

Atypical use of audience response system provides opportunity to formatively assess faculty teaching and improve learning outcomes

Mari Hopper, PhD¹, Megan Carroll¹, Serena Wright¹, Erich Bauer², W. Graham Carlos, MD²
 Indiana University School of Medicine-Evansville¹ & Indianapolis² Indiana



ABSTRACT

In response to curricular reform, a particularly effective new approach was developed for a course offered at all nine IUSM centers. Participants will learn about interdisciplinary planning, implementation of a "Grand Rounds" approach, novel use of audience response system for retrieval practice and formative assessment of teaching methods, and how Bloom scale ratings relate to student engagement and focus.

INTRODUCTION

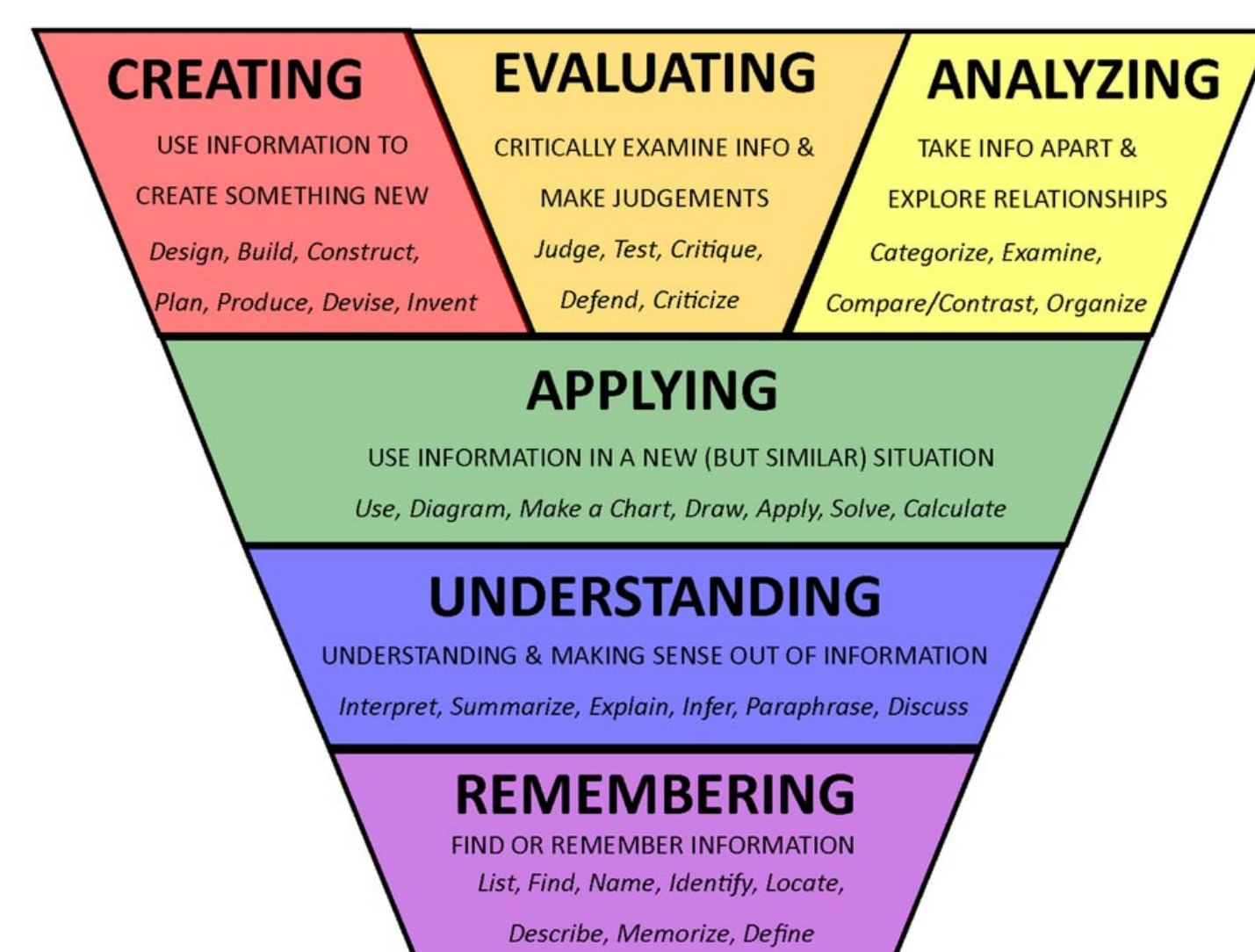
- First year implementing "reformed" curriculum
 - COMPARABILITY throughout all 9 IUSM campus centers
 - minimum of 50% active, non- didactic

Liaison Committee on Medical Education Standard 8.7

Comparability of Education/Assessment: A medical school ensures that the medical curriculum includes **comparable educational experiences** and **equivalent methods of assessment** across all locations within a given course and clerkship to ensure that all medical students **achieve the same medical education program objectives.**

Active Learning

- **Active learning** defined as engaging students in the process of learning through activities and/or discussion in class, as opposed to passively listening to an expert
 - Emphasizes higher-order thinking and often involves group work¹
 - Thought to develop Bloom's higher order skills



PROJECT GOALS:

- **Set multiple goals related to statewide delivery of new curriculum**
- Involve interdisciplinary course implementation teams
- Embraced "teachers as learners"
- Gather immediate student input to drive timely change

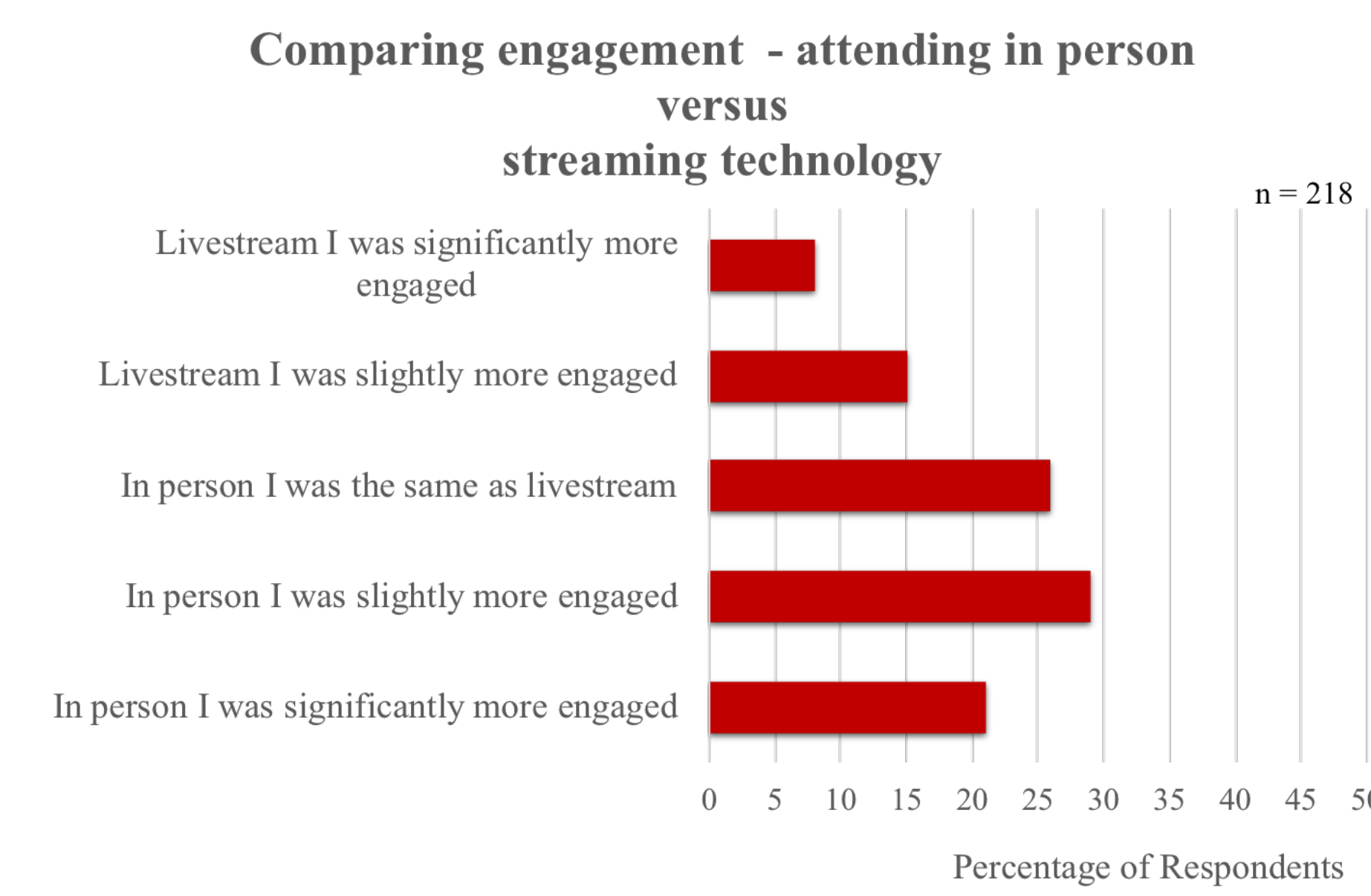
GOAL 1: Comparable at all 9 Centers

"Grand Rounds were awesome! They made it more like we were **one school with one great education...**"

MS2 Systems Based Pulmonary Course

Pulmonary Grand Rounds

- 9 three hour sessions
- Case based
- Interdisciplinary Panel
- Live at one center
 - Livestreamed to 8 centers
- **Maximize student engagement and focus**
- **Audience Response:**
 - Exam Style Questions
 - End of session evaluation



GOAL 2: Interdisciplinary Systems Based Approach

"Utilization of Top Hat made the **class really engaging** and helped with my understanding of the material."

- Interdisciplinary State-wide Course Implementation Teams
- Expert Panels for each session: Clinical Medicine, Pathology, Pharmacology and Physiology
- Clinical cases, videos, images and board style questions throughout
- Simultaneous student response via audience response system "clickers" statewide

Example: A 19-year-old man is brought to the ED after being shot in the chest. He has lost a lot of blood and appears pale. His skin is cool and clammy. He has altered mentation. On exam he is tachycardic and tachypneic, and the jugular veins are collapsed. Urinary output is minimal. IVC is collapsing on ultrasound. Which of the following is most consistent with the patient's condition?

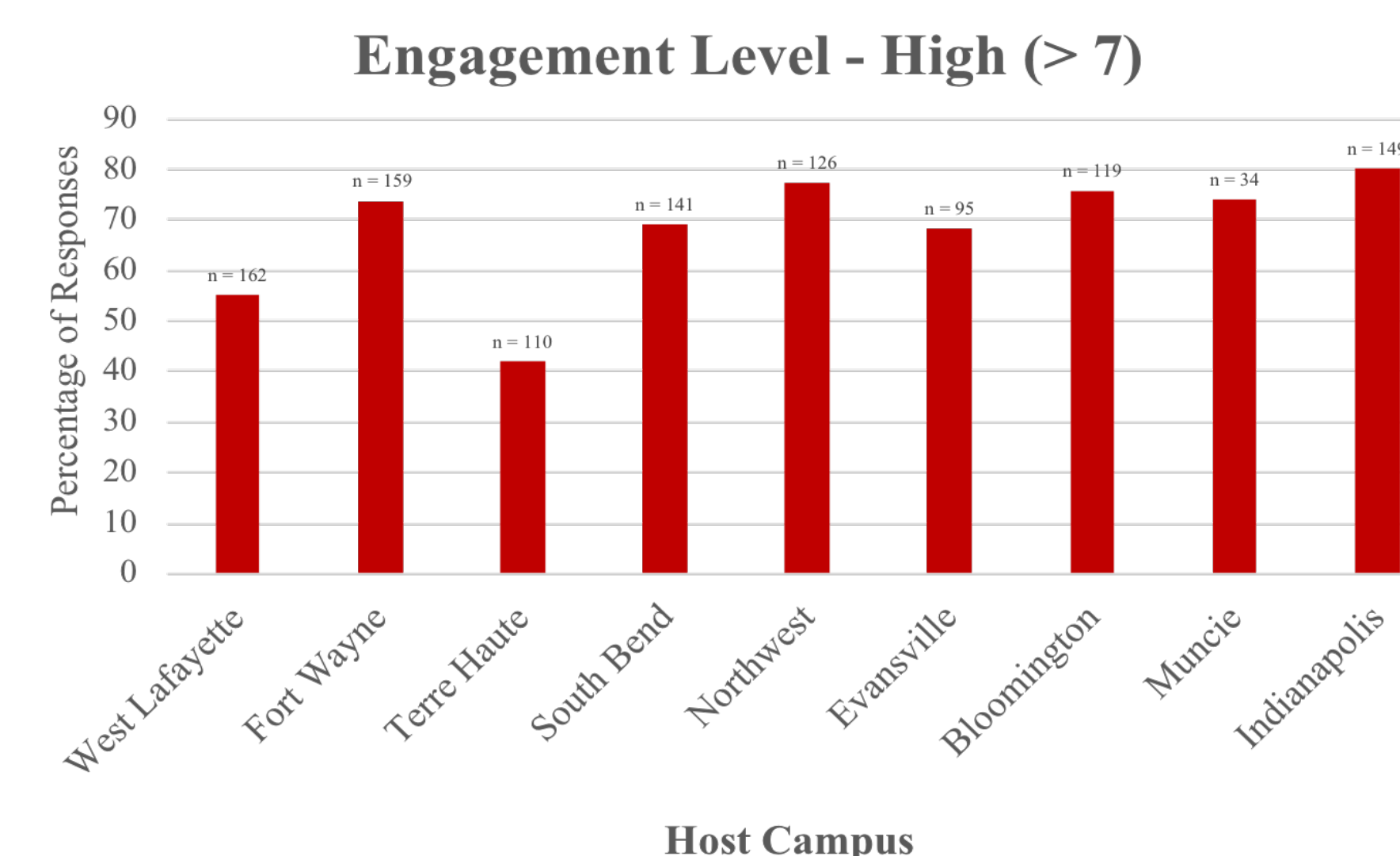
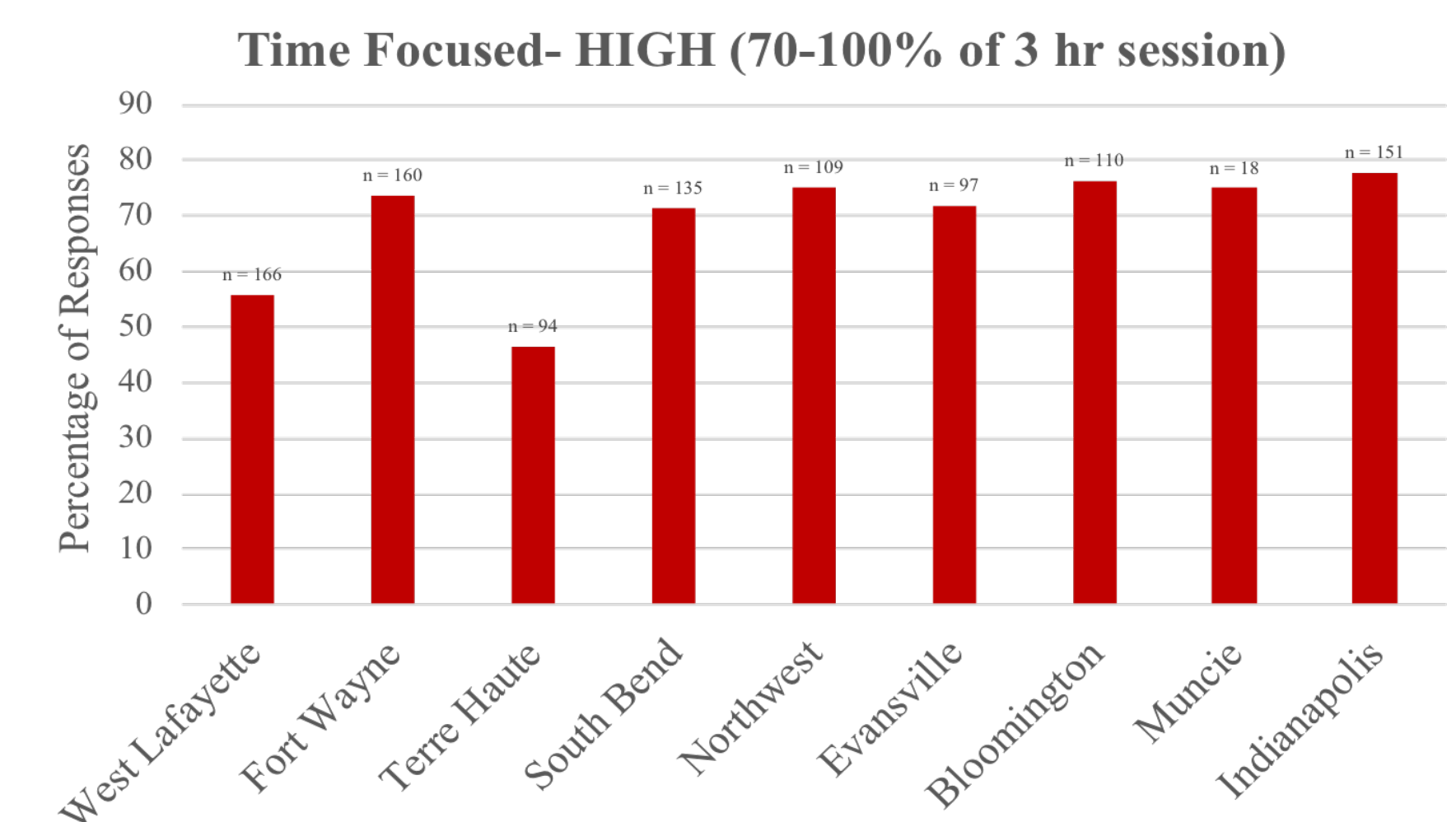
- A Preload up, CO up, SVR up
- B Preload up, CO down, SVR down
- C Preload down, CO down, SVR up
- D Preload down, CO down, SVR down

GOAL 3: Active Engagement of Learner

"I found myself **more engaged** with the Q & A response so that I wouldn't feel like I was disrupting class."

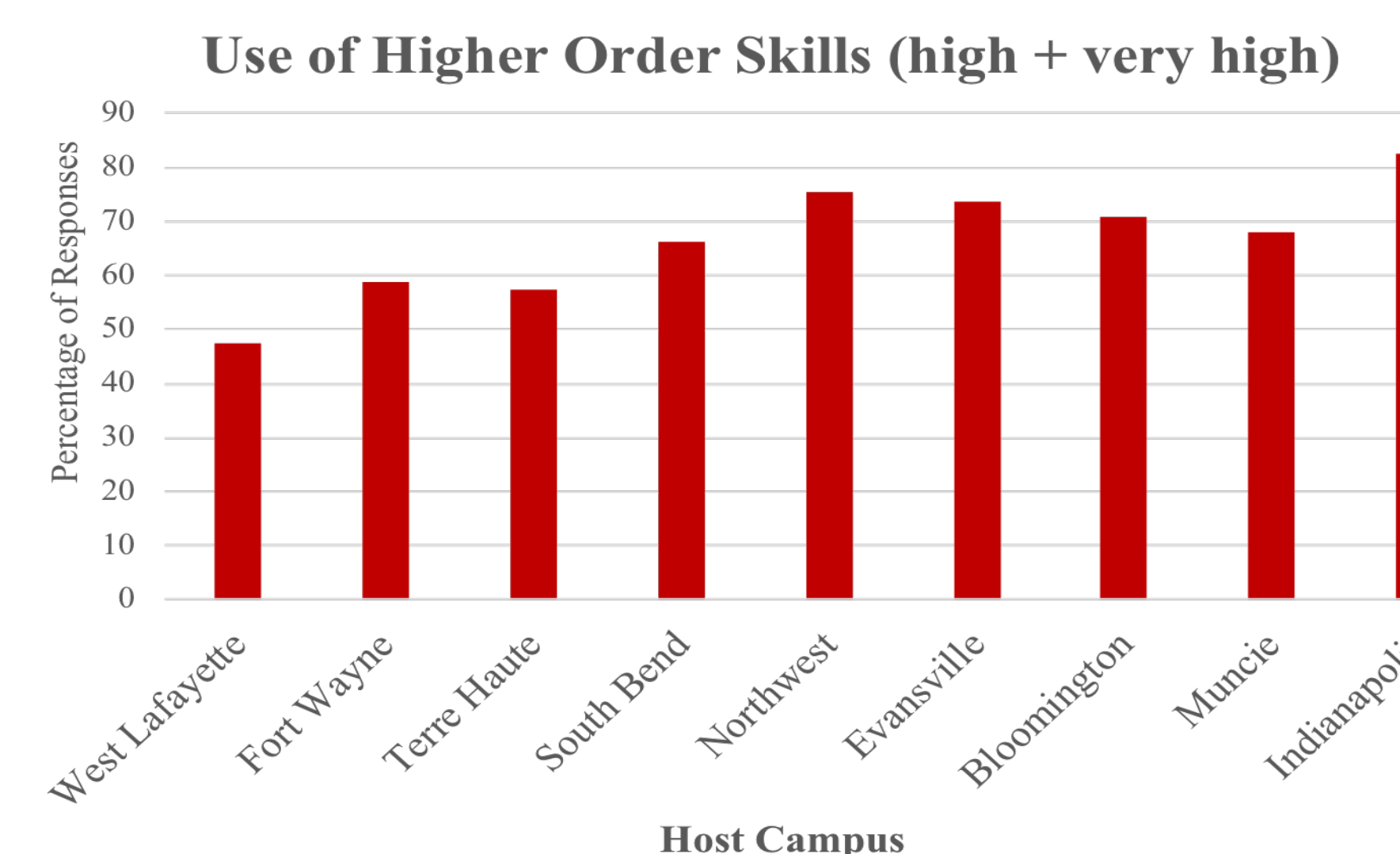
NOVEL USE OF Audience Response System

- End of Session Questions - formative teaching evaluation



GOAL 4: Development of Higher Order Skills

"Pulmonary Grand Rounds! This was **BY FAR the best learning experience** we have had throughout Phase 1 curriculum thus far."



"Blooming" the objectives and exam style questions

- 3 reviewers scored each objective and embedded questions
- 1 pt – low level - define, describe, identify, solve
- 2 pt – intermediate level – differentiate, compare, implement
- 3 pt – high level - synthesize, create, diagnose, construct, plan

GOAL 5: Increase Student Participation in Course Evaluations

"Instructors were very flexible and **receptive to feedback.**"

End of Session Evaluations:

1. Evaluate all faculty, materials and methods in session
2. Little time required – 4 questions, "click in"
3. No special log-in or email delay
4. Non-traditional questions posed

Changes made in real time as result of end of session student comments:

1. Additional and longer breaks
2. Adjusted pace
3. Added more exam style questions – increased difficulty
4. Drew all members of panel into conversation
5. Added live response chat line
6. Included wrap-ups in each case before moving to next
7. Use of on screen pointer – instead of laser pointer

RESULTS

Table Correlations
 (factors impacting use of higher order skills, engagement and focus time)

	Higher Order Skills (High + Very high)	Engagement (< 7)	Focus (>70% time)
Total # Slides	0.275	0.227	0.336
Total # Cases	0.01	0.316	0.364
Total # TH Questions	-0.531	-0.217	-0.129
TH Ques Bloomed	-0.196	-0.354	-0.299
Objectives Bloomed	0.569	0.425	0.449

National Board of Medical Examiners (NBME) Exam: summative evaluation delivered at end of course

IUSM exam performance 6% > normed values
 (86% correct responses compared to 80% nationally for this question set)

OUTCOMES

- **Innovative use of technology provides "COMPRABLE" experience**
- **Interdisciplinary "Grand Rounds Panels"**
- **Active participation via audience response system**
- **Novel use of audience response system**
 - Student feedback enables timely and critical adjustments by faculty
 - Reports high levels of student engagement, focus and use of higher order skills

REFERENCES

- Copeland, H. Liesel, et al. "Successful lecturing." *Journal of general internal medicine* 15.6 (2000): 366-371.
- Freeman, Joshua, and Alison Dobbie. "Use of an audience response system to augment interactive learning." *Family Medicine* 37.1 (2005): 12-14
- Smith, Michelle K., et al. "Why peer discussion improves student performance on in-class concept questions." *Science* 323.5910 (2009): 122-124.