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# CREATIVE WAYS STUDENTS INTERPRET EXPERIENCES AS PHYSICS MAJORS

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# Research Question

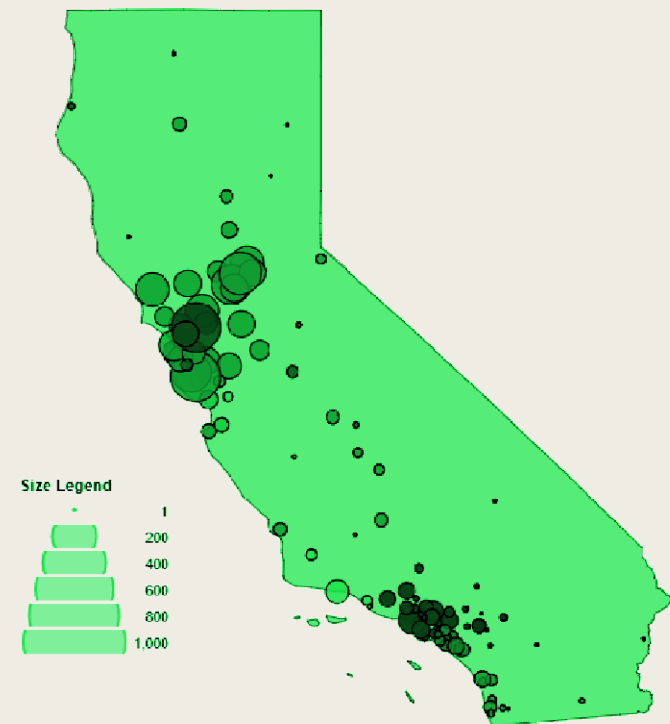
How do upper division transfer and freshman-admit physics majors interpret and respond to grades?

- This question is addressed using an **ethnographic approach**:
  - *Study a culture by focusing on everyday behaviors*
  - *Collect multiple forms of data*
  - *Engage with the community*

# Setting and Participants



- Setting: “Sun University”
  - *Physics department at a large research university in CA offering 4-year degrees*
  - *Upper division physics classes*
- Participants
  - *29 junior physics majors:  
14 transfer and 15 freshman-admit students*
  - *6 instructional staff*





# Data Collection and Analysis

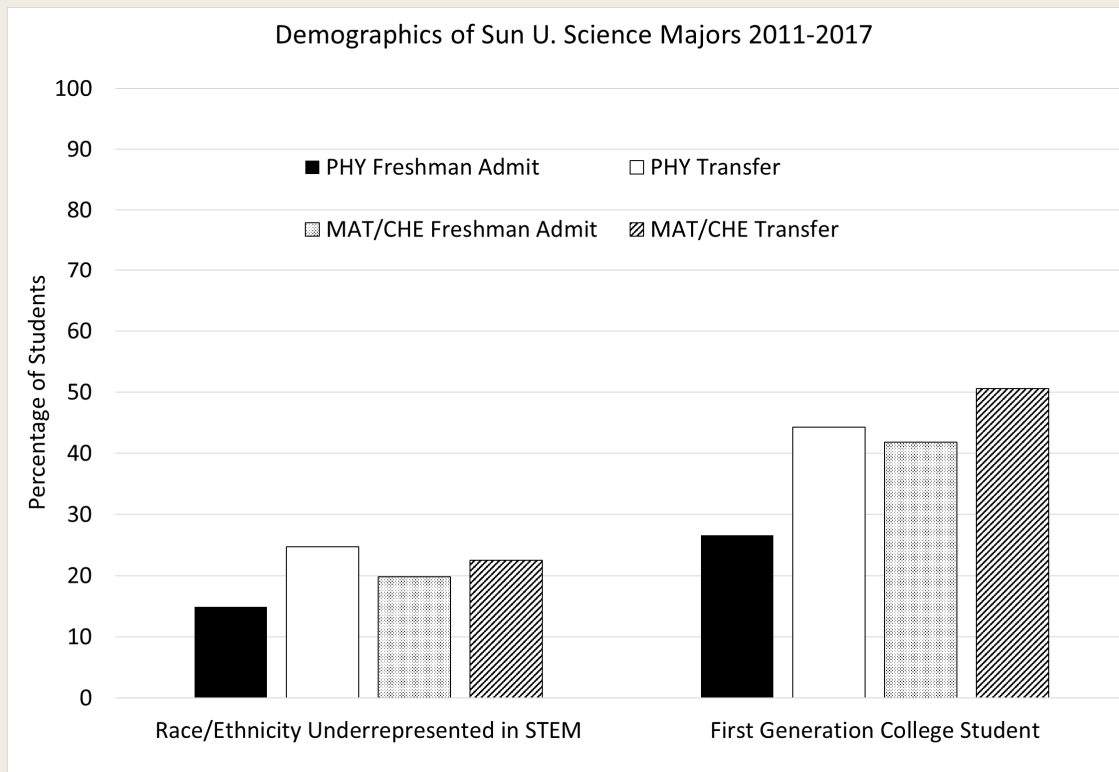
Type of Data Collection	Date Range	Total Number of Participants	Total Duration (in hours)	Data Format
Interview	Dec '16, Jun & Dec '17	20	32	Audio recordings
Observe Lecture	Oct '16 – May '17	29	37.2	Field notes & Audio recordings
Observe Office Hours	Feb – May '17	13	3.5	Field notes & Audio recordings
Participate in Help Sessions	Oct '16 – May '17	22	21.2	Audio recordings
Observe Outside of Class	Nov '16 – Dec '17	21	21.1	Field notes & Audio recordings
Grades	Jan – Jun '17	NA	NA	Numeric & Categorical
<b>Total:</b>	<b>15 months</b>	<b>35 participants</b>	<b>115 hours</b>	





# Physics Transfer Student Trends

Transfer students represent a distinct population from freshman-admits.



“I don’t think that physicists as a whole [...] have compassion for people of different walks of life or experiences, and that’s what community college is. It’s a bunch of people who for whatever reason did not go to [4-year] college at 18. Everyone’s got a different reason. That’s kind of what I loved about community college.”

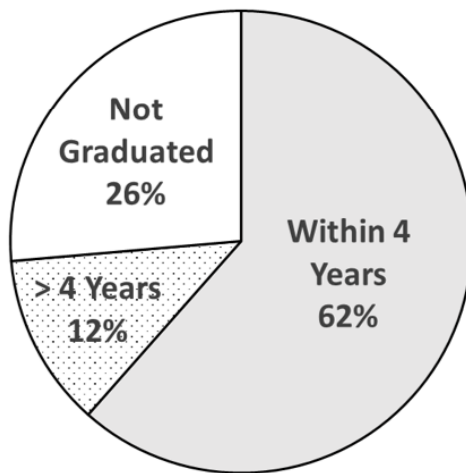
Interview Dec. 2017



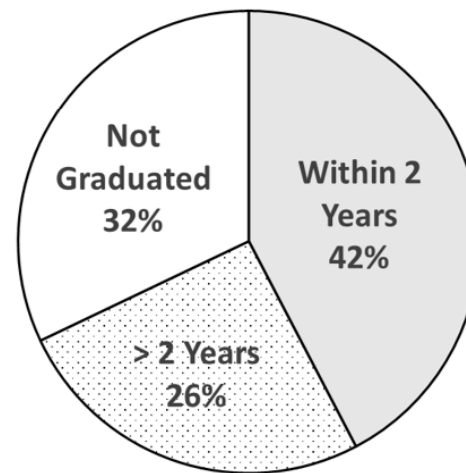
# Physics Transfer Student Trends

Transfer students are more likely to be delayed or not graduate.

Physics Graduation for Freshman Admit 2011-2017



Physics Graduation for Transfer 2011-2017



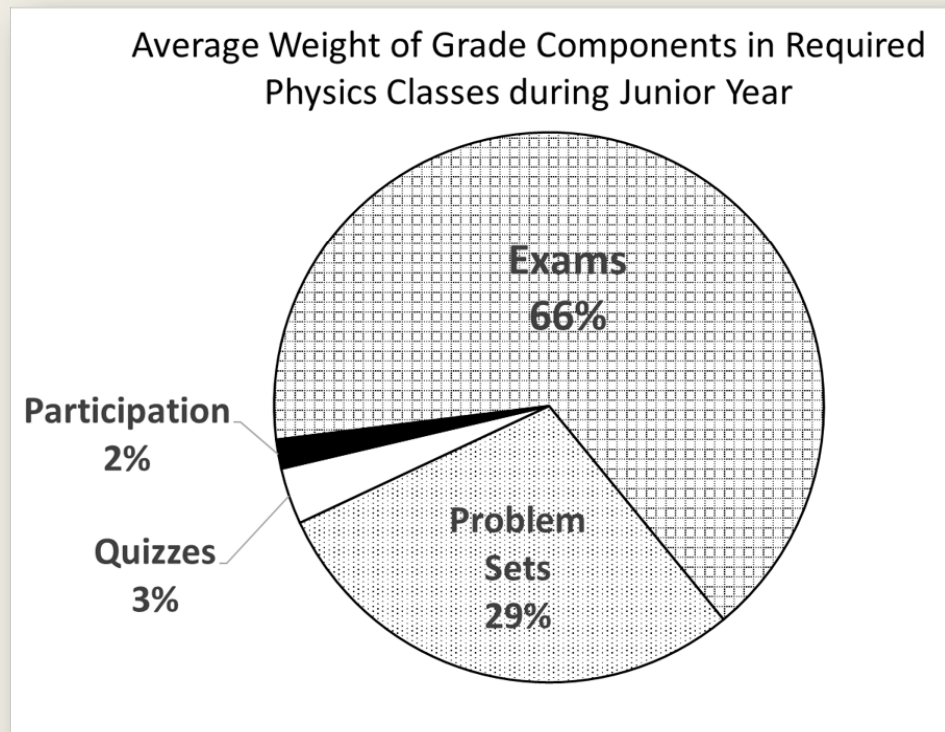
At the beginning I felt ready but then I keep hitting a little BS roadblock. This isn't what I thought it would be. Office hours are scheduled during class. Motivation wears down.

Discussion Dec. 2016



# Finding: Exam grades matter a lot

Course grade components according to syllabi from 6 required classes:



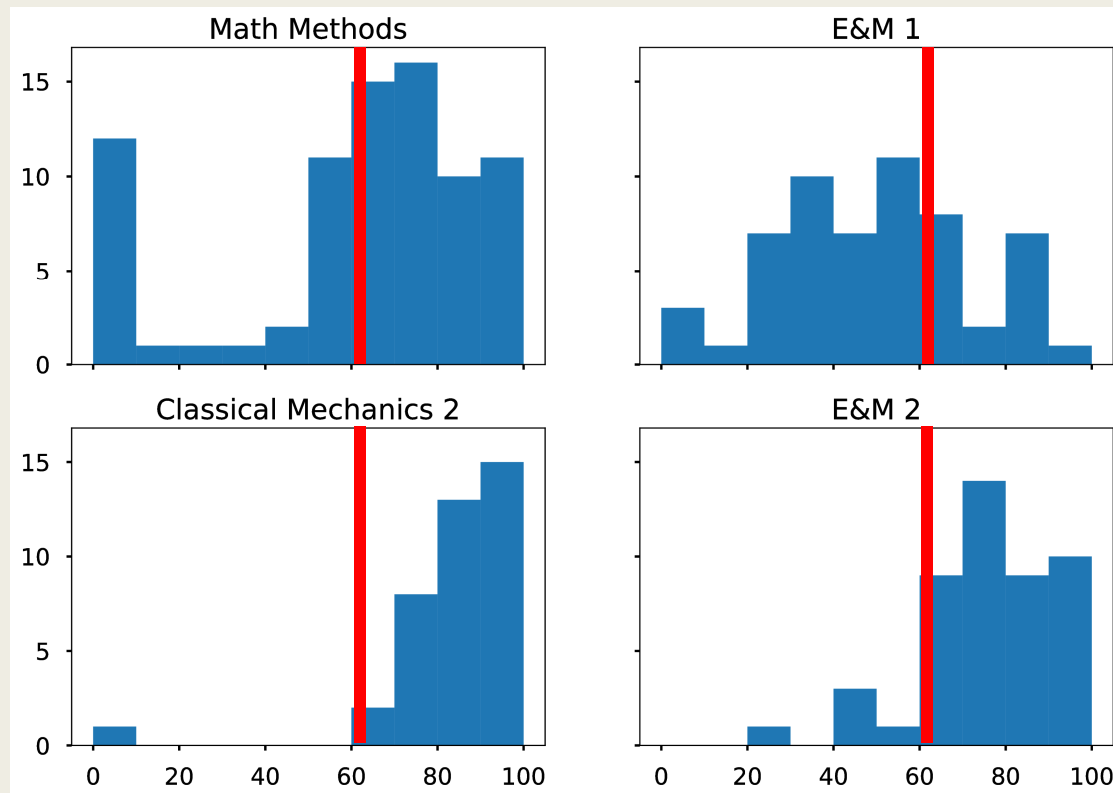
I started stressing out middle of the quarter because of my Classical Mechanics midterm grade. I did terrible on it. That really destroyed my confidence and caused my morning routine to get off balance.

Interview Dec. 2016



# Finding: Exam grades are low

Score distributions from 4 final exams in required physics classes:



J: [Prof. Walnut] gave me [my exam] with like no comment cuz I had failed and I was like, oh, that's too bad. That's ok I don't deserve a comment.

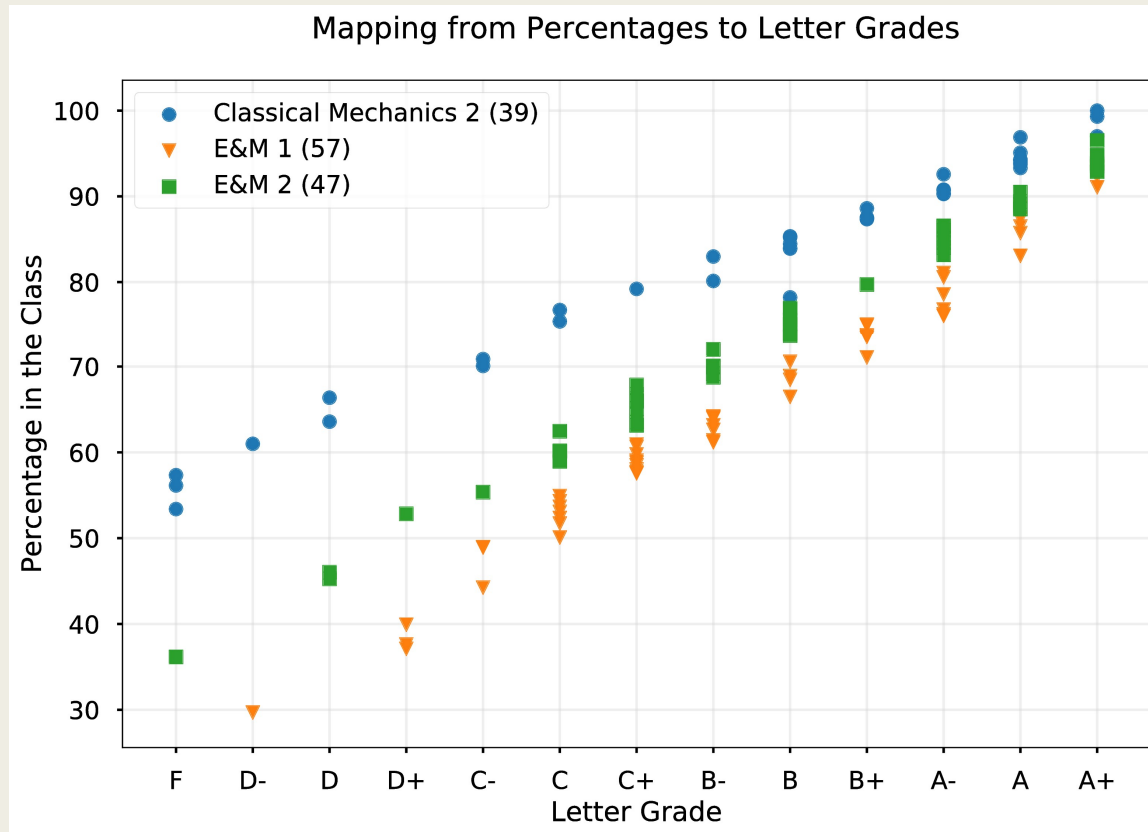
M: [J] said [they] failed but the class average was 56 so [they] got a C basically.

B: The average is failing. Isn't that crazy?

Discussion Dec. 2016



# Finding: Letter grades are competitive



M: Why can't they make the average 70% like normal? We feel like crap all the time.

H: We get a C or B or A in the end but we don't feel like we earned it.

B: It just means you failed less hard than someone else.

M: It's the most terrible feeling honestly.

Discussion Dec. 2016

# Advice from senior transfer students to new transfers



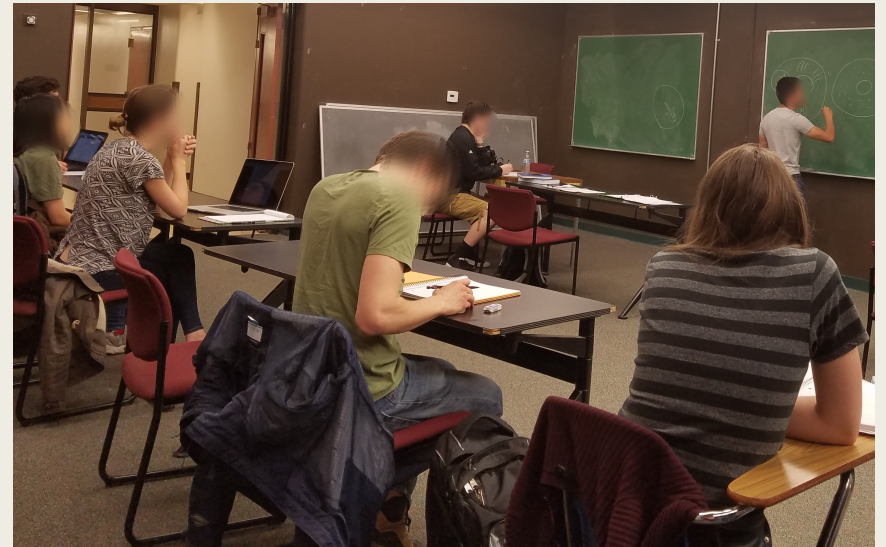
During a student-organized welcome event for new physics transfer students in Sept. 2017, senior transfer students offered advice about exam scores:

1. Do not interpret your score without knowing the mean and standard deviation.
2. Put your ego aside when receiving exam scores and just keep up the hard work. “Don’t trip when you see your score!”
3. You may have earned higher grades on exams in community college, but exams here [at Sun University] are designed to have low scores.
4. Faculty will curve the grades up, unless it’s a fair exam, because they can’t fail everyone.
5. Average scores here are curved to a B-, not a C like is common in community college.



# Recommendations for Instructors

1. Spend time listening to all students while they work. This may help align expectations and provide important, informal feedback.
2. Use a variety of strategies to assess students' understanding. Over-emphasis on written exams fails to capture the diversity of student skills.
3. Grade exams using rubrics to help reduce competition and give meaning to scores.
4. More suggestions?



# Thank you, and come see me at my poster!

- PST2E SESSION (Posters): Physics Education Research II
- San Diego Room
- 9:15 - 10:00pm tonight

Talk QR code:



Poster QR code:

