UC MERCED | SUSTAINABILITY

RESEARCH BRIEF

Brief #1 - April 2024

UC Merced Office of Sustainability: Brief #1 on Campus Decarbonization 2021/2023 Undergraduate Student Survey

Prepared by: Paul Almeida, Rasha Naseif, and Isabelle Haddad

STUDENT SURVEY HIGHLIGHTS

- Nearly two-thirds of students have taken courses that covered climate change
- Students report beliefs about climate change consistent with just transition action strategies
- More campus investment in Earth Day type activities may encourage more climate action and education around decarbonization
- UCM students report engaging in several pro-environmental behaviors

I. INTRODUCTION

This brief is part of a larger report on Decarbonization in the University of California System, with a focus on the UC Merced campus. The larger study is under the guidance of the UC President's Global Climate Leadership Council and its Pathways to a Fossil Free UC Task Force, which seeks equitable solutions to move away from a carbon-based economy. The focus here is on the final three of five UCOP-mandated deliverables:

1. Identify climate justice and equity considerations related to the transition of campus energy systems to fossil fuel free and propose solutions or next steps
2. Document knowledge gaps, and subsequent studies and analyses needed to conduct Net-Zero planning
3. Document knowledge gaps, and subsequent analyses and engagement activities needed to conduct climate action and resiliency planning for an academic setting

To partially achieve these goals, the UCM Office of Sustainability employed an online survey implemented with UC Merced undergraduate students to capture views and knowledge gaps on climate change, climate justice and climate action. The survey was administered in the spring semester of 2021 and the fall of 2023, respectively. The sample size was 594 students representing 7 percent of the 8300 undergraduates enrolled at UC Merced.[1] The survey queried students about the causes of climate change as well as potential solutions and equity considerations. The survey took approximately twenty minutes to complete and engaged with 1 out of every 14 students on campus.

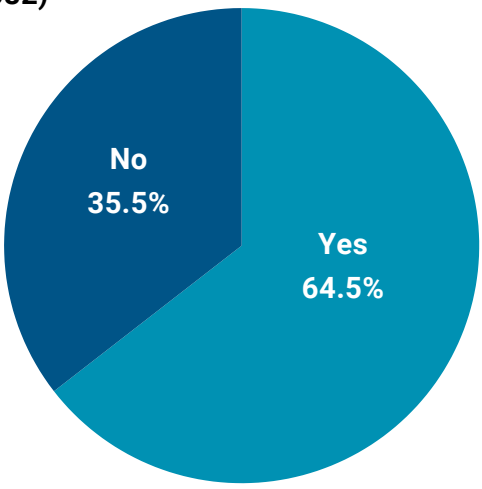
1 How to cite: Almeida, Paul, Rasha Naseif, and Isabelle Haddad. 2024. UC Merced Office of Sustainability Brief #1 on Campus Decarbonization 2021/2023 Undergraduate Student Survey. Merced, CA: University of California Merced.

2 The response rate for students targeted by the survey was 18.3%.

II. VIEWS ON CLIMATE CHANGE

In this section student views on climate change are presented.

Figure 1 - Have you ever taken a course where climate change was covered? (N=582)



Nearly two-thirds of students have been exposed to climate change education in a course. This indicates basic familiarity with the concept of climate change for a majority of undergraduate students. In terms of gaps, more information should be collected among the student population to better understand the types of courses where climate education occurred and the level of schooling where it took place (e.g., in college or high school). Also, more detailed reports of knowledge of key terms such as just transitions, decarbonization and climate solutions would be useful to gather for where to invest in future curriculum.

In terms of emotions, Table 1 reports how one feels about climate change. Students ranked highest (combining quite and very much) on feeling "worried" (70%) and "frustrated" (60%). The least intensely felt emotion was "hopelessness" (39%).

Table 1 - Personal feelings about climate change. (N=583)

Thinking about climate change/global warming makes me feel:					
Feeling	Not at all	Not very much	Somewhat	Quite	Very much
Angry	7.89% (46)	13.89% (81)	29.67% (173)	28.13% (164)	20.41% (119)
Hopeless	7.38% (43)	15.09% (88)	38.42% (224)	25.73% (150)	13.38% (78)
Anxious	7.20% (42)	11.84% (69)	26.59% (155)	30.19% (176)	24.19% (141)
Worried	2.92% (17)	4.63% (27)	22.30% (130)	39.79% (232)	30.4% (177)
Fearful	6.00% (35)	9.60% (56)	4.42% (160)	27.44% (197)	23.2% (135)
Frustrated	5.66% (33)	10.12% (59)	23.84% (139)	32.76% (191)	27.6% (161)
Powerless	6.52% (38)	11.84% (69)	31.22% (182)	26.41% (154)	24.0% (140)

These results tend to be promising indicators for a student's willingness to engage in climate solutions since the emotions of worry and frustration may motivate future climate action while relatively moderate levels of hopelessness will prevent nonaction. These findings are consistent with a similar survey question of youth climate protesters across 15 countries in 2019 where frustration and worry were most often mentioned and hopelessness the least.[2] Table 2 below has mixed results about optimism about addressing climate change. Undergraduate respondents felt less hopeful about policies positively impacting climate change, but not completely doomed given current circumstances that we can adapt to global warming. It also suggests more education and exposure to effective climate policies may increase personal efficacy to make a difference.

2 De Moor, J., Uba, K., Wahlström, M., Wennerhag, M., & De Vydt, M. (2020). Protest for a future II: Composition, mobilization and motives of the participants in Fridays For Future climate protests on 20-27 September, 2019, in 19 cities around the world. Stockholm: Swedish Research Council for Sustainable Development.

Table 2 - Please indicate to what extent you agree with the following statements: (N=583)

Statement	Not at all	Not very much	Somewhat	Quite	Very much
I feel hopeful about policies being able to address climate change	6.52% (38)	25.39% (148)	43.05% (251)	18.52% (108)	6.52% (38)
Even if things look bleak, I do not lose hope that we are able to deal with climate change	3.60% (21)	15.44% (90)	43.40% (253)	27.44% (160)	10.12% (59)

Table 2 provides information on climate change communication with parents. Over the past five years, youth-based environmental organizations, such as the Sunrise Movement and Fridays for Future, have assumed leadership roles in climate advocacy. Youth may be key educators within their families in terms of raising climate awareness.

Only about 16 percent of students seem to be in regular conversation with their parents about climate change. This may be another gap in which the university can promote more dialog about climate change and the benefits of decarbonization with students and parents at events such as Bobcat Day and graduation. Also, university internship programs whereby students carry out climate education, climate planning, and climate action activities in their hometowns would be an important channel to create more discussions with family members about the risks and challenges of the impacts of planetary warming. Other research on social movements, such as immigrant rights, has shown that youth are key recruiters in bringing their parents into civic engagement[3] on vital public issues.

Table 3 - Please answer the following question about your parents: How often do you discuss climate change with your parents? (N=582)

Not at all	Not very	Somewhat	Quite/Very Much	Does not apply
24.23% (141)	30.07% (175)	28.18% (164)	16.06 (92)	1.72% (10)

III. ISSUES OF EQUITY AND CLIMATE JUSTICE

Environmental injustice relates to the inordinate amounts of environmental pollution that lower income and communities of color are exposed to on a regular basis.[4] As a counter to environmental injustice, environmental justice refers to the notion that no specific group "should bear a disproportionate share of the negative environmental consequences resulting from industrial, municipal, and commercial operations or the execution of state policies."[5] This section provides information on student beliefs about climate and environmental justice related to just transitions.

[3] Bloemraad, I., & Trost, C. (2008). It's a family affair: Intergenerational mobilization in the spring 2006 protests. American Behavioral Scientist, 52(4), 507–532.

[4] Taylor, D. (2014). Toxic communities: Environmental racism, industrial pollution, and residential mobility. In Toxic Communities. New York University Press

[5] Bullard, R. D. (Ed.). (2005). The quest for environmental justice: Human rights and the politics of pollution (Vol. 19, pp. 32-33). San Francisco: Sierra Club Books. P.4

Students were queried about societal priorities involving equity in pursuing various forms of climate action. They were also asked about responsibility in generating the climate crisis and which groups are most vulnerable to the impacts of climate change.

Table 4 - Solutions to Environmental Problems and Climate Change (N=594)

Question	Agree/Strongly Agree	Neither Agree/Disagree	Disagree/Strongly Disagree
Modern science can be relied on to solve our environmental problems	79.6% (473)	15.8% (94)	4.5% (27)
Companies and the market can be relied on to solve our environmental problems	23.1% (137)	24.1% (143)	52.9% (314)
Measures to decrease CO2 emissions cannot be allowed to make social welfare arrangements worse	25.4% (151)	59.1% (351)	15.5% (92)

Table 4. Examines potential solutions to climate change and who should lead. Students showed substantial confidence in modern science in terms of addressing environmental problems, while displaying doubts about market-only solutions. This suggests that students would prefer that government subsidies and the use of tax dollars to invest in various climate technologies in the private sector (e.g., carbon capture and carbon sequestration, renewable energies, etc.) should be met with caution and extensive public oversight. Respondents also tended to favor a just transition perspective to climate action in that more students preferred not to make social welfare arrangements worse than those who felt it was worth the costs to social wellbeing.

Nonetheless, a majority of students (59%) were unsure about the relationship between CO2 mitigation and social welfare. This appears to be a gap where more educational efforts on these issues would benefit climate literacy on campus. This would include courses in the social sciences and humanities where the history of the welfare state is covered (e.g., the New Deal), and how such policies may connect to climate solutions such as various Green New Deals.

Figure 2 - In your opinion, who or what is to blame for climate change/global warming

When asked who is to blame for climate change in an open-ended question, students seemed to agree that corporations and industries as high emitters of fossil fuels were largely to blame (as observed in the word cloud in Figure 2 which reports the relative frequencies of different agents mentioned on the causes of climate change). "Companies" were stated more than any other word with 159 mentions, and "corporations" were the fifth most mentioned. The students also seem to agree that most people in a high consumption society play a role in exacerbating climate change. Daily activities, such as driving gas-powered cars and consumerism, increase GHG emissions and overall carbon footprints. Indeed, "people" was the second most stated term (134 mentions), while "humans" had the fourth most mentions, and "everyone" the sixth most. Additionally, "government" was reported as an accelerator of climate change with the third most mentions. UCM youth in general, may not perceive the state and politicians as moving fast enough to combat climate change while under lobbying pressure from the fossil fuel industry.

Table 5 asked students to state their preferences in terms of distribution of taxpayer resources in relation to climate mitigation and adaptation. The majority of respondents concur with just transition perspectives whereby conversions to green and renewable energy systems are combined with the inclusion of marginalized and excluded groups in the process.[6] Examples in California include state climate grants sponsored by the Strategic Growth Council and the Governor's Office of Planning and Research, such as the Transformative Climate Communities, Regional Resilience Grant, and the Regional Climate Collaboratives Programs.

[6] Heffron, R. J., & Heffron, R. J. (2021). What is the "just transition"?. Achieving a just transition to a low-carbon economy, 9-19.

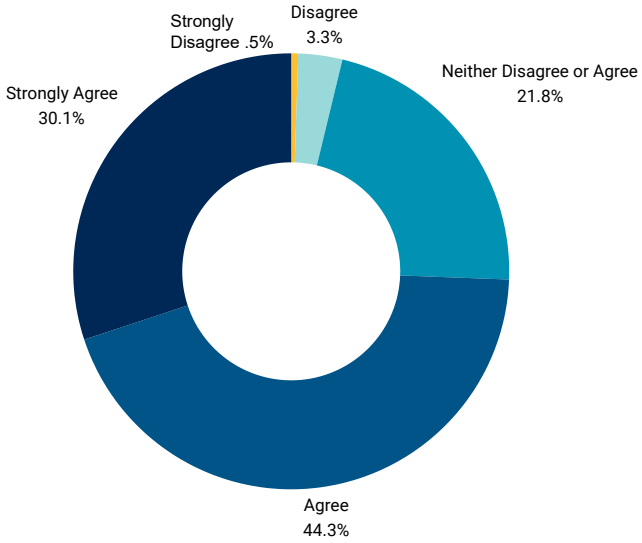
Table 5 - If forced to prioritize the allocation of limited resources, what would you think the government in your country should do? (choose one) (N=582)

The government should prioritize measures to reduce climate change, such as lowering CO2 emissions	15.64% (91)
The government should prioritize protecting people against the impacts of climate changes, such as flooding, drought, and forest fires	15.98% (93)
The government should give equal priority to both	53.95% (314)
Don't know, no opinion	14.43% (84)

The federal Inflation Reduction Act of 2022 also administers several initiatives involving decarbonization with equity considerations. Focusing on mitigation alone is referred to as carbon reductionism.[7] Techno-elite perspectives support carbon reductionist strategies whereby the climate crisis may be resolved via technological innovation and upgrading without incorporating the overall threat of the treadmill of economic production to ecological sustainability and social well-being.[8] Given the general support for just transitions among students, UCM is well-positioned to initiate climate action planning in the San Joaquin Valley involving undergraduates and disinvested communities to accelerate the decarbonization of the region.

Figure 3 supports the findings from Table 5 in that UCM students overwhelmingly believe climate change impacts vulnerable groups more than other social sectors. When combing agree with strongly agree, nearly three-fourths of respondents (74.4%)

Figure 3 - To what extent do you agree with the following statement: "Climate change negatively impacts the global poor more than other groups."



agree the poor are the most impacted by planetary warming. This climate justice belief system provides a baseline to begin implementing a variety of climate action initiatives (e.g., building and appliance electrification, low carbon transportation, and nature based climate solutions) on campus and in the wider region with just transition principles.

[7] Méndez, M. (2020). Climate change from the streets: How conflict and collaboration strengthen the environmental justice movement. Yale University Press.

[8] Gould, K. A., Pellow, D. N., & Schnaiberg, A. (2015). Treadmill of production: Injustice and unsustainability in the global economy. Routledge.

IV. CLIMATE ACTION

This section moves from beliefs to experience in actual environmental and climate action as well as motivations to participate in the future. Figure 4 and Table 6 examine level of involvement in the environmental movement. Figure 4 asks respondents the level they identify with environmental activism and environmentalism on a scale of 0 to 100. The mean response was moderate with the average falling near the middle of the spectrum, with slightly more students identifying with environmentalism than environmental activism (53 to 47, respectively). Table 6 reports affiliation with an environmental organization. Active member involves attending meetings, while passive affiliation means just sending contributions to an environmental organization. Less than 10 percent of students are members of any kind of environmental organization. The finding is consistent with the literature on youth civic engagement where younger people are more likely to be influenced to participate in environmental and climate action through friends or school, rather than more formal organizations or institutions.[9]

Figure 4 - On a scale of 0-100, to what extent do you identify...(Mean Response, N=582)

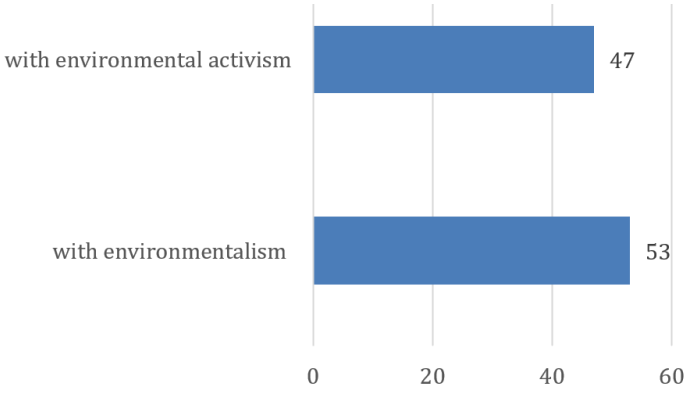
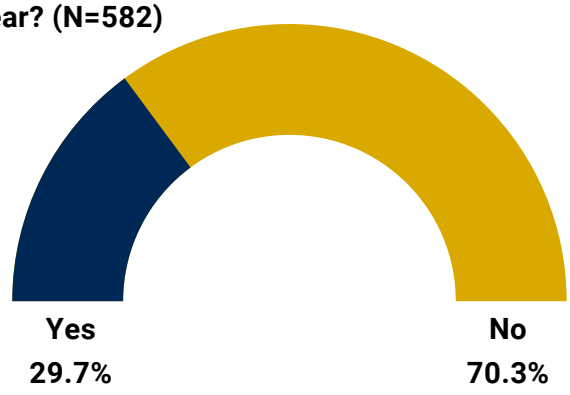


Table 6 - Have you been involved in the following type of organization in the past 12 months, please indicate whether you are not a member, passive member, or an active member? (N=582)

Organization	Not a member	Passive member/financial supporter	Active member
Environmental organization	90.21% (525)	7.56% (44)	2.23% (13)

Figure 5 asks respondents about participation in past Earth Day events. 30 percent of UCM students have participated in an earth day event in the past. This appears to be another actionable and low-cost campus investment. Involving the campus community in low risk and low cost activities such as Earth Day, would likely provide a gateway to more participation in educational events related to decarbonization and other forms of climate action.[10] Such events also include awareness of net zero goals and climate resiliency planning. Increasing UCM student participation in Earth Day-type activities would likely yield multiple benefits in terms of climate literacy and greater involvement in related initiatives.

Figure 5 - Have you ever participated in an Earth Day activity held on April 22 before this year? (N=582)



9 Rainsford, E., & Saunders, C. (2021). Young climate protesters' mobilization availability: climate marches and school strikes compared. Frontiers in Political Science, 3, 713340.

10 Fisher, D. R. (2024). Saving Ourselves: From Climate Shocks to Climate Action. Columbia University Press.

Respondents were also queried about specific individual actions taken to improve the environment.

Table 7 reports these behaviors. Over two-thirds of student respondents (69%) stated they reused items to avoid unnecessary waste. 61 percent reported reducing energy use, and 56 percent mentioned purchasing used goods as a practice to prevent excessive consumption. Over a third of students also reported changing diets, consuming less products for political, ethical, or environmental reasons. These pro-environmental/climate behaviors provide an additional gateway (similar to Earth-Day-type activities) to engaging in more collective and structural solutions to climate change and provide a sympathy pool on campus for recruiting students to climate resiliency and green transition initiatives.

In terms of engaging in collective action over climate change, such as attending rallies and demonstrations calling for policy change, Figure 6 asked students the most important factor to motivate them to participate. Consistent with the social science literature on participation in climate action, climate shocks[11] (such as extreme weather events) ranked the highest (43%) for motivation to participate in a climate demonstration, followed by the more abstract "rise in global temperatures" (34%). It appears the experiential aspect of climate change of observing or being impacted by climate-related events moves students more than awareness alone. Perhaps, the most notable finding in Figure 6 centers on that only six percent of students stated they would not attend a demonstration addressing climate change.

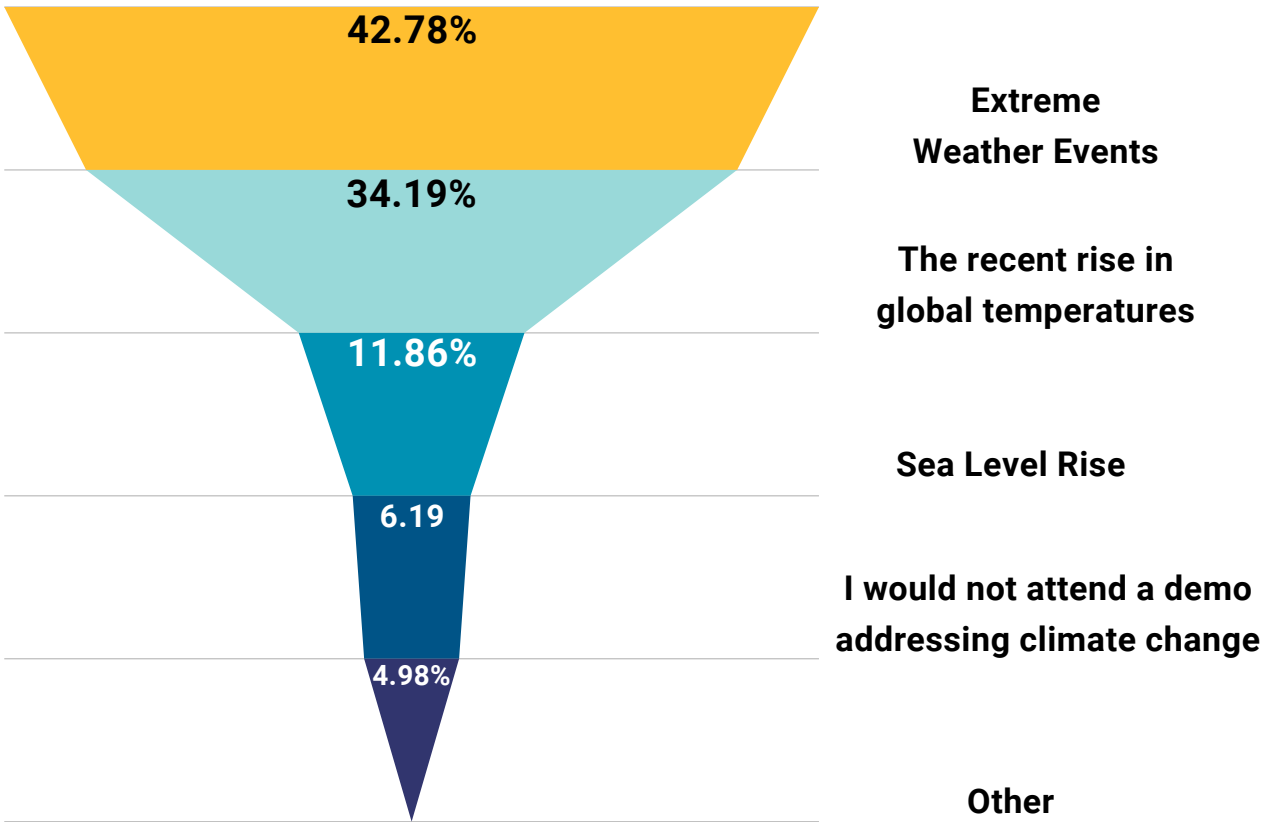
Table 7 - There are many things people can do to prevent or promote change. Have you, in the past 12 months...? (N=582)

	Yes	No
Gave up a trip by plane for political, ethical, or environmental reasons?	8.93% (52)	91.07% (530)
Deliberately bought products for political, ethical, or environmental reasons?	36.43% (212)	63.57% (370)
Changed your diet for political, ethical, or environmental reasons?	34.02% (198)	65.98% (384)
Consumed less products altogether for political, ethical, or environmental reasons?	43.47% (253)	56.53% (329)
Reused products like bottles and plastic bags for political, ethical, or environmental reasons?	69.24% (403)	30.76% (179)
Reduced energy use in your household for political, ethical, or environmental reasons?	60.65% (353)	39.35% (229)
Bought second-hand goods (such as clothes, bikes,	56.19% (327)	43.81% (255)

Similar to pro-environmental individual behaviors reported in Table 7, the willingness of 94 percent of students to attend a climate rally offers a vast sympathy pool for more institutionalized climate planning initiatives on campus and in the greater San Joaquin Valley involving undergraduates.

[11] Fisher, D. R. (2024). Saving Ourselves: From Climate Shocks to Climate Action. Columbia University Press.

Figure 6 - What aspect about climate change would be the most important in motivating you to attend demonstrations? (Choose One) N=582



V. CONCLUSION
FINAL RECOMMENDATIONS

The findings from this survey suggest a few key areas to expand campus and regional efforts to move toward a low carbon economy. In terms of climate education, students have been exposed to at least a minimal level of climate curriculum. More investment in campus climate curriculum and climate activities/internships may generate more optimism about addressing climate change with a greater understanding of the multiple forms of climate solutions currently initiated. Additionally, the survey demonstrates a majority of students already maintain an equity mindset, which will be critical to ensure that campus climate initiatives are guided by just transition principles and avoid reproducing existing structures of inequality. Indeed, UCM is well-positioned to take more of leadership role within the University of California Climate Change Working Group Subcommittee on Environmental Justice. Students also reported already engaging in pro-environmental behaviors and a strong willingness to engage in collective action in relation to climate change. Hence, a large sympathy pool exists within the UCM student body to **involve undergraduates** in applied programs around climate planning and to implement a variety of decarbonization-type projects.

VI. APPENDIX

The appendix provides additional information on the relative representativeness of the survey sample to the general UCM student population. Annual household income was measured in this study as a self-reported four-category ordinal variable with options of $0–24,999, $25,000–49,999, $50,000–74,999, and $75,000 and above. In the sample, 77.5 percent of respondents reported their household income as under the median household income in the U.S. ($75,000). The median household income of the entire population of UCM students is estimated at $57,160. Table 8 below reports the distribution of class ranking of the survey sample. First year students were under-represented in this study. Table 9 provides information comparing self-identified Race/Ethnicity of the sample to the 2022 population of UCM Students.

Table 8 - What year are you at the university? (N=582)

First year	Second year	Third year	Fourth year	Fifth year	Other
5.50% (32)	20.79% (121)	32.65% (190)	37.8% (220)	2.58% (15)	0.69% (4)

Table 9 - Self-Reported Race/Ethnicity of Survey Sample compared to UCM Population

Race/Ethnicity	UCM Undergraduate Students (2022)	Survey Sample of Undergraduate Students
Asian/Pacific Islander	21.72% (1812)	18.93% (110)
American Indian	0.10% (8)	0.52% (3)
Black or African American	4.63% (386)	2.75% (16)
Latina/o	55.32% (4616)	62.71% (365)
White	8.49% (708)	11.51% (67)
Other	9.76% (814)	3.61% (21)
	N= 8344	N= 582

[1] The response rate for students targeted by the survey was 18.3%.