (0%)	0 (0%)	0.24
	End	40 (71%)	11 (20%)	3 (5%)	1 (2%)	1 (2%)	
If available, I will continue to utilize practice quizzes in the future.	Mid-point	81 (88%)	9 (10%)	1 (1%)	1 (1%)	0 (0%)	0.44
	End	46 (82%)	8 (14%)	2 (4%)	0 (0%)	0 (0%)	
I believe more courses should offer practice quizzes	Mid-point	89 (97%)	2 (2%)	1 (1%)	0 (0%)	0 (0%)	0.08
	End	49 (88%)	5 (9%)	2 (4%)	0 (0%)	0 (0%)	
Practices quizzes should continue to be offered in Pharmacotherapy 554	Mid-point	86 (93%)	4 (4%)	2 (2%)	0 (0%)	0 (0%)	0.07
	End	46 (82%)	7 (13%)	2 (4%)	1 (2%)	0 (0%)	

RESULTS

Figure 1: Average Number of Quiz Attempts Organized by Student Competency on Each Test



REFERENCES

1. Gallagher, JC. et al. Am J Pharm Ed. 2018; 82(6): 6770.
2. Zorek, JA. et al. Am J Pharm Ed. 2010; 74(8):157.
3. Larson, DP. et al. Med Edu. 2008; 42(10): 959-966.
4. Gleason, BL. et al. Am J Pharm Ed. 2011; 75(9): article 186.