NC STATE UNIVERSITY

College of Education
College of Sciences

Understanding the URM Student Perspective in Large Enrollment Active Learning Classrooms

Michelle Nugent, Science Education, and Miriam Ferzli, Biological Sciences

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1 Background and Introduction

College enrollment rates of traditionally underrepresented minorities (URMs) in science, technology, engineering, and mathematics (STEM) fields are improving, yet these individuals have higher attrition rates than their non-URM peers. This perpetuates a STEM population is not representative of the United States' diverse society.

This study defines URM as a student who belongs to one or more of the following groups: person with a disability, first-generation college student (FGCS), member of the LGBTQ+ community, need-based financial aid recipient (NBFA), racial minority (non-White, non-Asian), and a transfer student.

Research suggests that incorporation of active learning strategies in college classrooms has positive impacts on achievement outcomes and persistence factors among STEM URM students.

2 Research Questions and Design

This study addresses an area of research that is lacking; namely, the student perception and relative value of events that take place in the classroom. The following research questions were examined:

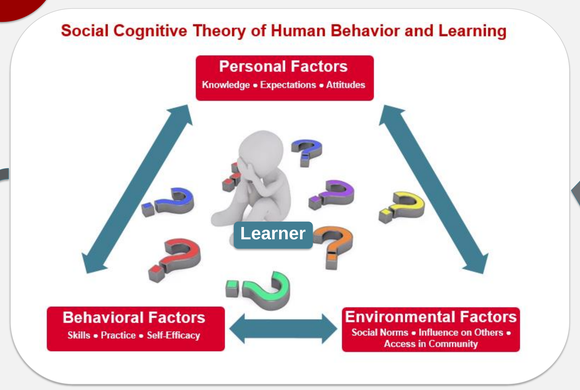
- **RQ1** Which learning events do URM students perceive as most useful for learning?
- **RQ2** How do URM students' perceptions of task-value and performance compare in different learning environments?

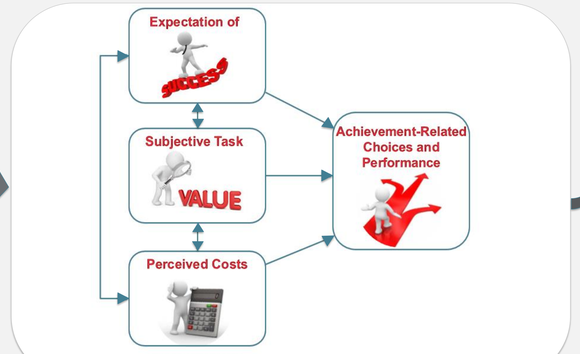
Study Setting: Two sections of an introductory biology course for science majors. The same instructor teaches both sections and uses a segmented combination of lecture and intentionally designed activities.

Study Design: Convergent parallel mixed-methods study, wherein data were collected throughout the entirety of one semester to examine student perception of active learning from multiple sources.

	SCALE-UP	Lecture
Classroom Setup	Active-learning environment, 9-person round tables.	Auditorium style, forward-facing seats, divided into three sections.
Enrollment Capacity	96	240
Seating	Assigned	Not Assigned
Student Resources	16 distributed projection screens, individual computers provided, dry-erase boards and markers distributed around the room.	Single projection screen in front of room. Personal computer use permitted.
Instructor Position	Instructor moves around the room throughout lecture, and moves between tables during activities.	Primarily at front podium, moves along the rows between sections during activities.
In-class Teaching Assistants	5	0
Peer Interactions	Students work in assigned groups of 3 during activities throughout the semester.	Students are encouraged to work with peers in their proximity during activities.

3 Theoretical Frameworks

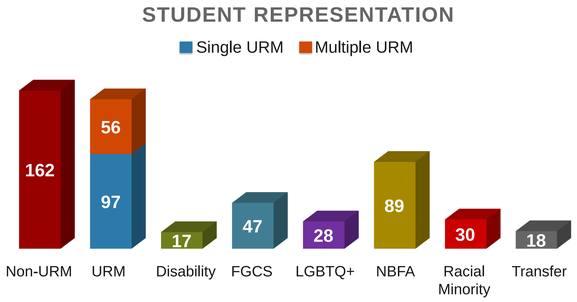




Select Components of Expectancy-Value Theory

4 Participants and Perception Measures

Total participants: n = 315, **SCALE-UP**: n = 95, **Lecture**: n = 220



Perception Measurement Instruments

Qualitative Tool: "Just-In-Time" Top Hat Question: following 7 different activities, students responded to the prompt, "List two or three aspects of this activity that you found useful for learning the concept."

Quantitative Tool: Task Ranking Activity: at the end of the semester, students were asked to rank classroom learning events based on level of usefulness to their learning.

5 Research Findings

RQ1 Which learning events do URM students perceive as most useful for learning?

Findings From Qualitative Analysis


Real-time application of course content.

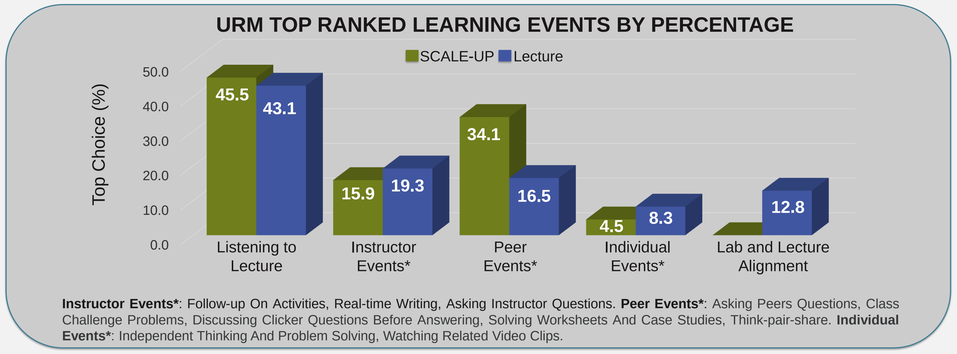

Seeing different perspectives via peer interactions.


Instructor follow-up that confirms understanding.


Critically thinking via low-stakes concept reinforcement.


Discovering real-world relevance of class material.

Findings From Quantitative Analysis



Instructor Events*: Follow-up On Activities, Real-time Writing, Asking Instructor Questions. **Peer Events***: Asking Peers Questions, Class Challenge Problems, Discussing Clicker Questions Before Answering, Solving Worksheets And Case Studies, Think-pair-share. **Individual Events***: Independent Thinking And Problem Solving, Watching Related Video Clips.

RQ2 How do URM students' perceptions of task-value and performance compare in different learning environments?

	Total Activity Task Value	Total Exam Score	Total Quiz Score	Total Lab Score	Total Course Grade
SCALE-UP URMs	✓	✓	✓	✓	✓
Lecture URMs					

✓ = Higher task-value and/or score.

6 Implications and Limitations

URMs value activities that include critical thinking and peer collaboration, especially when the class format centers around collaborative, active learning as compared to the traditional classroom seating.

PRACTICAL TAKEAWAY: **Incorporate well-planned peer activities frequently.**

Students place high value on lecture and instructor events. This may be linked to how students were trained to learn in high school – viewing the instructor as the expert, and lecture as a familiar learning format. Students can benefit from regular exercises to develop metacognitive awareness.

PRACTICAL TAKEAWAY: **If lecturing, structure it around active learning. Scaffold peer trust and collaboration. Provide regular opportunities for student reflection.**

Limitations: This study does not consider the impact of lecture and activity dispersion. The various URM sample sizes are not large enough to statistically analyze differences between groups. The research context does not allow for generalizability due to study size and scope.