STUDENT AND FACULTY NEEDS FOR SUCCESS DURING THE COVID-19 PANDEMIC: FOLLOW-UP STUDY

Technical Report (August 2022)

WAKE TECH
EFFECTIVENESS & INNOVATION

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Acknowledgments

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Executive Summary

The purpose of this study was to follow-up on the Madsen, Bartek & Sumithran (2021) study documenting the transformational change that occurred in instruction, services, and student outcomes during the COVID-19 pandemic, as well as to provide a "check-in" with students and faculty about the barriers they faced in completing or teaching their courses in Fall 2021. Statistical analyses were conducted on student success rates[1], withdrawal rates[2], and equity gaps for the Fall 2021 semester as compared to Fall 2020. In Fall 2021, surveys were also administered to students and faculty to gain insights into challenges experienced and to identify how the college can better support them going forward. This executive summary provides an overview of the key findings from the statistical analyses and survey research, along with conclusions and recommendations based on the findings.

Findings

- **Total Course enrollment:** How does total course enrollment in Fall 2021 compare to Fall 2020? To Fall 2019?
    - **The proportion of traditional seats increased and online seats declined but a majority of seats were still online:** Traditional (seated) instruction resumed in Fall 2021, increasing from 1% of total capacity in Fall 2020 to 21% in Fall 2021. The proportion of online instruction capacity reduced from 88% in Fall 2020 to 62% in Fall 2021 but was still elevated compared to Fall 2019, when online course enrollments were about one-third of total course enrollments. About 60% of student services remained virtual in the 2021-2022 academic year.
    - **Enrollment declined:** After initially holding steady between Fall 2019 and Fall 2020, total course enrollment declined 4.3 percentage points, which is still less than the steep rate of decline nationally.[3] Proportionally, the highest declines were among White/Caucasian females and White/Caucasian non-Pell recipients. While

[1] Success Rate: Percentage of A, B, C, S, and P grades out of all grades including withdrawals but excluding AU, X, SR, and NA.
[2] Withdrawal Rate: Percentage of W, WP, WE (special COVID-19 withdrawal grade), and WF grades out of all grades excluding AU, X, SR, and NA.
[3] From Fall 2019 to Fall 2020, community colleges have experienced nearly an 11% decline in enrollment (Brock, 2021).

WTCC enrollment declines may be associated with COVID-19, they may also be associated with Wake County's strong economic recovery and dropping unemployment rates after the initial onset of the pandemic.

- **Online Student Success Rates, Withdrawal Rates, and Equity Gaps:**
  - How do student success and withdrawal rates in Fall 2021 compare to Fall 2020? To Fall 2019?
    - **After improving between Fall 2019 and Fall 2020, overall online student success rates declined from 70% to 68% and withdrawal rates rose from 18% to 19% in Fall 2021, similar to pre-pandemic levels.** The only demographic group experiencing continued improvement in both success and withdrawal rates between Fall 2020 and Fall 2021 were White/Caucasian males. The steepest declines in success rates were among White/Caucasian Pell recipients.
  - How do equity gaps in Fall 2021 compare to Fall 2020? To Fall 2019?
    - **Equity gaps continued to narrow for Black/African American females, Black/African American Pell Recipients, and Hispanic/Latinx females, but widened for Hispanic/Latinx males, Black/African American males, and Hispanic/Latinx Pell recipients.**

Group	**Success Rate % point changes (2020FA to 2021FA)**	**Success Equity Gaps % point changes (2020FA to 2021FA)**	**Withdrawal % point changes (2020FA to 2021FA)**	**Withdrawal Equity Gaps % point changes (2020FA to 2021FA)**
Black/African American Females	Declined by 3	Narrowed by 1.3	Increased by 1	Narrowed by 1.5
Black/African American Males	Declined by 2	Widened by 1.7	Remained constant	Narrowed by 0.5
Black/African American Pell Recipients	Declined by 3	Narrowed by 0.3	Increased by 1	Narrowed by 0.7
Black/African American Non-Pell Recipients	Declined by 2	NA	Increased by 1	NA
Hispanic/Latinx Females	Declined by 3	Narrowed by 1.8	Remained constant	Narrowed by 1.2

Group	Success Rate % point changes (2020FA to 2021FA)	Success Equity Gaps % point changes (2020FA to 2021FA)	Withdrawal % point changes (2020FA to 2021FA)	Withdrawal Equity Gaps % point changes (2020FA to 2021FA)
Hispanic/Latinx Males	Declined by 3	Widened by 3.8	Increased by 1	Widened by 3.4
Hispanic/Latinx Pell Recipients	Declined by 3	Widened by 3.9	Increased by 2	Widened by 2.8
Hispanic/Latinx Non-Pell Recipients	Declined by 2	NA	Remained constant	NA
White/Caucasian Females	Declined by 3	NA	Increased by 2	NA
White/Caucasian Males	Increased by 1	NA	Declined by 1	NA
White/Caucasian Pell Recipients	Declined by 5	Widened by 2.5	Increased by 1	Widened by 0.9
White/Caucasian Non-Pell Recipient	Remained constant	NA	Remained constant	NA

- **Barriers students faced in Fall 2021:** What did students believe were the biggest barriers they faced in Fall 2021 that would impede their ability to succeed in their courses that semester?
    - Despite doubling emergency federal financial aid and shifting about 40% of instruction and services from online to hybrid and traditional modalities in Fall 2021, students in Fall 2021 faced barriers that may be associated with the declines in the student success in online courses in Fall 2021:
        - **Personal/Family issues:** Females in all three major racial-ethnic groups, more than males, reported personal or family health issues and childcare issues as barriers to their success.
        - **Work obligations:** White/Caucasian females and Hispanic/Latinx females, in particular, indicated that work obligations impeded their success.
        - **Getting what they need from support services:** Hispanic/Latinx Pell recipients and Black/African American males, in particular, reported experiencing barriers in getting what they needed from support services.

        - **Financial cost burden:** Students in each of the historically minoritized groups reported experiencing financial cost burden at considerably higher rates.
        - **Changing course modalities mid-semester:** Students cited mid-semester changes from seated to online as an impediment to successfully completing their courses.
- **Barriers faculty faced in Fall 2021**: What did faculty believe were the biggest barriers they faced in Fall 2021 that would impede their ability to teach their courses that semester?
    - Curriculum faculty were more likely to identify institutional, rather than personal, barriers, in the ability to teach their courses during Fall 2021. These included:
        - Getting compensated adequately (56%)
        - Clear communication about COVID-19 policies/procedures (45%)
        - Changing from seated to online instruction mid semester (45%)
        - Personal or family health issues (34%)
        - Work obligations (28%)

Conclusions and Recommendations

- **Enrollment:** More research is needed to be able to untangle the effects of Wake County economic factors on enrollment trends and among demographic groups during the pandemic. However, given that enrollment declines in Fall 2021 occurred as the COVD-19 pandemic continued *and* are closely associated with regional economic recovery, the college may want to focus future recruitment and marketing efforts on emphasizing flexible scheduling and course modalities as well as upskilling to higher wage jobs.
- **Student Success:** Given the Fall 2021 declines in online student success to pre-pandemic levels as compared to Fall 2020, despite doubling emergency federal aid and moving more services to traditional and hybrid modalities, faculty and staff should consider what they might do to replicate the Fall 2020 instruction and services to address the barriers students cited as impeding their success. Based on the data collected in this study, these might include:

    - Expand online instruction and services to proportions more closely replicating Fall 2020, as appropriate for specific programs and services.
    - Provide maximum flexibility in instruction and services in courses, at the same levels as Fall 2020. This flexibility is especially important for females who are navigating personal, family health, and childcare issues, as well as juggling work obligations.
    - Strategically target academic and student supports to Hispanic/Latinx Pell recipients and Black/African American males to ensure they are getting what they need to succeed. Target success coaching to these groups to continue the trend of closing equity gaps that was started with the pandemic. Develop communication mechanisms to these students to ensure they can easily find the resources and support services they need, including academic, financial, wellness, advising, and others.
    - While more research is needed on the impact of emergency federal financial aid on student success at the student-level, the college should consider strategically targeting emergency federal financial aid to historically minoritized students and White/Caucasian Pell recipients.
- **Faculty Success**: While the pandemic placed a strain on all faculty and staff, faculty in particular felt overextended and the effect of institutional barriers that impeded their teaching in Fall 2021. Some of the actions that can be taken in the future to prevent these barriers:
    - Create a college-wide classroom contingency plan to provide protocols and approved instruction options for faculty should social distancing be necessary in the future.
    - Continue to advocate at the state level for community college faculty pay raises.
    - Provide retention bonuses to faculty on an annual basis.

Background

In March 2020, the Wake Technical Community College employee community unified and responded to the global COVID-19 pandemic with unprecedented and swift changes in operations. From Spring 2020 through Spring 2021, a research team at the college conducted a study to (a) capture the disruptive changes in policy, instruction and assessment, and academic and student support processes and practices, and (b) to compare how those changes may or may not have affected equity gaps at the college. The technical report, *Transformational Change in Response to COVID-19* (Madsen et al., 2021), details the ways the college's operations transformed, the changes in student and employee perceptions and attitudes, as well as changes in student success rates, withdrawal rates, and equity gaps that occurred during that time. Notably, the study found that overall, contrary to national trends, enrollment rebounded in Fall 2020 and held steady. More so, rather than widening, equity gaps in performance between most majority and historically minoritized subgroups actually narrowed in the semesters during the pandemic compared to semesters before the pandemic.

To continue to monitor the impacts of the college's responses on student performance and equity gaps, the research team conducted similar statistical analyses for the Fall 2021 semester as compared to Fall 2020. With the majority of faculty and staff who participated in the initial study having indicated a desire to keep many of the innovations put into place during the first year of the pandemic, we would expect to see similar success rates, withdrawal rates, and equity gaps as in Fall 2020. Additionally, the purpose of this follow-up study was to provide a "check-in" with students and faculty about the barriers they may be facing in completing or teaching their courses and how the college can better support them. To this end, this study aimed to answer the following research questions:

- How does course enrollment in Fall 2021 compare to Fall 2020? To Fall 2019?
- How do student success and withdrawal rates in Fall 2021 compare to Fall 2020? To Fall 2019?
- How do equity gaps in student retention and success rates in Fall 2021 compare to Fall 2020?
- What did students believe were the biggest barriers they faced in Fall 2021 that would impede their ability to succeed in their courses that semester?

- What did faculty believe were the biggest barriers they faced in Fall 2021 that would impede their ability to teach their courses that semester?

Differences in Instruction and Services between Fall 2020 and Fall 2021

Initially, a major assumption of this study was that the changes to instruction and services present in Fall 2020 persisted in Fall 2021 due to the continuing pandemic (i.e., there were no major changes to instruction or services in Fall 2021 as compared to Fall 2020). However, capacity data by course delivery method revealed the following differences in instruction in Fall 2021 compared to Fall 2020:

- Some traditional[4] (seated) instruction resumed, increasing from 1% of total capacity in Fall 2020 to 21% in Fall 2021; the percentage of online instruction capacity reduced from 88% in Fall 2020 to 62% in Fall 2021.
- The percentage of capacity for blended[5] course delivery increased from 5% of total capacity in Fall 2020 to 9% in Fall 2021.
- The percentage of capacity for hybrid[6] course delivery (students can take course in-person or online) increased from 6% of total capacity in Fall 2020 to 7% in Fall 2021 (K. Wang, personal communication, June 16, 2022).

Changes in student services:

- While student support services were heavily remote in Fall 2020 with some on-campus service offered, approximately 60% of these services remained virtual and 40% went back to in-person during the 2021-2022 academic year (B. Gann, personal communication, June 17, 2022).

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[4] "College curriculum or continuing education course in which 100% of the instruction is delivered face to face with the instructor and student **not** separated by distance. This is true even when some instructional activities are conducted using web-based technology" (L. Chapman & J. Parker, personal communication, May 24, 2018)

[5] "College curriculum or continuing education course in which < 50% of instruction is delivered when the student and the instructor are separated by distance" (L. Chapman & J. Parker, personal communication, May 24, 2018).

[6] "College curriculum or continuing education course in which > 50% but < 100% of instruction is delivered when the student and the instructor are separated by distance" (L. Chapman & J. Parker, personal communication, May 24, 2018). https://www.nccommunitycolleges.edu/sites/default/files/numbered-memos/cc18-024_-_instructional_delivery_method_codes.pdf

- As shown in Table 1 below, compared to Fall 2020, by Fall 2021 the college was able to provide more robust wraparound supports through federal emergency aid. Between 2020 and 2021 the number of disbursements more than doubled (from 5,456 to 15,653), the number of students receiving disbursements nearly doubled (from 5,456 to 10,053) and the amount of total disbursements nearly doubled ($5,124,500.00 to $10,219,648.00)

Table 1- Higher Education Emergency Relief Fund (HEERF) disbursements by Wake Tech to Students 2020-2022.

Year	2020	2021	2022	Overall
Number of Disbursements	5,456	15,653	8,533	29,642
Unique Headcount	5,456	10,053	7,086	14,356
Min Disbursement ($)	$ 460.00	$ 200.00	$ 36.00	$ 36.00
Max Disbursement ($)	$ 1,610.00	$ 5,000.00	$ 6,495.00	$ 6,495.00
Average Disbursement ($)	$ 939.29	$ 652.89	$ 1,185.87	$ 859.02
Total Disbursements ($)	$ 5,124,500.00	$ 10,219,648.00	$ 10,118,998.99	$ 25,463,146.99

Methods

Statistical Analysis

Inferential statistical analyses were performed using Propensity Score Matching (PSM) techniques (a quasi-experimental statistical method) to compare success and withdrawal rates in online course seats before and after the onset of the COVID-19 pandemic. Since PSM does not allow for combining multiple matched sets, separate analyses were conducted for each matched set (Fall 2019/Fall 2020; Fall 2020/Fall 2021). Comparisons were then drawn to report on changes in rates between consecutive years, as well as how rates in Fall 2021—when some instruction and services returned to seated/in-person—compared to Fall 2019, prior to the transition to nearly all online instruction. (For more details on the statistical analysis methods, see Appendix A.)

Surveys

In Fall 2021, the research team administered separate surveys to students and faculty to gather information on barriers they had experienced in successfully completing/teaching their courses. In December 2021, survey results were provided to the college's Executive Leadership Team and posted to the college's Research site on the Portal. A grand total of 2,421 students responded to the student survey, with 2,119 credit-seeking (Curriculum, "CU") students responding out of 22,105 invited to participate (9.6% response rate) and 245 non-credit-seeking (Continuing

Education, “CE”) students responding out of 11,293 invited to participate (2.2% response rate). After removing submissions from students under age 18, CU student respondents totaled 1,917 and CE student respondent totaled 244. While aggregate survey results for CE students are provided in the report, the low respondent count does not allow for disaggregating the data into subgroups as performed with the results for CU students.

A grand total of 407 faculty responded to the faculty survey, with 343 Curriculum (CU) faculty responding out of 861 invited to participate (39.8%. response rate) and 64 Continuing Education (CE) faculty responding out of 504 invited to participate (12.7% response rate).

A Note on Disaggregations

To examine potential equity gaps among students by race-ethnicity, sex, and socioeconomic level (for which students’ receipt or non-receipt of Pell Grants serves as a proxy), as well as intersections of these demographics, findings for enrollment, performance, and survey responses are double disaggregated (race-ethnicity*sex and race-ethnicity*Pell status). While many races, ethnicities, and genders are represented among Wake Tech’s student population, the analyses focus on the categories with the largest representation in order to make inferences from the findings. Although there are inconsistencies between the racial-ethnic categories in our institutional student data system and the survey data, the more inclusive category descriptions are referenced in the narratives for all analyses conducted.

Findings

Findings are organized by the study’s key research question as follows:

Course Enrollment: How does course enrollment in Fall 2021 compare to Fall 2020? To Fall 2019?

To visualize the pandemic’s potential impact on students’ ability to access the college, descriptive statistics of overall course (seats) enrollment pre-pandemic and during the pandemic are provided in the charts below. As Figure 1 shows below, overall enrollment fell just slightly in Fall 2020 compared to Fall 2019 (by 957 seats). In Fall 2020, nearly all of the demographic proportions by race-ethnicity/gender and race-ethnicity/Pell status remained consistent with Fall

2019, with the most notable difference being the two-percentage-point drop for Black/African American Pell students.[7]

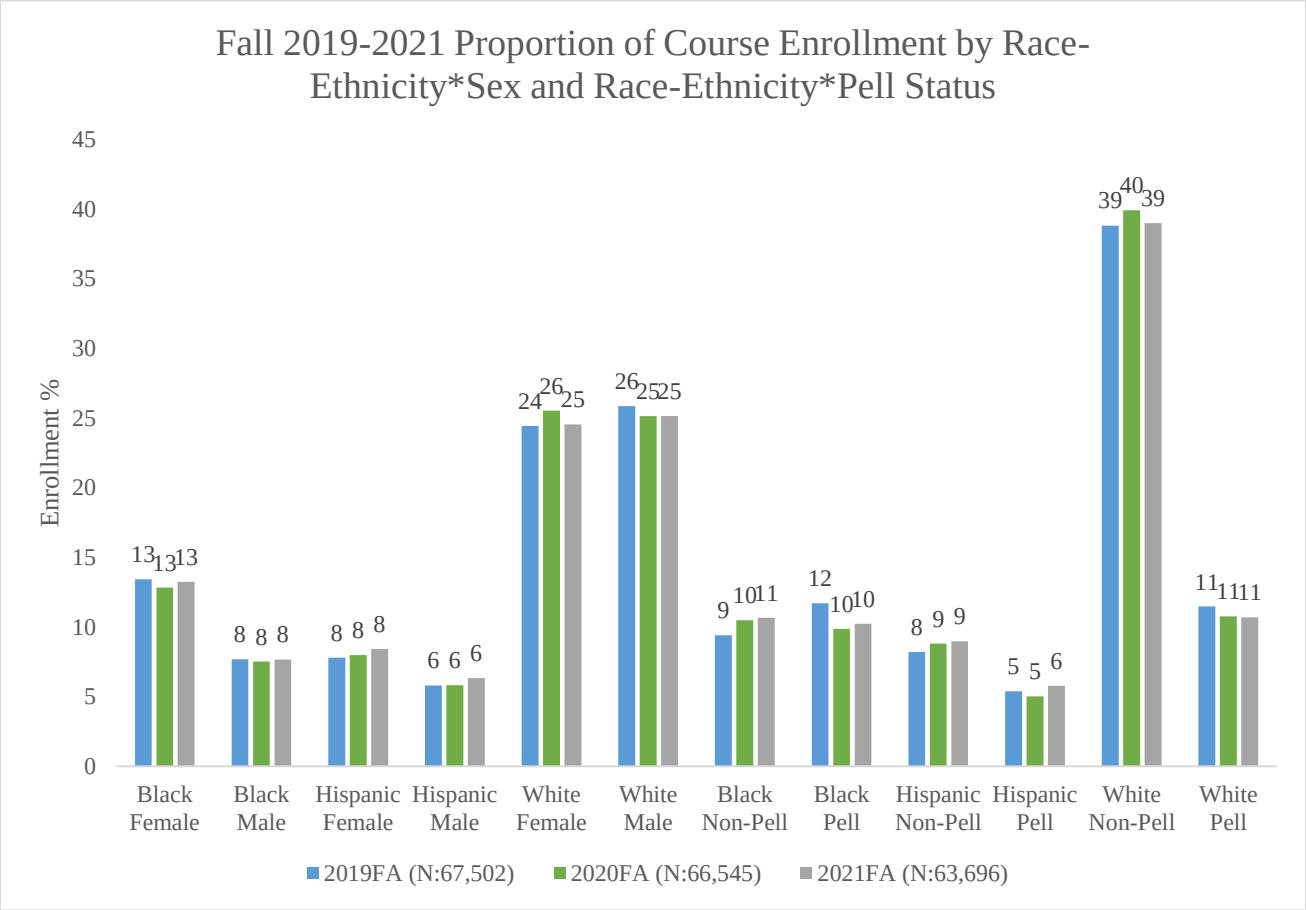

*Figure 1: Fall 2019-2021 proportion of course enrollment, by race-ethnicity*gender and race-ethnicity*Pell status.*

Comparing the second Fall semester (2021) to the first (2020) during the pandemic, total enrollment fell slightly, by 2,849 seats, or about 4%, distributed as follows:

- Among racial/ethnic groups, the proportion of enrolled seats remained steady (no major increases or decreases) between Fall 2020 and Fall 2021 among Black/African American females and males, Hispanic/Latinx females and males, and White/Caucasian males, but

[7] While the Chi-square test indicates that differences between Fall 2019 and Fall 2020 were significant for some of the demographic categories shown, the effect sizes for some of these categories are too small (<0.01) which indicates very small association if there is any.

dropped slightly among White/Caucasian females (one percentage point) between Fall 2020 and Fall 2021.

- Among Pell recipients, the proportion of enrolled seats stayed about the same for Black/African American and White/Caucasian students and increased by one percentage point among Hispanic/Latinx students between Fall 2020 and Fall 2021.
- Among non-Pell recipients, the proportion of enrolled seats increased by one percentage point among Black/African American and Hispanic/Latinx students and decreased by one percentage point among White/Caucasian students.

In summary, while total duplicated enrollment of course seats declined slightly after one year of the pandemic, the proportional declines were mainly among White/Caucasian females and White/Caucasian non-Pell recipients. The proportion of enrolled seats remained steady or increased slightly among Black/African American and Hispanic/Latinx students and Pell recipients. This data substantiates Wake Tech's continued ability to provide Wake County with equitable access to higher education more than one year into the COVID-19 pandemic at rates similar or equal to before the pandemic.

Success and Retention: How do student success and withdrawal rates in Fall 2021 compare to Fall 2020?

Several sets of Propensity Score Matching (PSM) analysis were conducted to examine the effects of changes in response to COVID-19 as online instruction continued through Fall 2021. Charts below show the results of these analyses for the overall student population and by gender, race-ethnicity, and Pell Grant status. Comparisons for Fall 2019 compared to Fall 2020 are also included as reference points for student performance in the first year of the pandemic.

Success Rates Fall 2019 to Fall 2020: Compared to the success rate for online courses in Fall 2019, prior to the pandemic, the success rate for online courses in Fall 2020 increased significantly overall (from 68% to 72%) and across genders, racial-ethnic groups, and Pell Grant status except for (a) Hispanic/Latinx males and (b) Hispanic/Latinx students non-Pell recipients, as shown in Figure 2 below.

Success Rates Fall 2020 to Fall 2021: The following year, in Fall 2021, success rates in online courses decreased across genders, racial-ethnic groups, and Pell Grant status, except for White/Caucasian males, which showed an increase of two percentage points, although it was not

statistically significant. Statistically significant decreases occurred overall (from 70% to 68%) and among the following groups: Black/African American females (from 58% to 55%), White/Caucasian females (from 77% to 74%), Black/African American Pell recipients (from 56% to 53%) and non-Pell recipients (from 60% to 56%), and White/Caucasian Pell recipients (from 76% to 71%). However, in each of these cases, the success rates in Fall 2021 stayed near the Fall 2019 success rates.[8]

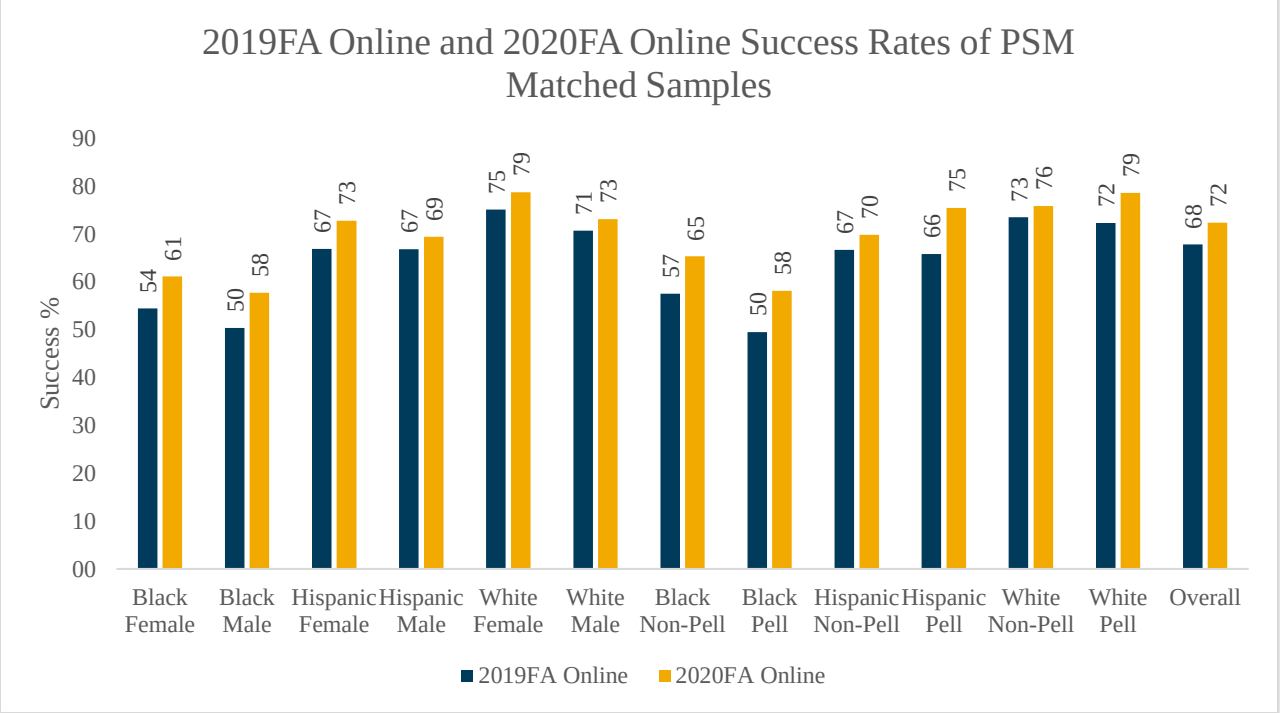

Figure 2: 2019FA online and 2020FA online success rates of PSM matched samples.

[8] Procedures involved in the matching process of Propensity Score Matching statistical analysis may result in differences in the exact percentages for the success and withdrawal rates and equity gaps for the Fall 2020 semester when matched first with Fall 2019 and, second, with Fall 2021. Each matched set is a different sample, as the sample is selected based on the particular characteristics of the two matched sets.

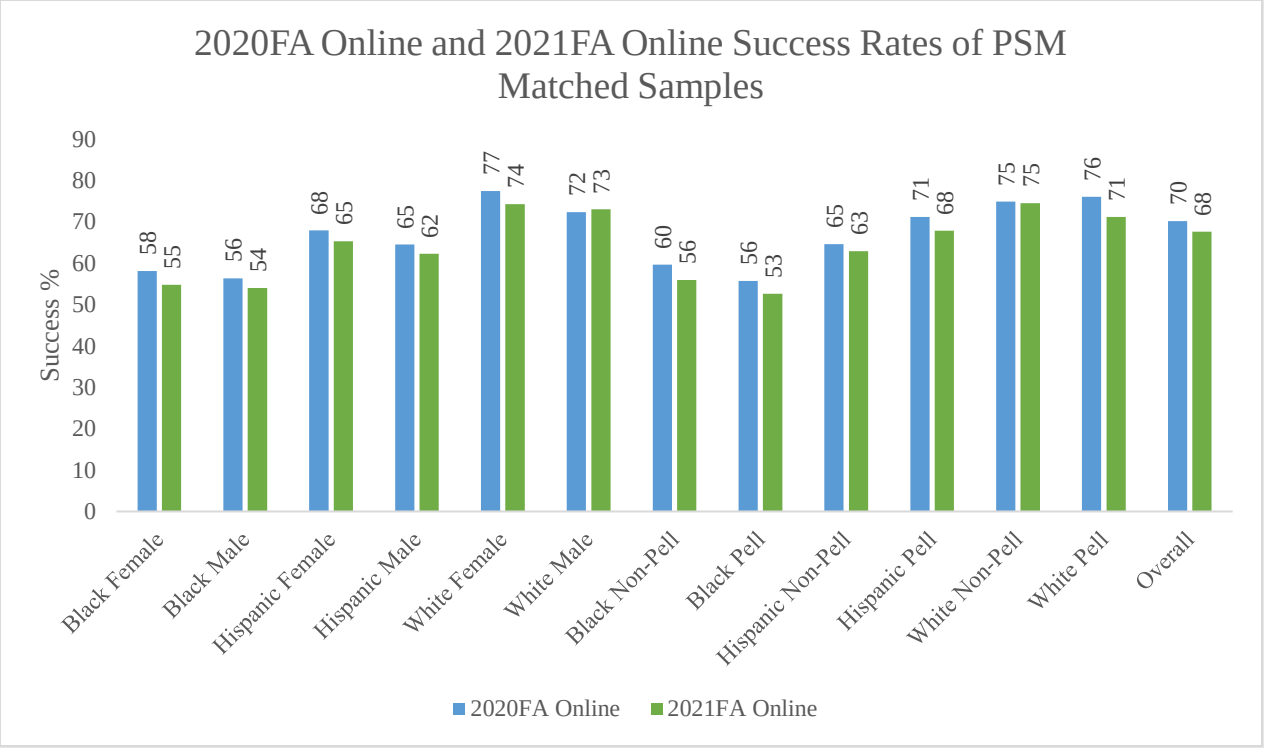

Figure 3: 2020FA online and 2021FA online success rates of PSM matched samples.

Withdrawal Rates Fall 2019 to Fall 2020: Compared to the withdrawal rate for online courses in Fall 2019, the withdrawal rate for online courses in Fall 2020 decreased significantly overall (from 20% to 18%) and for students of each major racial-ethnic group who received Pell Grants, Black/African American females, Black/African American students who did not receive Pell Grants, and White/Caucasian males and females, as shown in Figure 4 below.

Withdrawal Rates Fall 2020 to Fall 2021: The following year, in Fall 2021, withdrawal rates increased slightly but significantly overall (from 18% to 19%) and for White/Caucasian females (from 15% to 17%) (not significant for other demographic groups); however, the rates in Fall 2021 stayed near the Fall 2019 withdrawal rates. Withdrawal rates continued to decrease for Black/African males, Hispanic/Latinx females and non-Pell recipients, and White/Caucasian males, although the declines were not statistically significant compared to Fall 2020.

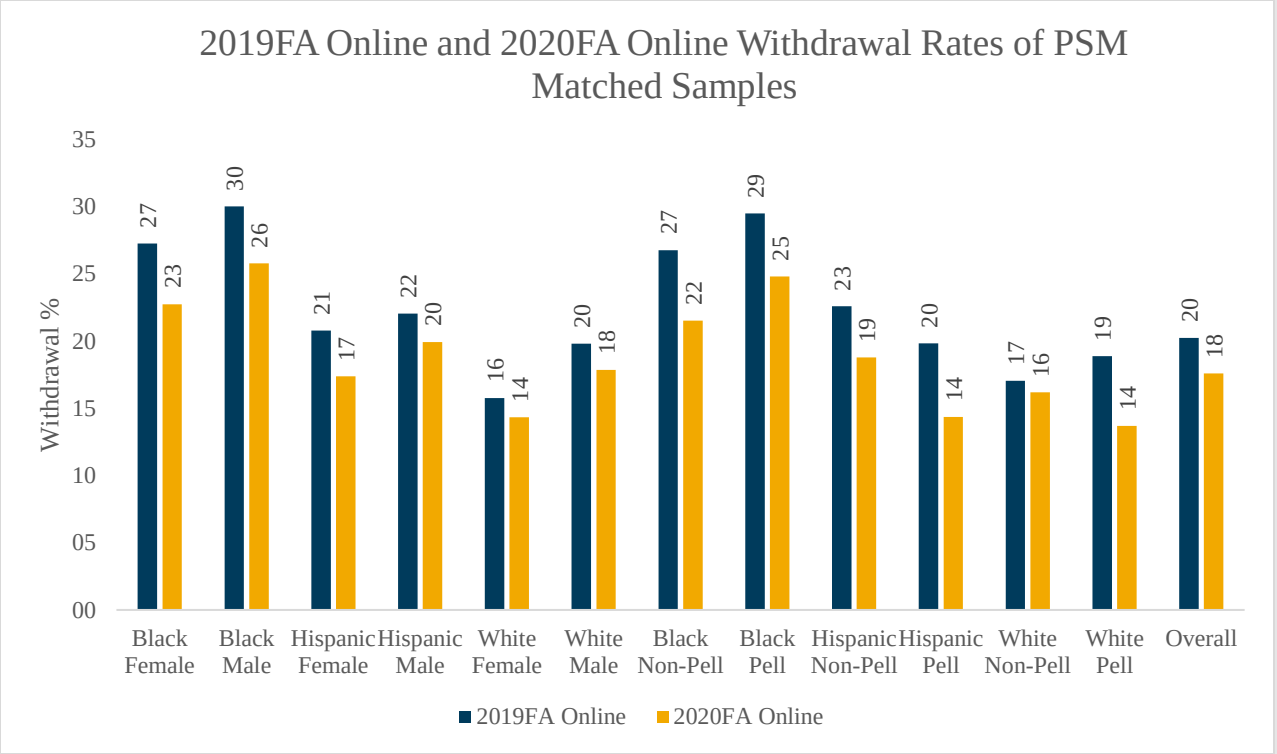

Figure 4: 2019FA online and 2020FA online withdrawal rates of PSM matched samples.

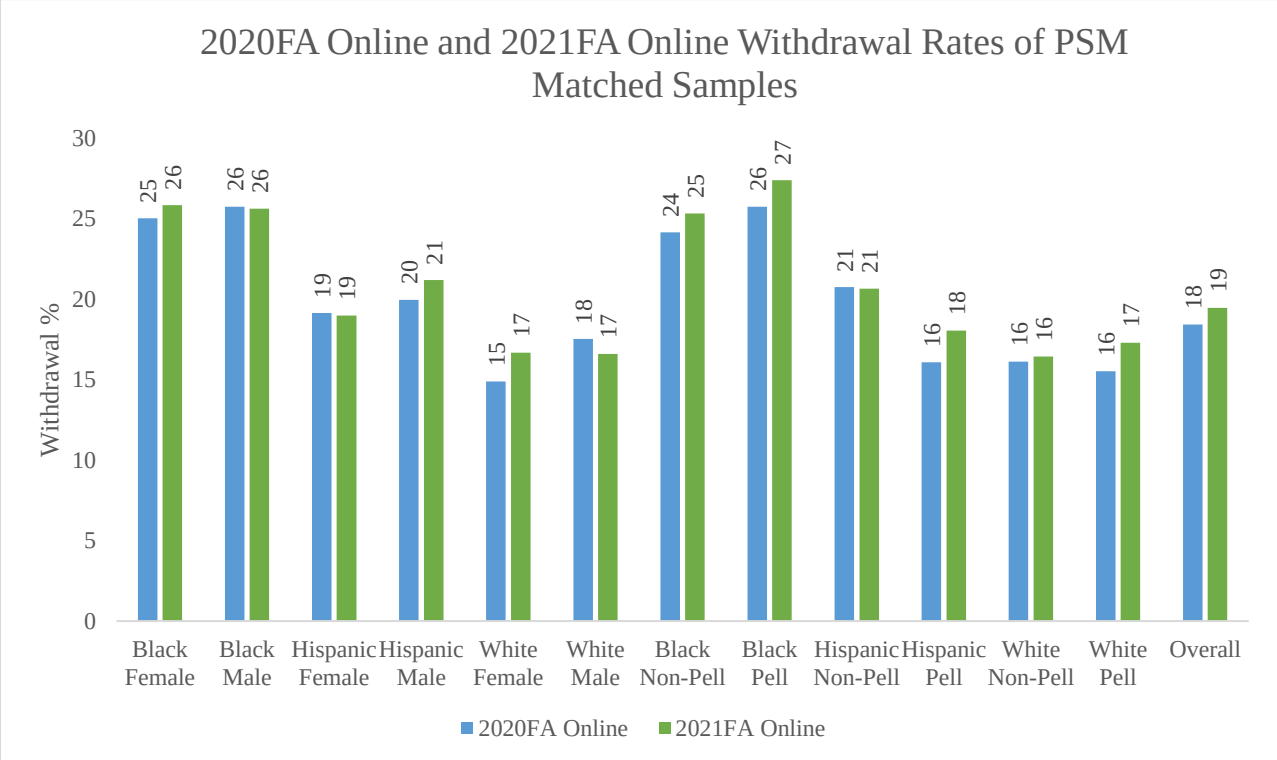

Figure 5: 2020FA online and 2021FA online withdrawal rates of PSM matched samples.

Equity Gaps: How do equity gaps in student retention and success rates in Fall 2021 compare to Fall 2020? To Fall 2019?

To assess whether the changes made in response to COVID-19 have an association with widening or narrowing of equity gaps in retention and success rates for low-income students and students of color at Wake Tech, additional PSM analyses were conducted to compare gaps for the following subgroups:

1. Black/African American males and White/Caucasian males
2. Black/African American females and White/Caucasian females
3. Hispanic/Latinx males and White/Caucasian males
4. Hispanic/Latinx females and White/Caucasian females
5. White/Caucasian Pell recipients and White/Caucasian Non-Pell recipients
6. Black/African American Pell recipients and White/Caucasian Non-Pell recipients
7. Hispanic/Latinx Pell recipients and White/Caucasian Non-Pell recipients

The charts below show the gaps in success and withdrawal rates (and whether the differences are statistically significant) for the control groups compared to the treatment groups (1st comparison: Fall 2019 is control, Fall 2020 is treatment; 2nd comparison: Fall 2020 is control, Fall 2021 is treatment).

Equity Gaps Fall 2019-Fall 2020 (Success Rate): Disaggregating by race-ethnicity and gender, as shown in Figure 6 below, indicates a decrease in the success rate gap in Fall 2020 for most of the subgroups, particularly between Black/African American Pell recipients and White/Caucasian Non-Pell recipients (from 25% to 19%). However, increases in the success rate gap occurred between Hispanic/Latinx males and White/Caucasian males (from 4.3% to 6.1%), and Hispanic/Latinx Pell recipients and White/Caucasian Non-Pell recipients (from 4.1% to 4.8%).

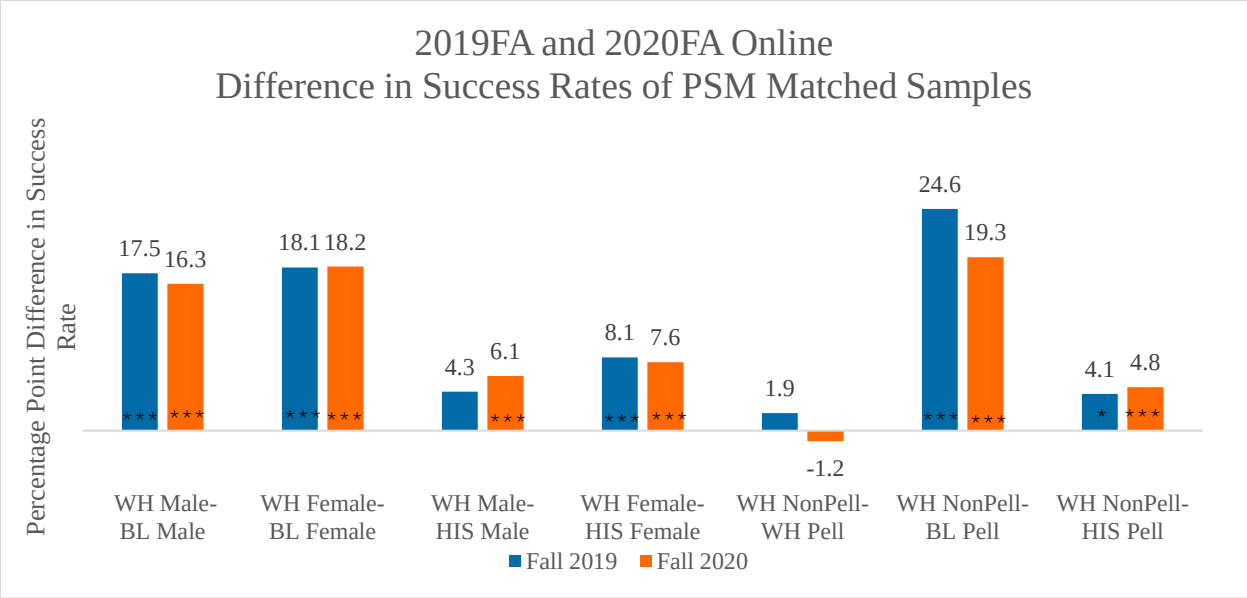

Figure 6: 2019FA online and 2020FA online difference in success rates of PSM matched samples, by race-ethnicity/gender and race-ethnicity/Pell status.

Equity Gaps Fall 2020-Fall 2021 (Success Rate): In Fall 2021, as Figure 7 shows below, we see these gaps continue to increase between Hispanic/Latinx males and White/Caucasian males (from 5.9% to 9.7%) and Hispanic/Latinx Pell recipients and White/Caucasian Non-Pell recipients (from 4.5% to 8.4%). Increases in the success rate gap also occurred between Black/African American males and White/Caucasian males (from 16.2% to 17.9%), and between White/Caucasian Non-Pell recipients and recipients (from 0.8% to 3.3%). Meanwhile, success rate gaps continued to decrease between the following groups:

- Black/African American females and White/Caucasian females (from 18.2% to 16.9%)
- Hispanic/Latinx females and White/Caucasian females (from 7.7% to 5.9%)
- Black/African American Pell recipients and White/Caucasian non-Pell recipients (from 19.5% to 19.2%)

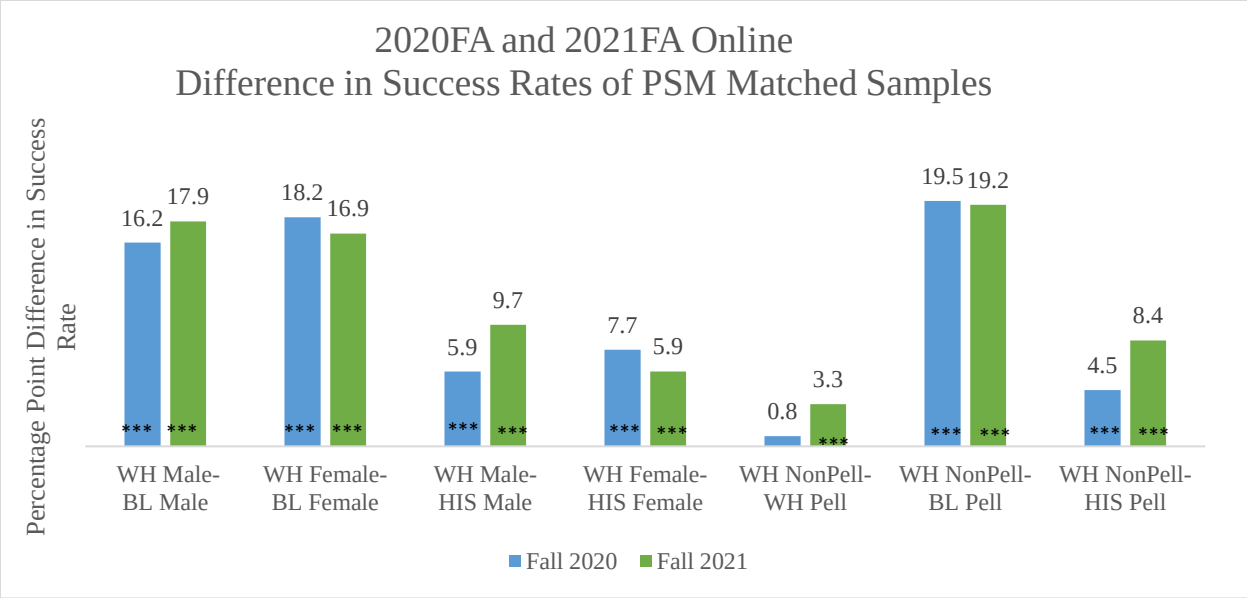

Figure 7: 2020FA online and 2021FA online difference in success rates of PSM matched samples, by race-ethnicity/gender and race-ethnicity/Pell status.

Equity Gaps Fall 2019-Fall 2020 (Withdrawal Rates): Figure 8 below indicates a decrease in the withdrawal rate gap from Fall 2019 to Fall 2020 for most of the subgroups, particularly between Black/African American Pell recipients and White/Caucasian Non-Pell recipients (from 12.6% to 9.4%). Notable increases in the withdrawal rate gap occurred between Black/African American males and White/Caucasian males (from 7.8% to 9.0%) and Hispanic/Latinx males and White/Caucasian males (from 1.1% to 2.6%).

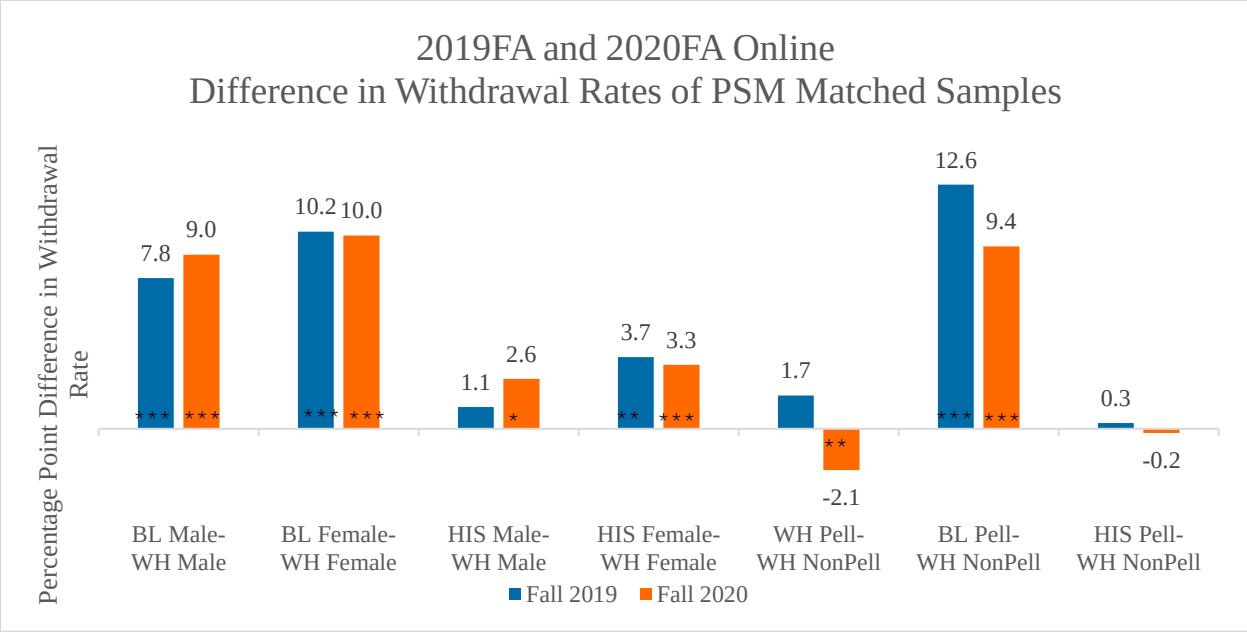

Figure 8: 2019FA online and 2020FA online difference in withdrawal rates of PSM matched samples, by race-ethnicity/gender and race-ethnicity/Pell status.

Equity Gaps Fall 2020-Fall 2021 (Withdrawal Rates): In Fall 2021, as Figure 9 shows below, the gap continued to increase between Hispanic/Latinx males and White/Caucasian males (from 2.0% to 5.4%). Gaps also widened between White/Caucasian Non-Pell recipients and recipients (from -0.2% to 0.7%), and Hispanic/Latinx Pell recipients and White/Caucasian non-Pell recipients (from 0.4% to 3.2%). Meanwhile, withdrawal rate gaps decreased between the following groups:

- Black/African American males and White/Caucasian males (from 9.5% to 9.0%)
- Black/African American females and White/Caucasian females (from 10.0% to 8.5%)
- Hispanic/Latinx females and White/Caucasian females (from 3.4% to 2.2%)
- Black/African American Pell recipients and White/Caucasian non-Pell recipients (from 9.6% to 8.9%)

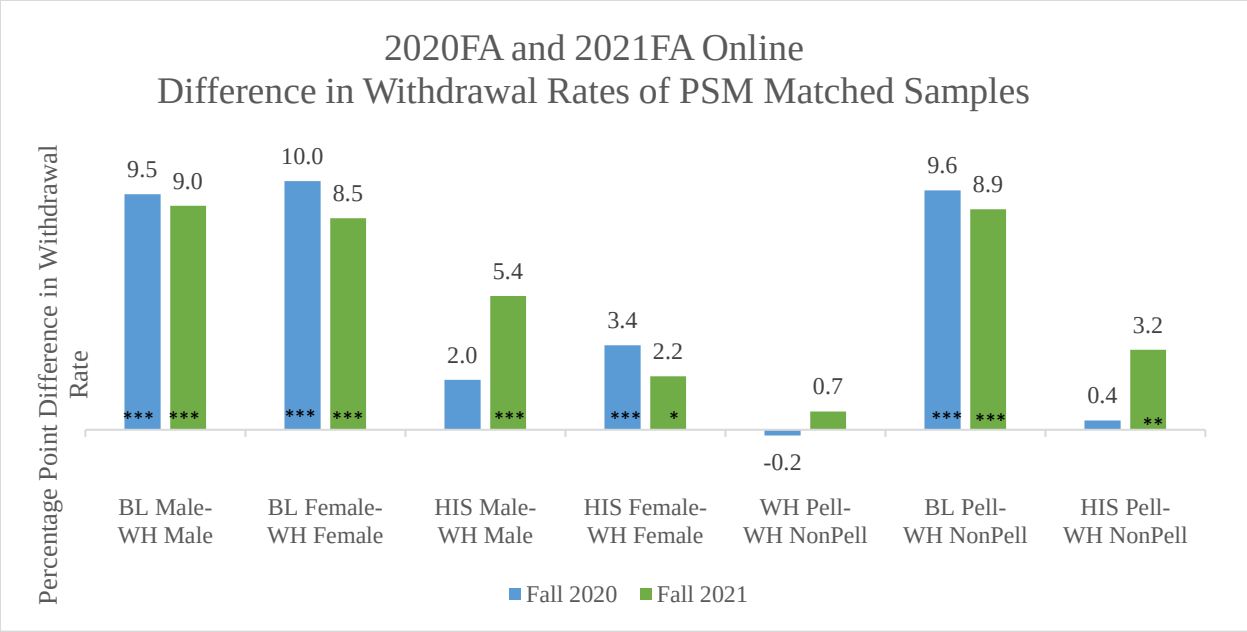

Figure 9: 2020FA online and 2021FA online difference in withdrawal rates of PSM matched samples, by race-ethnicity/gender and race-ethnicity/Pell status.

Summary of Statistical Analyses

Success and Withdrawal Rates:

Between Fall 2020 and Fall 2021, statistically significant decreases in success rates occurred among the following, although the success rates in Fall 2021 stayed near the Fall 2019 success rates:

- Overall population (68% in Fall 2019 compared to 68% in Fall 2021)
- Black/African American females (54% in Fall 2019 compared to 55% in Fall 2021)
- Black/African American Pell recipients (50% in Fall 2019 compared to 53% in Fall 2021)
- Black/African American Non-Pell recipients (57% in Fall 2019 compared to 56% in Fall 2021)
- White/Caucasian females (75% in Fall 2019 compared to 74% in Fall 2021)
- White/Caucasian Pell recipients (72% in Fall 2019 compared to 71% in Fall 2021)

Between Fall 2020 and Fall 2021, statistically significant increases in withdrawal rates occurred among the following, although the success rates in Fall 2021 stayed near the Fall 2019 success rates:

- Overall population (from 20% in Fall 2019 compared to 19% in Fall 2021)
- White/Caucasian females (from 16% in Fall 2019 compared to 17% in Fall 2021)

Equity Gaps:

Between Fall 2020 and Fall 2021, success rate gaps widened between:

- Hispanic/Latinx males and White/Caucasian males (from 5.9% to 9.7%)
- Hispanic/Latinx Pell recipients and White/Caucasian Non-Pell recipients (from 4.5% to 8.4%)
- Black/African American males and White/Caucasian males (from 16.2% to 17.9%)
- White/Caucasian Pell Grant non-recipients and recipients (from 0.8% to 3.3%)

Between Fall 2020 and Fall 2021, success rate gaps continued to narrow between:

- Black/African American females and White/Caucasian females (from 18.2% to 16.9%)
- Hispanic/Latinx females and White/Caucasian females (from 7.7% to 5.9%)
- Black/African American Pell recipients and White/Caucasian non-Pell recipients (from 19.5% to 19.2%)

Between Fall 2020 and Fall 2021, withdrawal rate gaps widened between:

- Hispanic/Latinx males and White/Caucasian males (from 2.0% to 5.4%)
- White/Caucasian Non-Pell recipients and recipients (from -0.2% to 0.7%)
- Hispanic/Latinx Pell recipients and White/Caucasian non-Pell recipients (from 0.4% to 3.2%)

Between Fall 2020 and Fall 2021, withdrawal rate gaps narrowed between:

- Black/African American males and White/Caucasian males (from 9.5% to 9.0%)
- Black/African American females and White/Caucasian females (from 10.0% to 8.5%)

- Hispanic/Latinx females and White/Caucasian females (from 3.4% to 2.2%)
- Black/African American Pell recipients and White/Caucasian non-Pell recipients (from 9.6% to 8.9%)

Student Survey: What did students believe were the biggest barriers they faced in Fall 2021 that would impede their ability to succeed in their courses that semester?

Personal Barriers

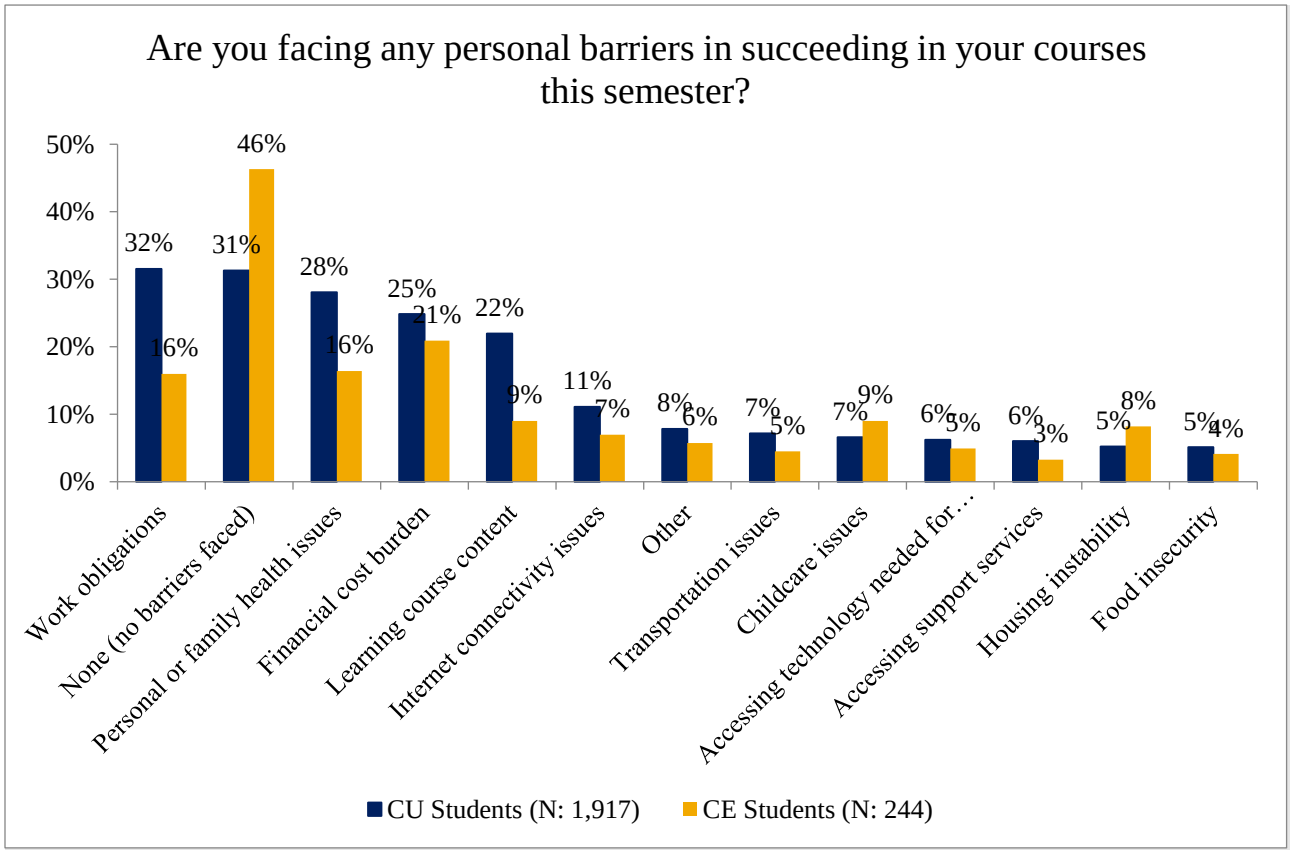

Figure 10: Personal barriers reported by CU/CE students, Fall 2021

As Figure 10 shows, overall, CU students reported experiencing personal barriers at higher percentages than CE students, except when it came to childcare issues and housing instability.

Table 2: Top personal barriers students experienced and representative quotes

Top Personal Barriers	Representative Quotes from Elaboration
(1) Work obligations	*"Being over scheduled at work due to staffing shortages (due to covid, actually) and not being able to afford wifi and having my computer get broken."* *"I am working two part time jobs around the work study job I have while completing my course. Scheduling has been tough but it helps me pay my rent and expenses."*
(2) Personal or family health issues	*"Previously contracted COVID-19 with residual health complications resulting in unable to return to work and causing financial and housing instability while trying to care for 4 children and continue my education."* *"I have a lot of health issues that require me to go to several weekly doctor visits. Also while dealing with two children and one that has a disability. Not to even mention that we have lost 8 family members this year to covid. It has been rough for everyone so we are all just coping."*
(3) Financial cost burden	*"I also have had some financial instability lately due to bill costs and the cost of tools for school and work since I am studying automotive."* *"Having to pay for my own bills has been my biggest battle. I work everyday and overtime it is mentally draining and I have no energy left for school.* *"Financial aid for food not school."*
(4) Learning course content	*"Learning course content: since my classes are online or hybrid, I struggle to take in the information sometimes, I am aware of the ILC center and all of the resources I could use for help but sometimes my job can take time from me as well."*
(5) Internet connectivity issues	*"I am in online classes and I frequently don't have Wi-Fi due to construction and other things happening around me. I find myself in the McDonald's parking lot a lot or at my grandparents house that is 30 mins away which takes time out of my learning."*

Although this barrier was rarer than others, five percent of CU student respondents and eight percent of CE student respondents indicated that they were experiencing housing instability, with several noting that they had been, or where on the verge of, homelessness.

> *"I have been homeless the entire time I have been in this class on top of working and family obligations."*
>
> *"I am on the verge of being homeless but I am trying my very hardest to complete my classes even though I am going through a really hard time right now."*
>
> *"Just started a new job, lost my housing due to not being able to find a place, also trying to Get my GED at the same time by December but do not want to overwhelm myself with alot especially when I do get depressed and more."*

As Figures 11 and 12 show, when comparing the most frequently reported personal barriers among CU student groups by race-ethnicity*Pell status and race-ethnicity*sex, some distinctions emerge:

- **Work obligations (32% overall)**: the top major barrier, particularly for:
    - Hispanic/Latinx: females (39%) and Pell recipients (39%)
    - White/Caucasian females (36%)
- **None (31% overall):** the following were more likely than other groups to report no barriers faced:
    - White/Caucasian: males (35%) and non-Pell recipients (35%)
    - Black/African American: males (39%) and non-Pell recipients (40%)
- **Personal or family health issues (28% overall)**: females in all three of the largest racial-ethnic groups were considerably more likely than their male counterparts to report personal or family health issues as a personal barrier:
    - White/Caucasian: 30% females compared to 21% males
    - Hispanic/Latinx: 31% females compared to 21% males
    - Black/African American: 32% females compared to 20% males
- **Financial cost burden (25% overall)**: highest for:
    - Hispanic/Latinx: males (30%), females (30%), and non-Pell recipients (33%)
    - Black/African American: females (30%) and non-Pell recipients (30%)

- **Learning course content (22% overall)**: least likely to report learning course content as a personal barrier:
    - Black/African American non-Pell recipients (13%)
- **Internet connectivity issues (11% overall):** most prevalent among:
    - Black/African American: females (15%) and non-Pell recipients (15%).

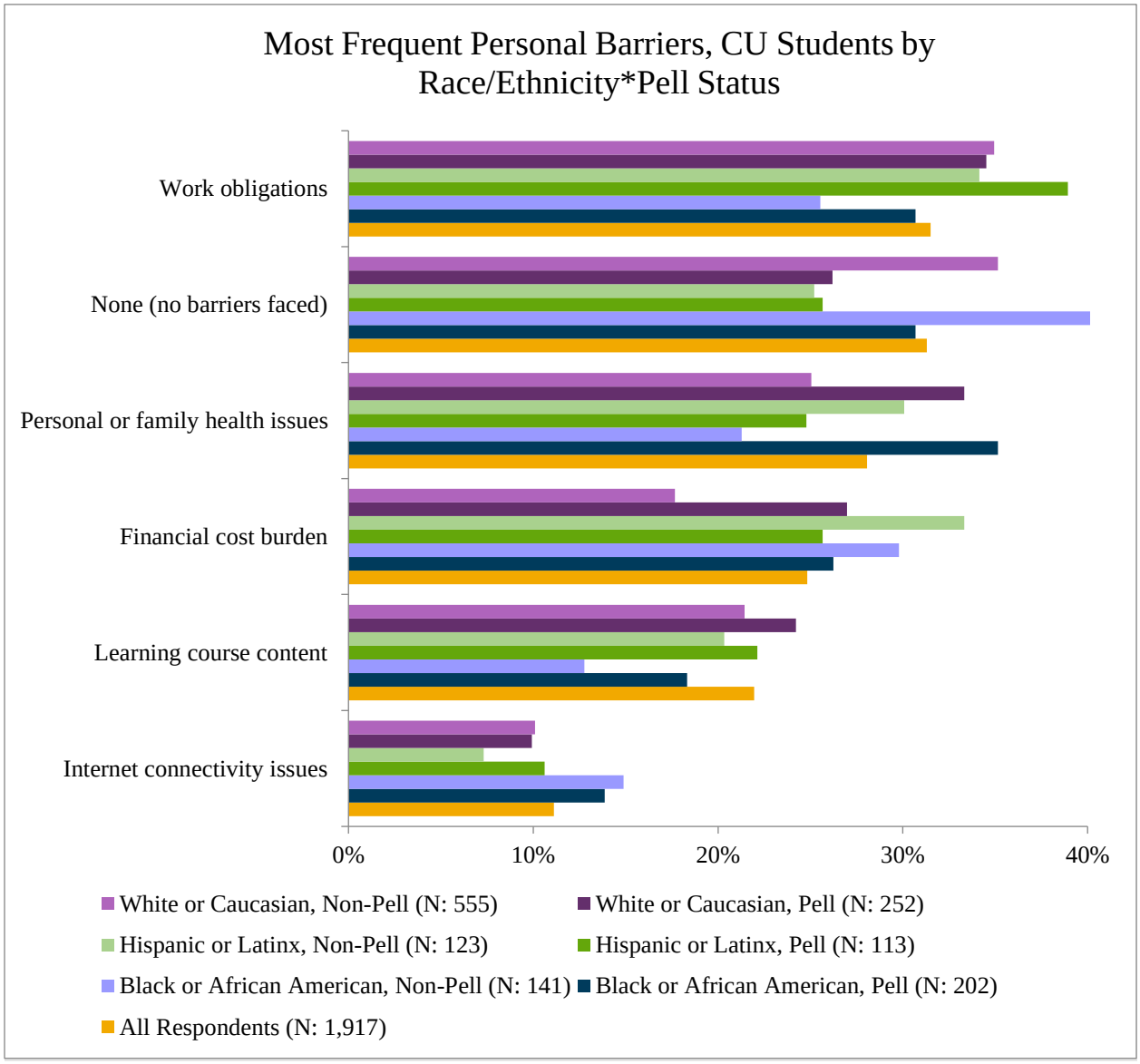

*Figure 11: Most frequent personal barriers, CU students by race/ethnicity*Pell status*

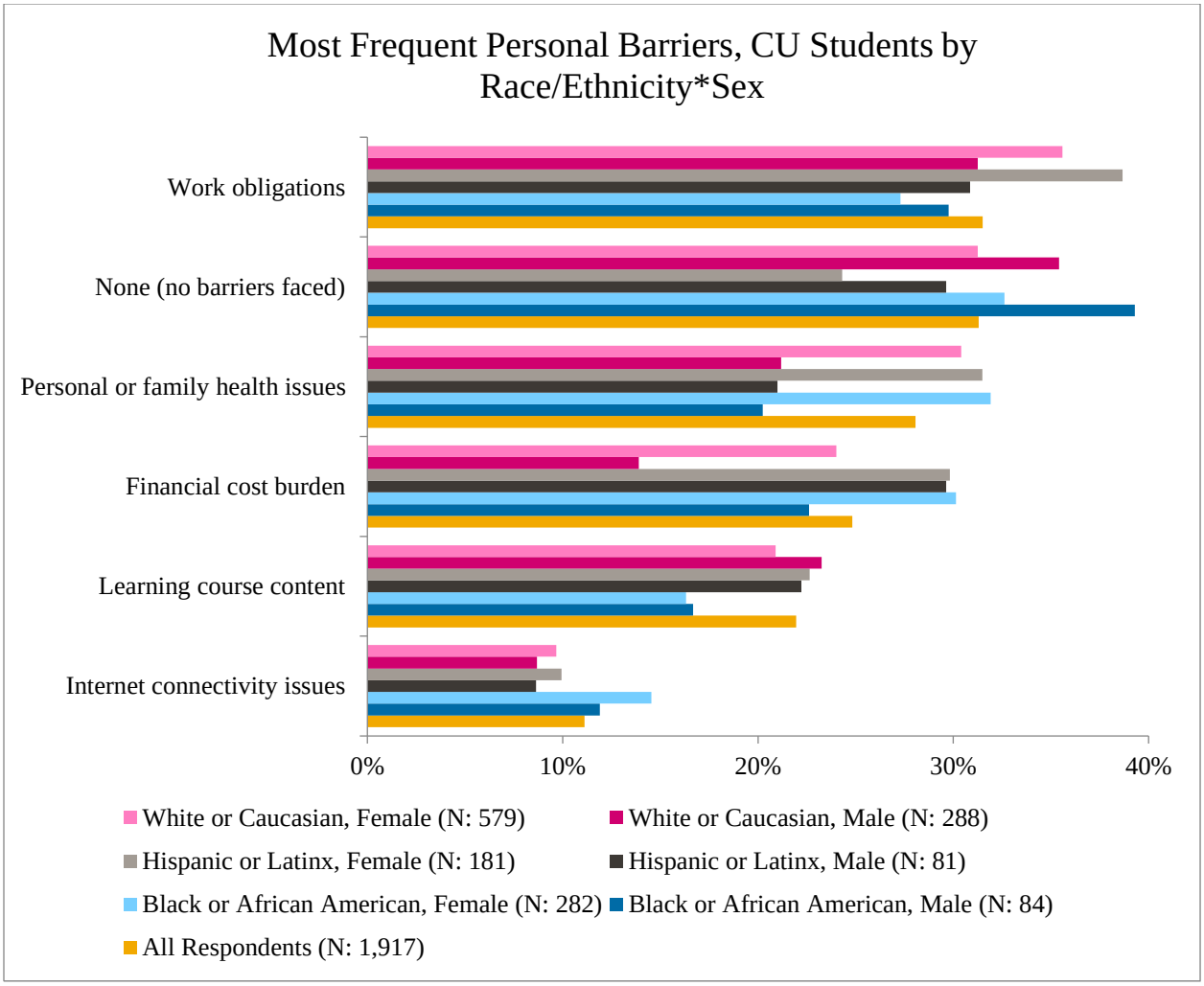

*Figure 12: Most frequent personal barriers, CU students by race/ethnicity*sex*

While less frequently reported as major personal barriers among the survey respondents overall, it is important to understand whether equity gaps exist among groups of students regarding the barriers they experience. As Figures 13 and 14 show below, Black/African American or Hispanic/Latinx respondents tended to be more likely than their White/Caucasian counterparts to have reported the following as personal barriers to completing their courses:

- **Transportation issues (7% overall)**:
    - 14% of Black/African American Pell recipients compared to 4% of White/Caucasian Pell recipients
    - 13% of Black/African American females compared to 4% of White/Caucasian females
- **Accessing technology needed for courses (6% overall)**:

    - 10% of Hispanic/Latinx non-Pell recipients compared to 5% of White/Caucasian non-Pell recipients
    - 10% of Hispanic/Latinx males compared to 5% of White/Caucasian males
    - 8% of Black/African American Pell recipients compared to 5% of White/Caucasian Pell recipients
    - 8% of Black/African American males compared to 5% of White/Caucasian males
- **Accessing support services (6% overall)**:
    - 8% of Black/African American females compared to 5% of White/Caucasian females
- **Housing instability (5% overall):**
    - 7% of Hispanic/Latinx males compared to 3% of White/Caucasian males
    - 8% of Black/African American males compared to 3% of White/Caucasian males
    - 9% of Black/African American females compared to 4% of White/Caucasian females
- **Food insecurity (5% overall):**
    - 9% of Black/African American females compared to 4% of White/Caucasian females

An exception was **childcare issues**, which highlights major equity gaps between females and males and between Pell recipients and non-Pell recipients, rather than among racial-ethnic groups. Black/African American and White/Caucasian Pell recipients also reported food insecurity as a personal barrier at a similar rates (9% and 8%, respectively).

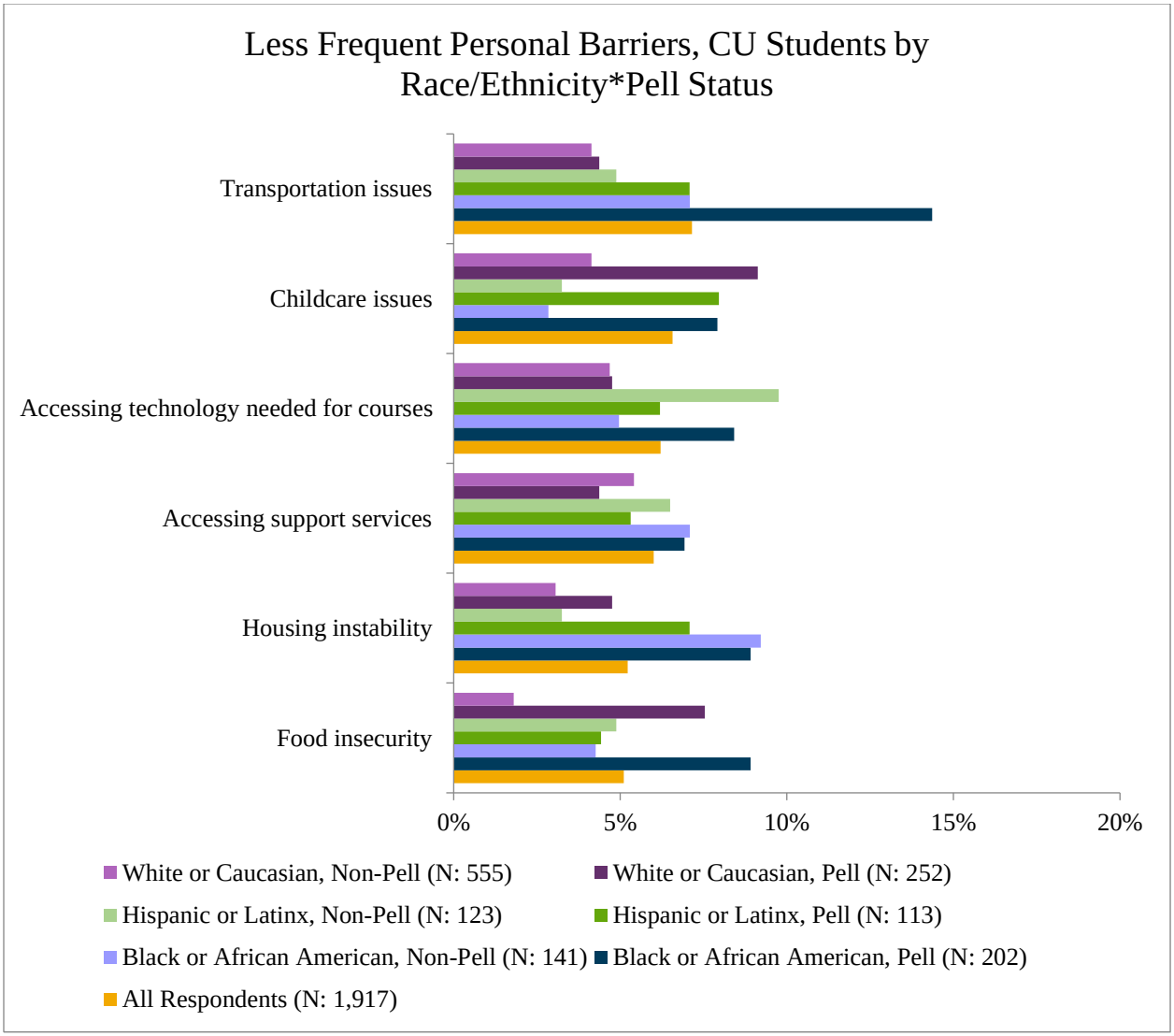

*Figure 13: Less frequent personal barriers, CU students by race/ethnicity*Pell status*

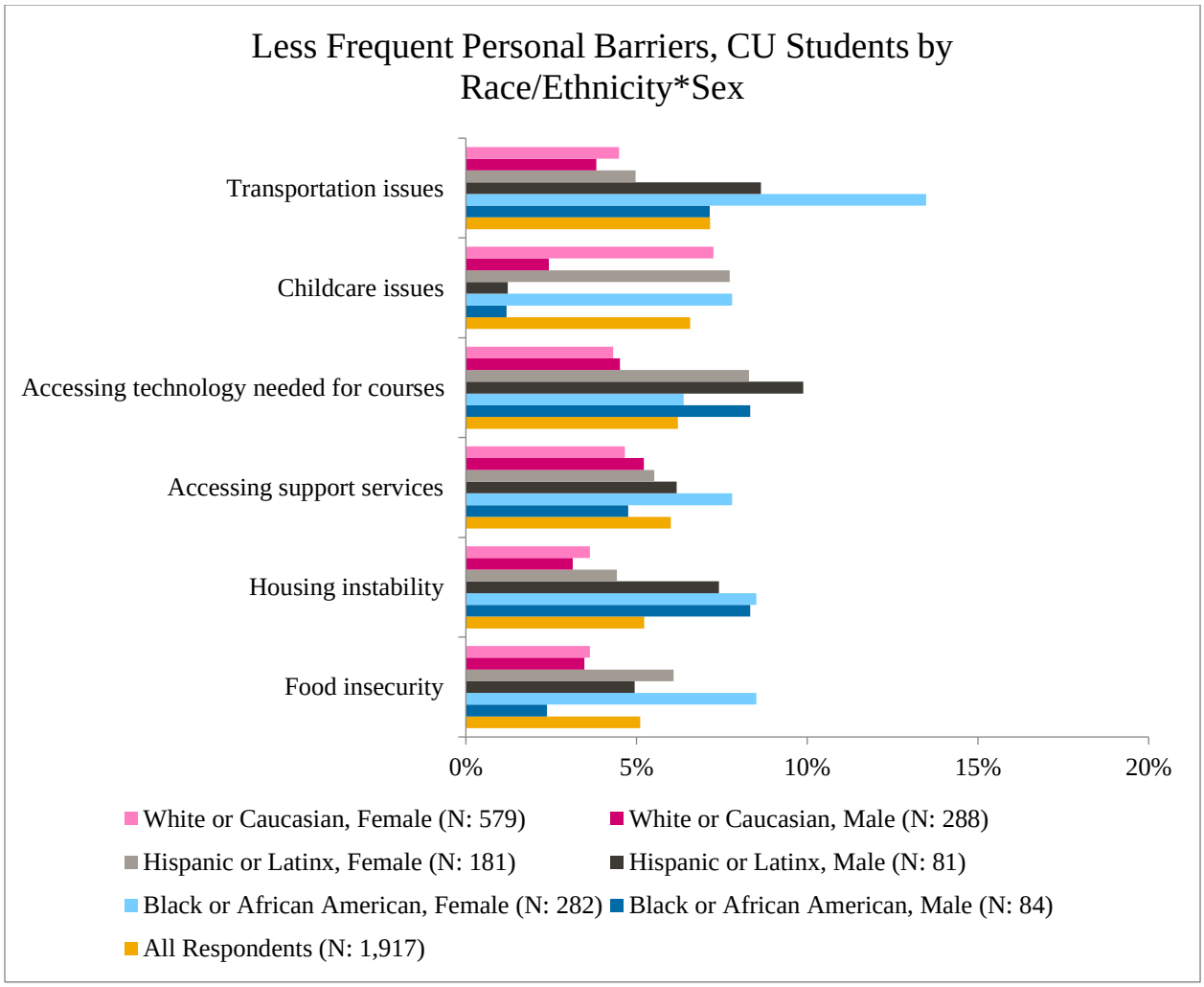

*Figure 14: Less Frequent Personal Barriers, CU Students by Race/Ethnicity*Sex*

Institutional Barriers

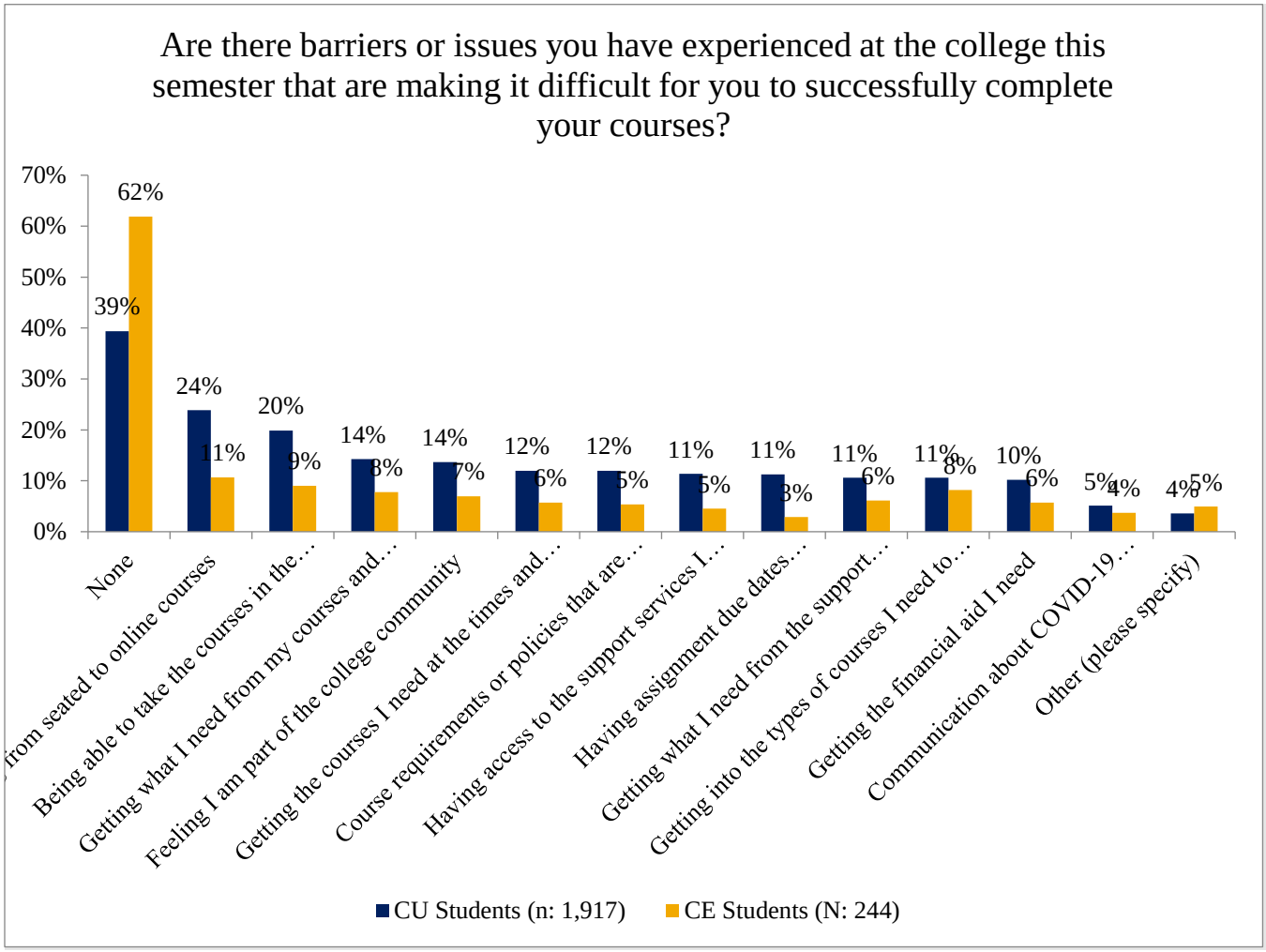

Figure 15: Institutional barriers reported by CU/CE students, Fall 2021

Similar to personal barriers, CU students reported facing institutional barriers at higher percentages than CE students, with nearly two out of three CE student respondents reporting that they had not faced any institutional barriers.

Table 3: Top institutional barriers students experienced and representative quotes

Top Institutional Barriers	Representative Quotes from Elaboration
(1) Changing from seated to online courses	*"I signed up for in person classes to meet people and I was moved online without discussion within 4 hours of an announcement.* *"Changing from seated to online formats was detrimental to both my learning and my mental health. I learn best in face to face classes but the pandemic has hurt my ability to do so.*
(2) Being able to take the courses in the modalities I learn best (face-to-face or online)	*"I do better in class and having a hybrid situation it's more difficult to effectively learn for me."* *"I learn best when I can take classes online so al the online classes have been working well for me and my schedule. The weird shift to hybrid and in person classes feels weird and unnecessary, especially considering that Covid is still a huge problem and I'm immunocompromised."*
(3) Getting what I need from my courses and instructors so I can do well	*"Because of my work schedule, I was benefiting from fully online classes. Since in person has gone back partially, there are less courses available that work with my schedule."* *"I am starting a new career and have questions about the internship I'm in- I need guidance but my professor isn't answering his email."*
(4) Feeling I am part of the college community	*"I only have one class in person, therefore I don't feel very connected to my peers this semester because I haven't built any connections."* *"I feel isolated a lot when it comes to online schooling because there is little to no contact in between classmates unless if the teachers make groups and such."*

Overall, student respondents were less likely to report experiencing institutional barriers in completing their courses than they were personal barriers, particularly among Black/African American respondents. For the most frequent institutional barriers reported, Hispanic/Latinx students were most likely to have reported changing from seated to online courses and being able to take the courses in the modalities they learn best as being barriers; however, there were not major differences compared to the percentages of White/Caucasian students who reported those barriers.

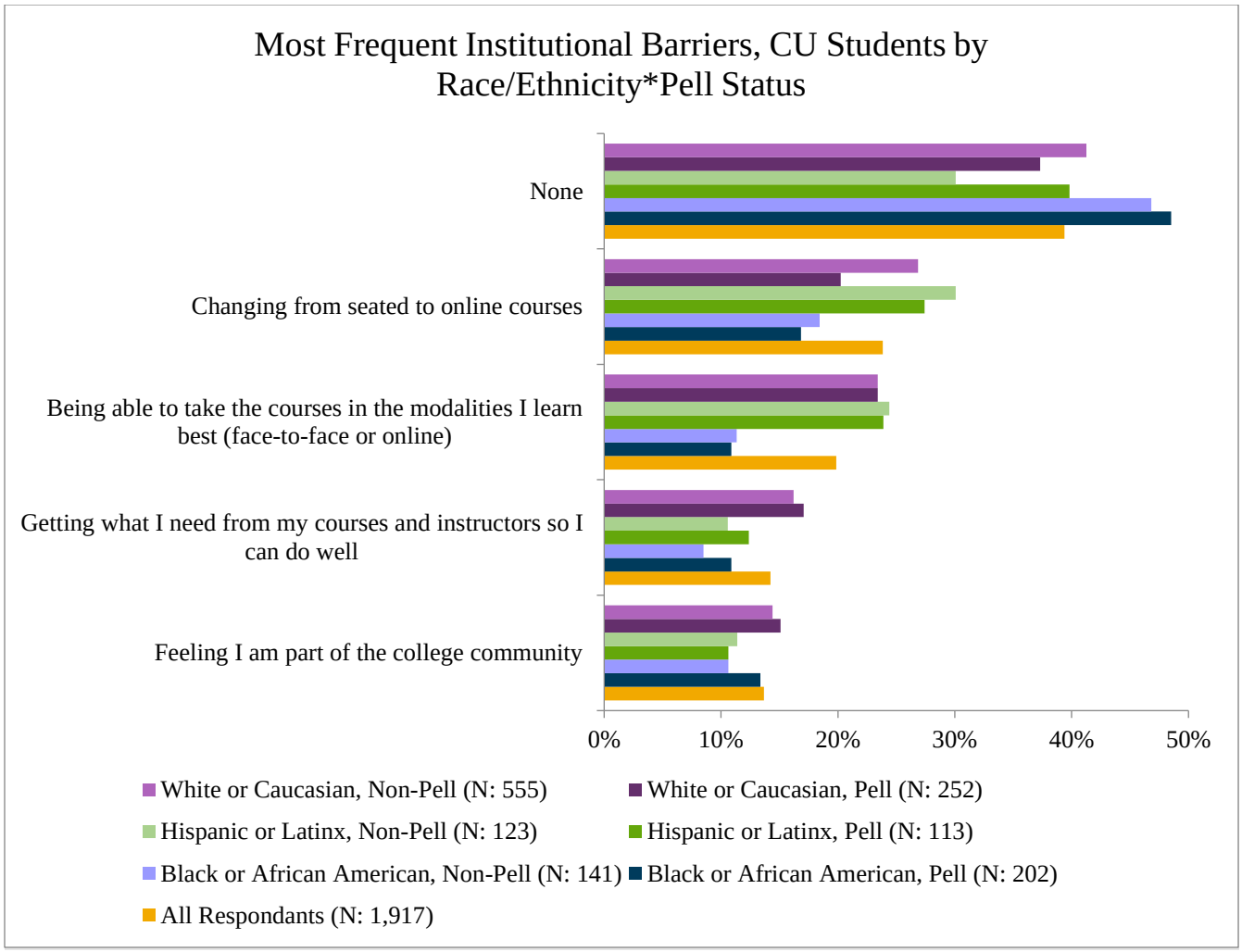

*Figure 16: Most frequent institutional barriers, CU students by race/ethnicity*Pell status*

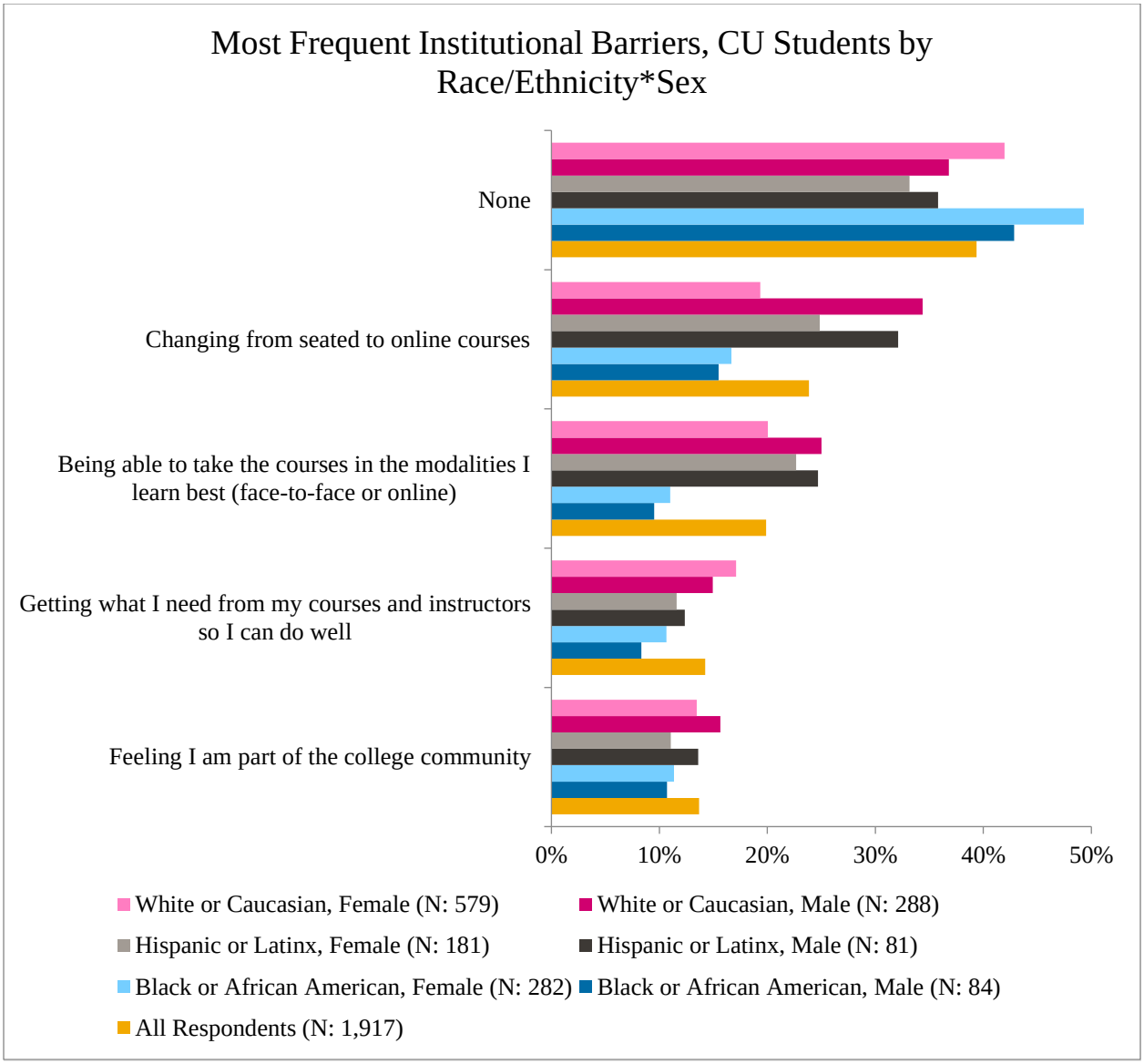

*Figure 17: Most frequent institutional barriers, CU students by race/ethnicity*sex*

Differences among CU student groups were more evident for some of the less frequent institutional barriers, including:

- **Getting into the types of courses students need to move forward in their program (11% overall)**:
    - 13% of Black/African American Pell recipients compared to 9% White/Caucasian Pell recipients
- **Getting what students need from the support services so that they do well in their courses (11% overall):**

- 18% of Black/African American males compared to 8% of White/Caucasian males
- 14% of Hispanic/Latinx females compared to 8% of White/Caucasian females

- **Getting the financial aid students need (10% overall)**:
  - 15% of Hispanic/Latinx males compared to 5% of White/Caucasian males
  - 19% of Hispanic/Latinx females compared to 9% of White/Caucasian females
  - 15% of Black/African American males compared to 5% of White/Caucasian males

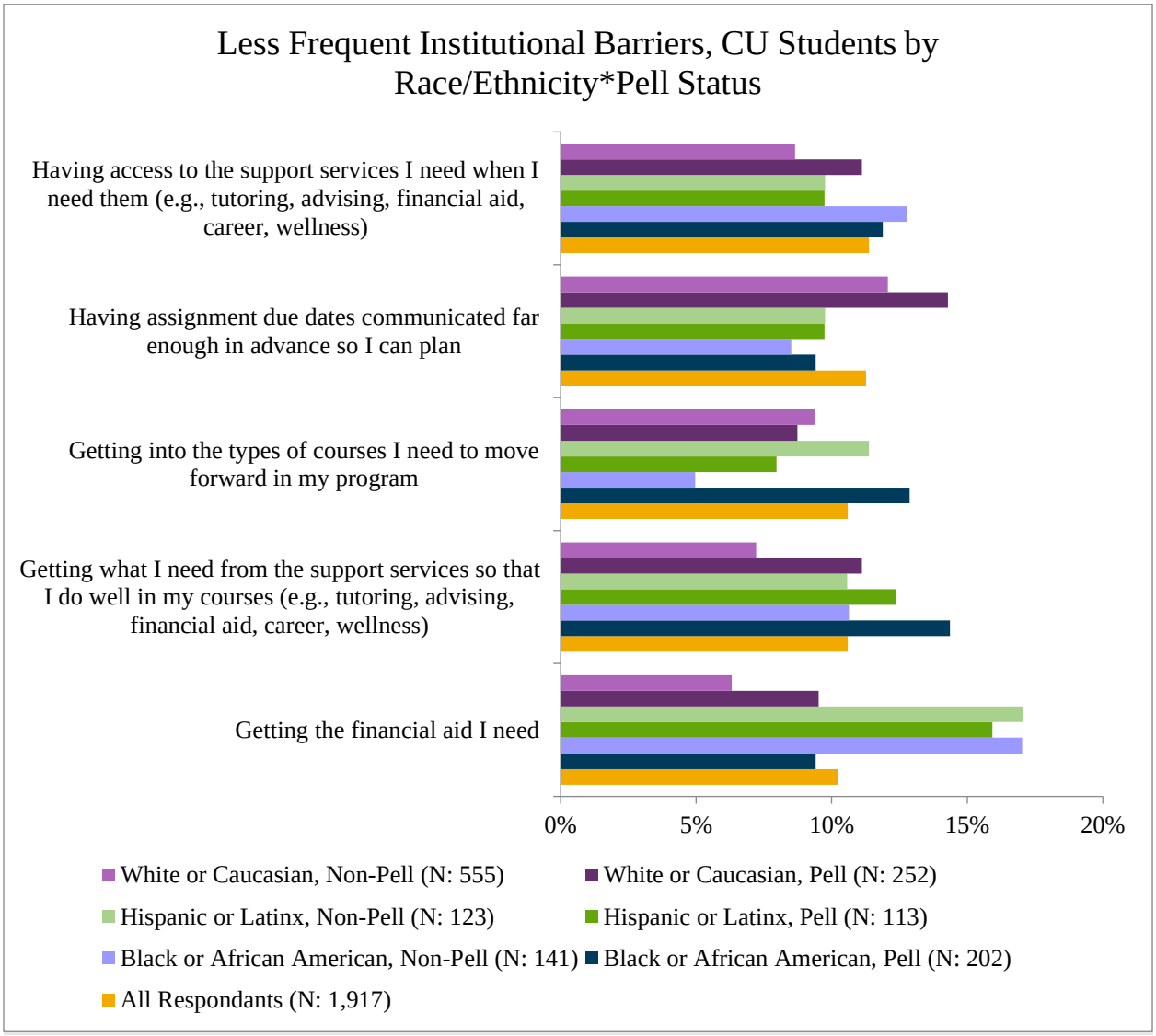

*Figure 18: Less frequent institutional barriers, CU students by race/ethnicity*Pell status*

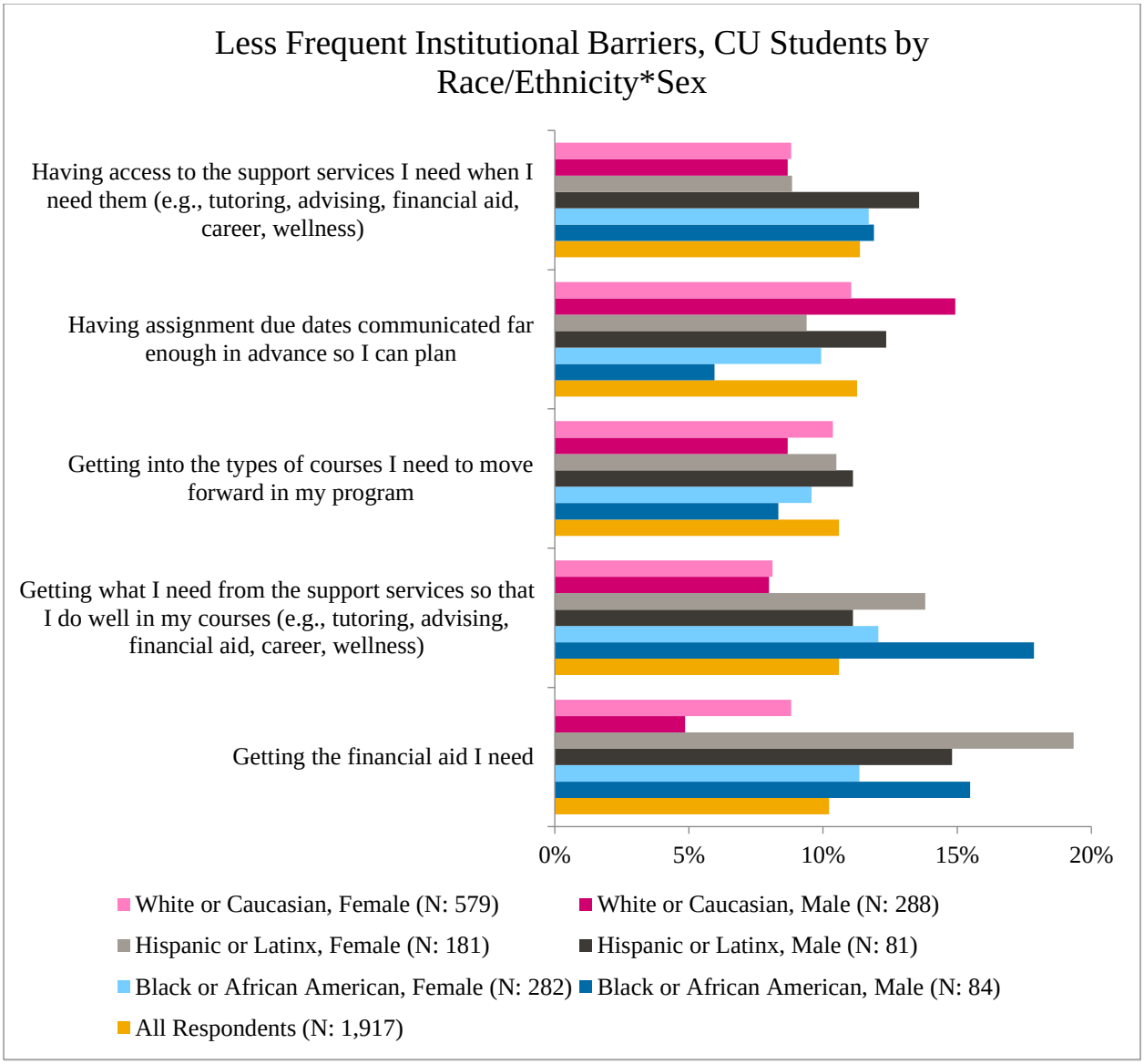

*Figure 19: Most frequent institutional barriers, CU students by race/ethnicity*sex*

Faculty Survey: What did faculty believe were the biggest barriers they faced in Fall 2021 that would impede their ability to teach their courses that semester?

Personal Barriers

For CU faculty respondents, personal barriers related to personal or family health issues and work obligations tended to go hand-in-hand. Many reported experiencing increased stress and anxiety from being required to maintain an on-campus presence while they cared for family members who are immunocompromised or too young to be vaccinated. While the majority (55%) of CE faculty respondents indicated that they had not experienced personal barriers in

teaching their courses, many who did experience barriers elaborated on their increased financial burden and issues related to technology, including:

- issues with personal internet connectivity,
- computers not being updated, and
- how students' internet/technology limitations created challenges for them while teaching.

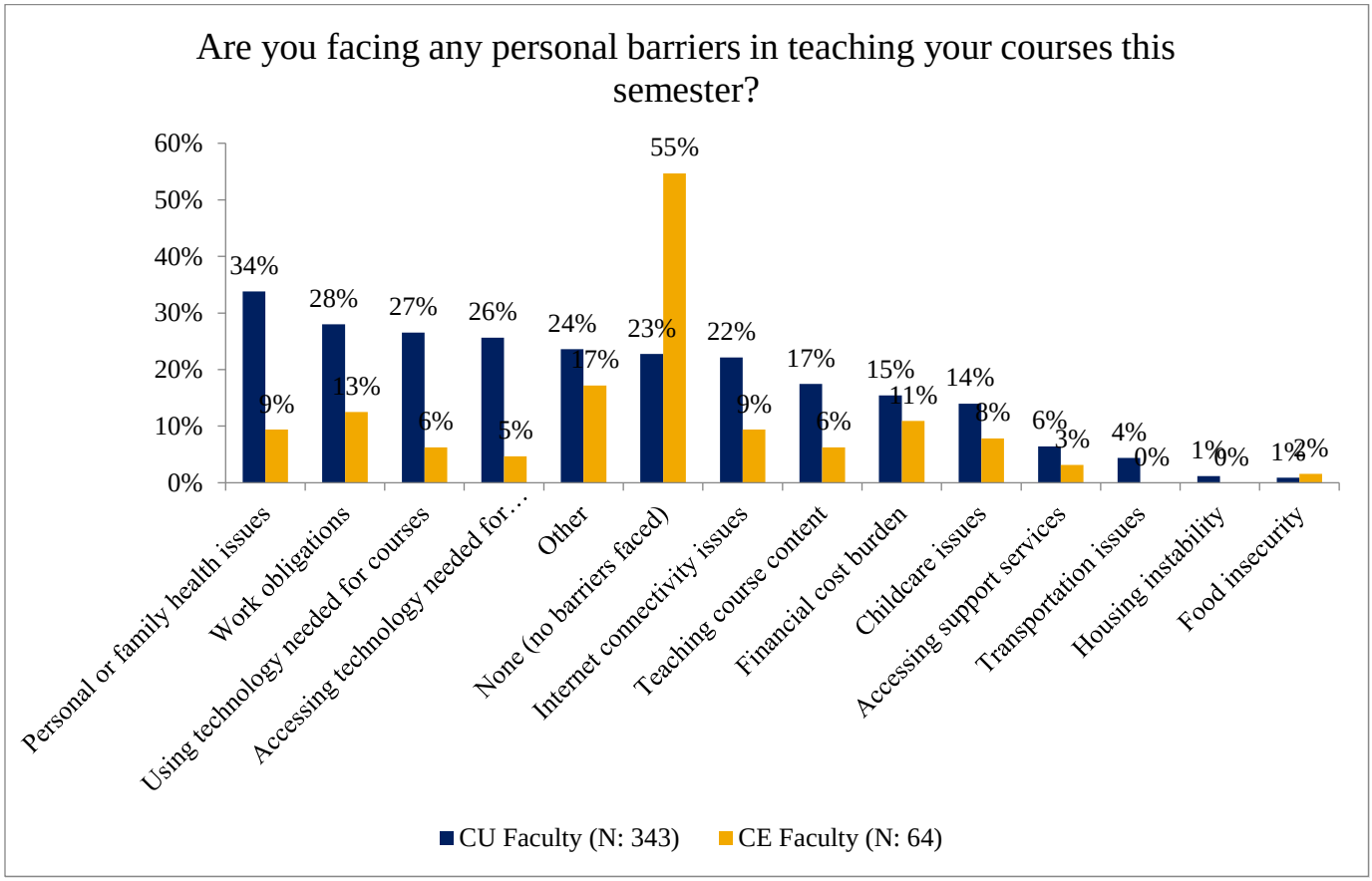

Figure 20: Personal Barriers Reported by CU/CE Faculty, Fall 2021

Table 4: Top Personal Barriers Faculty Experienced and Representative Quotes

Top Personal Barriers	Representative Quotes from Elaboration
(1) Personal or family health issues	"I am a caregiver for a person who is at high risk for severe complications of Covid even with the vaccine. The pressures of having to find alternatives for a proposed spring return for all faculty in the spring is a source of extreme stress…there is no clear policy guidance such as an accommodation for a family caregiver."
(2) Work obligations	"Being required to maintain an on campus presence when I have family members who are vulnerable and children who are too young to be vaccinated." "I am very thankful that I can be online this semester and I would love to continue to work from home some in the future. The demand is there for online courses. Watching a young child full-time while working full-time and managing a house is very hard."
(3) Using technology needed for courses	"Hyflex classrooms have frequent tech issues, which uses class time on most days." "I often have issues getting the speakers and video to work in the Hyflex classroom. Every time I'm in there I have to set it up again. It seems like every day it get's wiped." "podium computers haven't consistently worked, Teams has booted me off multiple times for no reason on campus during class."
(4) Accessing technology needed for courses	"Having the appropriate technology in the classroom to teach effectively. This includes dual monitors, cameras and microphones for hosting virtual sessions." "It was a terrible issue with our proctoring software not being the quality needed, and then being delayed in having access on time (prior to the start of the semester)."

Table 5: "Other" Personal Barriers Faculty Experienced and Representative Quotes

Major Themes in "Other" Category	Representative Quotes
Increased workload; more time responding to student concerns	"Having to teach double workload due to splitting of classes into half seated and half virtual." "I need a second job because of added expenses, however my workload has increased, even though on paper, it technically should be less-and have zero free time to work a second job." "I spent a lot of time communicating with students, addressing their own barriers that could prevent them from being successful in the class. Engaging with students to identify even the appropriate college resources that can help them was time-consuming. On a typical work day, many hours were spent reaching out to students (many of whom did not respond), typing and responding to emails, making phone/video calls, leaving very little time for grading and feedback."
Teaching while masked	"Hard to teach with your mouth covered the entire time and impossible to hear the students or engage them due to masks. "It is extremely difficult to teach clearly and comfortably using a face mask. When we were allowed to use shields, that was much easier, although not ideal.

Institutional Barriers

Regarding institutional barriers, more than half (56%) of the CU faculty respondents cited inadequate compensation as a major barrier in their ability to succeed in teaching their courses, many describing how their increased workload and absence of raises and extra pay made it challenging for them to continue to work at the college, with some representative responses indicating that they could not work other jobs due to the additional sections they needed to teach to maintain safe face-to-face COVID-19 protocols. Similarly, as mentioned, although nearly half (44%) of CE faculty respondents indicated that they had not experienced institutional barriers in teaching their courses, the most common issue elaborated on in their open-ended responses referred to pay concerns. In particular, they cited having added work responsibilities, such as course preparation, attendance recording, and work stemming from switching platforms, without extra pay.

Changes in course modalities were among the most frequently reported challenges for both CE and CU faculty respondents. In particular, CU faculty respondents expressed confusion and frustration about the shift to a HyFlex/cohort/hybrid teaching model early in the Fall semester. Along with experiencing difficulties with accessing and using the technology needed for teaching in this model, they found it to be less effective and the decision to have been made without their input.

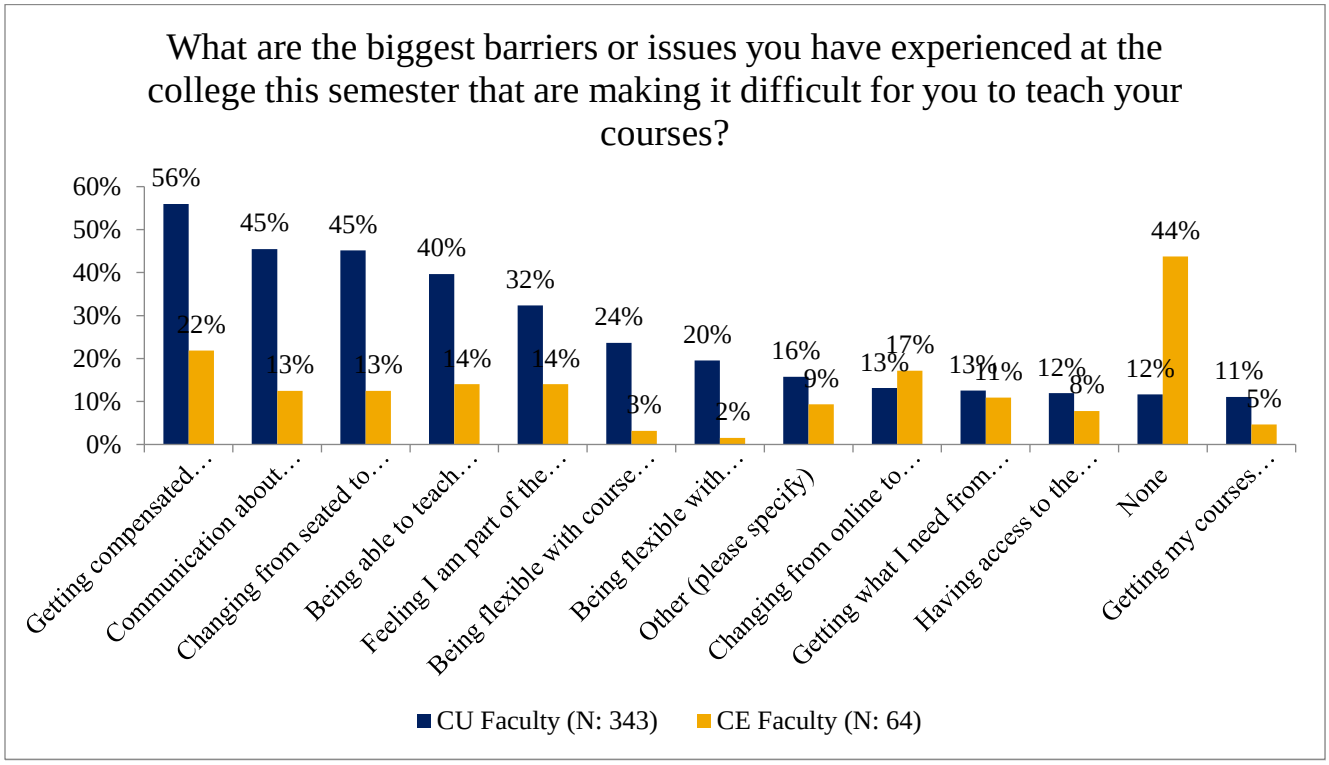

Figure 21: Institutional Barriers Reported by CU/CE Faculty, Fall 2021

Table 6: Top Institutional Barriers Faculty Experienced and Representative Quotes

Top Institutional Barriers	Representative Quotes from Elaboration
(1) Getting compensated adequately	"A lot is always expected of my department but since the start of COVID, it seems I have been working around the clock without any extra pay for the extra work." "Instructors have not been compensated for the additional amount of work required during COVID to keep up with items, such as reporting, tailoring lessons for hyflex courses, and various other administrative tasks." "Pay is very low for the exorbitant amount of planning time it takes to teach a 3-hour class. Pay is only given for the time teachers are teaching in class."
(2) Communication about COVID-19 policies/procedures	"I just want clear policies as an instructor about how to handle students who test positive in my seated courses." "Faculty are expected to shut up and bear the burden of the adjustments. We are not included in decision making nor are we privy to the reasoning behind and responsibility for the policy changes. Those responsible for policy should explain clearly the reasoning for policies and take transparent responsibility for them."
(3) Changing from seated to online instruction	"I had courses that were supposed to be seated. Now I have to teach half one day a week and the other half on another day, and I am not allowed to have the other half on-line virtually."
(4) Being able to teach courses in the modalities I teach best (face-to-face or online)	"I've learned over the past 18 months that I am a better online instructor than in-person. I've created an excellent course (as noted in my evaluation), but now I'm told that online instruction will not be prioritized. My students are more successful in my online course. I feel like Wake Tech is going backwards instead of looking forwards."
(5) Feeling I am part of the college community	"The frequent changes and lack of communication have made me feel less than part of a community." "With Delta wave, I've been at home (thankfully), but it's led me to feeling more isolated."

Table 7: "Other" Institutional Barriers Faculty Experienced and Representative Quotes

Major Themes in "Other" Category	Representative Quotes
Not feeling supported by administration	"At the beginning of the pandemic, I felt like Wake Tech was concerned not only with student success and safety, but also the safety and success of faculty. I felt supported by the college, and that support helped me be the best educator in a challenging situation. THAT FEELING IS GONE. I feel like the college has forgotten that in order for faculty to support students, the college needs to support faculty." "Expectations of leadership has been greater in meeting the needs of the students and the focus of the Strategic Plan. Which has not completely been explained to Faculty, unless we have read the plan and updates on our own, and little attention has been paid to the impact of all this, (in and out and changing things out) on the Faculty."
Teaching in mixed modalities; split classroom format; cohort model	"The cohort model has interfered greatly with successful class experiences. The life has gone out of the students in classes that initially were lively and engaged." "I have had difficulty with the split classes. The interaction of students who are not in a given classroom on a specific day is disheartening. I believe all online or all in class works better than a split session with students attending one day and online the other day." "The split classroom format is impossible. Students hate it and I feel like I'm teaching in two different rooms." "Effective Hyflex instruction requires a TA managing the chat and technology, while the instructor teaches the material. There is no peer-reviewed literature to state that what we are doing enhances student success, yet we proceed forward anyway."

Summary of Survey Data

For students, personal barriers, more so than institutional barriers, presented challenges for them in succeeding in their courses in Fall 2021. The major challenges cited tended to relate to job changes due to COVID (e.g., increase in hours, schedule changes, layoffs) and needing to care for family members, due to either health issues or children at home. Financial stress also loomed large for about a quarter of student respondents, some noting that they would benefit from financial assistance to buy food and pay bills, not just for tuition. Although nearly 40% of CU student respondents and over 60% of CE student respondents reported facing no institutional barriers, CU students who did experience barriers tended to cite their confusion and frustration

about the COVID-related shift to hybrid and in-person classes early in the Fall 2021 semester. Others noted that they would like for the course attendance policy to be more flexible and to have more time to complete assignments.

While personal or family health issues and work obligations were also the top personal barriers experienced by faculty, institutional barriers presented more challenges for them in teaching their courses. In particular, around half of the faculty respondents reported challenges related to not getting compensated adequately, communication about COVID-19 policies/procedures, and changing from seated to online instruction. Overall, key themes in faculty responses related to their feeling overworked, under paid, and under-appreciated. Like the student respondents, faculty also expressed confusion and frustration about the shift to a HyFlex/cohort/hybrid teaching model early in the Fall 2021 semester. Along with experiencing difficulties with accessing and using the technology needed for teaching in this model, they found it to be less effective and the decision to have been made without their input.

Discussion and Conclusions

While Wake Tech was able to reach its goal of equitable access during the pandemic, the enrollment decline among White/Caucasian females and White/Caucasian non-Pell students at the start of the second full academic year of the pandemic compared to the first, as well as higher withdrawal rates among White/Caucasian females by Fall 2021 as compared to Fall 2020, may be an indicator of the effects of the prolonged challenges faced as the pandemic continued, and the disparities in choices available to different student groups. While our data show that females among all demographic groups were considerably more likely than their male counterparts to report personal or family health issues as a personal barrier, White/Caucasian females also reported work obligations as a barrier more so than other groups.

The pandemic also may not be the only factor affecting enrollment at Wake Tech in both Fall 2020 and Fall 2021. National studies have found that community college course enrollments vary with local unemployment rates: a 1 percent increase in unemployment rate results in a 0.5 to 4% increase in full-time enrollment (Betts & McFarland, 1995; Hillman & Orians, 2013), with larger increases associated with adults older than recent high school graduates. In North Carolina, when disaggregated by college, Wake Tech was one of only four colleges in the state that showed a

strong, positive correlation of curriculum, continuing education, basic skills, and total enrollment with local unemployment rates (McKinney, 2017). Wake Tech verified this strong positive correlation with its own, internal predictive analytics study and forecasting of enrollment between 2002 to 2022 (Bartek and Sumithran, 2019). Given unemployment rates have been dropping in Wake County over time (see Fig. 22 below) as Wake County is one of the hottest labor markets in the country, during the onset of the pandemic through Fall 2020, enrollments may have held steady not only due to the efforts of the college to mitigate the effect of the pandemic on enrollment, but due to the high unemployment rates at the same time. Once the economy recovered, when unemployment rates plummeted, Wake Tech enrollment may have declined slightly with it. More research is needed to be able to untangle the effects of the pandemic on the enrollment trends verses the strong unemployment signals that affect them.

Figure 22: Unemployment rates over time in the Raleigh, NC Metropolitan Statistical Area (US Bureau of Labor Statistics, 2022)

Between Fall 2020 and Fall 2021, increases in equity gaps occurred between several subgroups, noted below. When examining the barriers faced and comparing among groups by race-ethnicity, sex, and Pell status, some trends emerge that may provide insights into the widened equity gap between these groups. In particular, students in each of the minoritized groups in the Propensity Score Matched sets reported experiencing **financial cost burden** at considerably higher rates than students in the majority group:

- 30% of Hispanic/Latinx males compared to 14% of White/Caucasian males
- 26% of Hispanic/Latinx Pell recipients compared to 18% of White/Caucasian non-Pell recipients
- 23% of Black/African American males compared to 14% of White/Caucasian males
- 27% of White/Caucasian non-Pell recipients compared to 18% of White/Caucasian non-Pell recipients

Students in two of the minoritized groups in the matched sets also reported experiencing barriers in **getting what they needed from support services so that they could do well in their courses** at notably higher rates than students in the majority group:

- 12% of Hispanic/Latinx Pell recipients compared to 7% of White/Caucasian non-Pell recipients
- 18% of Black/African American males compared to 8% of White/Caucasian males

While we see the gaps in success and withdrawal rates decreasing between White/Caucasian and Black/African American females and between White/Caucasian and Hispanic/Latinx females, the survey data indicate that the gap was not reduced due to females experiencing fewer barriers. Rather, **particular barriers were reported disproportionately among females**:

- Females in all three groups reported **personal or family health issues** and **childcare issues** as barriers at higher rates than their male counterparts.
- **Work obligations** were reported at the highest rates among White/Caucasian females and Hispanic/Latinx females.
- **Financial cost burden** was reported at the highest rates overall for Hispanic/Latinx females and Black/African American females.

Furthermore, while internet connectively, transportation issues, and food insecurity were some of the least frequently reported barriers overall, Black/African American females were more likely than other groups to have experienced these issues as a barrier to completing their courses. Considering the decline in success rates for females across all three major racial-ethnic groups in Fall 2021 (with statistically significant declines for Black/African American females and White/Caucasian females), and the return from fully online to seated and hybrid/blended instruction that required some on-campus visits, the survey data suggest that females at Wake

Tech experienced multiple barriers that made successfully completing their coursework difficult during the COVID-19 pandemic.

Like CU students, CU faculty also marked personal or family health issues and work obligations as the top two personal barriers they faced in Fall 2021. Institutional barriers were more prevalent than personal barriers for CU faculty, however, as over half (56%) indicated that getting compensated adequately posed a major barrier for their ability to teach their courses. Nearly half (45%) also noted that communication about COVID-19 policies/procedures and changing from seated to online instruction posed barriers for them.

Summary

Based on this study's findings from the statistical analyses of enrollment, success, and withdrawal rates and evidence from survey data:

- Slight enrollment declines occurred predominantly among White/Caucasian females and White/Caucasian non-Pell students, as well as higher withdrawal rates among White/Caucasian females. The enrollment declines are also associated with a precipitous drop in the unemployment rate in Wake County after the onset of the pandemic.
- Increases in equity gaps from Fall 2020 to Fall 2021 between several subgroups could be connected to experiencing financial cost burden and not getting the support services needed to succeed, as students in some of the minoritized groups reported these barriers at considerably higher rates than students in the majority group.
- Overall, female students in each subgroup at Wake Tech experienced multiple barriers at higher rates than their male counterparts— including personal or family health issues, childcare issues, work obligations, and financial cost burden—that made successfully completing their coursework difficult during the COVID-19 pandemic.
- CU faculty were more likely to identify institutional, rather than personal, barriers they experienced in teaching their courses, with about half citing compensation, communication, and changes in course delivery modalities as major issues.

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Appendix A: Data Collection and Analysis

Course Enrollment and Student Performance Data

For this follow-up study, administrative data sets from the Fall 2019, Fall 2020, and Fall 2021 semesters were downloaded from the college's student information system (Ellucian Colleague). The data included demographic variables (i.e., gender, race, age), socioeconomic variables (i.e., Pell recipient status), academic variables (i.e., High School and college GPA), enrollment, and course performance variables (success or withdrawal status). After the data was cleaned and validated using SAS 9.4, descriptive statistics were reported for these variables, and then, for course performance variables, inferential statistical analysis were performed using Propensity Score Matching (PSM) techniques (a quasi-experimental statistical method) (Guo & Fraser, 2015).

In this study, several covariates, including student demographic, socioeconomic, and academic variables were used in calculating the propensity scores of the cases in control groups compared to the treatment groups (1st comparison: Fall 2019 is control, Fall 2020 is treatment; 2nd comparison: Fall 2020 is control, Fall 2021 is treatment). After an iterative covariate balancing process, once a desired covariate balance was achieved, logistical regression analysis was performed to compare success and withdrawal rates prior to COVID-19 and after major changes were made in response to COVID-19. Multiple sets of analyses were conducted, two of which are referenced in this report:

1) Fall 2019 online success/withdrawal rates compared to Fall 2020 online success/withdrawal rates
2) Fall 2020 online success/withdrawal rates compared to Fall 2021 online success/withdrawal rates

Results were double disaggregated by race-ethnicity*sex and race-ethnicity*Pell Grant status. To assess whether the changes made in response to COVID-19 have an association with widening or narrowing of equity gaps in retention and success rates for low-income students and students in minoritized racial-ethnic groups—specifically, those who identify as Black or African American

or Hispanic/Latinx—at Wake Tech, additional PSM analyses were conducted to compare gaps for the following subgroups:

1. Black/African American males and White/Caucasian males
2. Black/African American females and White/Caucasian females
3. Hispanic/Latinx males and White/Caucasian males
4. Hispanic/Latinx females and White/Caucasian females
5. White/Caucasian Pell recipients and White/Caucasian non-Pell recipients
6. Black/African American Pell recipients and White/Caucasian non-Pell recipients
7. Hispanic/Latinx Pell recipients and White/Caucasian non-Pell recipients

Survey Data

In Fall 2021, the research team administered separate surveys via Survey Monkey to students and faculty—the student survey was administered October 5-15 and the faculty survey was administered October 12-22. A grand total of 2,421 students responded to the student survey, with 2,119 credit-seeking (Curriculum, "CU") students responding out of 22,105 invited to participate (9.6% response rate) and 245 non-credit-seeking (Continuing Education, "CE") students responding out of 11,293 invited to participate (2.2% response rate). After removing submissions from students under age 18, CU student respondents totaled 1,917 and CE student respondent totaled 244. While aggregate survey results for CE students are provided in the report, the low respondent count does not allow for disaggregating the data into subgroups as performed with the results for CU students.

A grand total of 407 faculty responded to the faculty survey, with 343 Curriculum (CU) faculty responding out of 861 invited to participate (39.8%. response rate) and 64 Continuing Education (CE) faculty responding out of 504 invited to participate (12.7% response rate).

At the close of the survey administration period, all submissions from students under age 18 were filtered out of the results and summaries of remaining results were exported from Survey Monkey to an Excel spreadsheet. To compare student survey results by race-ethnicity*sex and race-ethnicity*Pell Grant status, and to compare faculty survey results by CU/CE, results were filtered by category in Survey Monkey and exported into Excel to produce comparative charts.

All open-ended responses to survey questions were exported into Excel and imported into Dedoose, a computer assisted qualitative data analysis software program. When importing

survey data into Dedoose, an initial codebook was created from column headings, which aligned with specific survey questions. Within these primary codes, or categories, of responses, research team members used open coding to identify themes in students' and faculty's experiences of barriers in completing or teaching their courses.

Comparison of the Sets of Results

After each data set was analyzed, the results from the statistical analyses were compared with survey results to identify the ways they aligned or contrasted with one another. The insights gleaned from comparing the two data sets were synthesized to interpret the extent to which the survey data and the PSM data converged, diverged, or related to each other in some other way, and the specific ways they provide a more complete understanding of the how students and faculty fared at the start of the second full academic year during the pandemic.

Appendix B: Student Survey Questions

1. Since the beginning of the Fall 2021 semester, have you known where to go to find the most up-to-date information about Wake Tech's COVID-19 policies and/or procedures?

Always

Usually

Sometimes

Rarely

Never

2. Are you facing any personal barriers in succeeding in your courses this semester? (Check all that apply)

Personal or family health issues

Financial cost burden

Transportation issues

Food insecurity

Housing instability

Work obligations

Childcare issues

Learning course content

Accessing technology needed for courses

Accessing support services

Internet connectivity issues

Other

None (no barriers faced)

3. Please share here some more details about any of the items you checked above.

4. Are there barriers or issues you have experienced at the college this semester that are making it difficult

for you to successfully complete your courses? (Check all that apply)

Communication about COVID-19 policies/procedures

Changing from seated to online courses

Having access to the support services I need when I need them (e.g., tutoring, advising, financial aid, career, wellness)

Getting what I need from the support services so that I do well in my courses (e.g., tutoring, advising, financial aid, career,

wellness)

Getting into the types of courses I need to move forward in my program

Getting the courses I need at the times and days I need them

Being able to take the courses in the modalities I learn best (face-to-face or online)

Getting what I need from my courses and instructors so I can do well

Having assignment due dates communicated far enough in advance so I can plan

Course requirements or policies that are inflexible

Getting the financial aid I need

Feeling I am part of the college community

Other (please specify)

None

5. Please share here some more details about any of the items you checked above.

6. Do you expect to complete your course(s) this semester?

Yes, I expect to complete all of my courses this semester.

I expect to complete some but not all of my courses this semester.

No, I do not expect to complete any of my courses this semester.

If you think you will not complete all of your courses this semester, please share why not:

7. Have you accessed any of the following student services/resources? (Check all that apply)

Academic advising

Financial assistance (e.g., grants, scholarships, gift cards, etc.)

Housing assistance

Food assistance (e.g., The Nest, grocery gift cards)

Technology assistance (e.g., laptop or tablet access)

One-Stop Answer Center

Disability Support Services

Wellness (counseling and referral services)

Career and Employment Resources

Individualized Learning Center (ILC) tutoring

Library services

Rhetoric, Exposition, Argumentation, and Literature (REAL) Center

Science, Technology, Engineering, and Math (STEM) Center

Other (please specify)

None of the above

If you are facing barriers this semester, please consider accessing the resources above. Many can be found through these websites:

https://www.waketech.edu/student-services/student-support

https://www.waketech.edu/student-services/virtual-support-center

https://www.waketech.edu/student-services/individualized-learning-center

https://www.waketech.edu/student-services/libraries

Background and Demographic Questions

At Wake Tech, closing equity gaps among our students is a top priority. The questions that follow are for the purpose of better gauging whether groups of students may be experiencing support services differently in order to continue improving them to best meet all students' needs.

8. Which of the following describes your enrollment status for Fall 2021? Check all that have applied to you

during this semester.

Full-time credit-seeking (12 or more credit hours)

Part-time credit-seeking (less than 12 credit hours)

Enrolled in non-credit course(s)

No longer enrolled at Wake Tech

9. Please mark any of the following English or math courses in which you are enrolled this semester. If none,

mark "N/A".

ENG-111

ENG-112

MAT-143

MAT-152

MAT-171

MAT-172

N/A

10. Which best describes your gender identity?

Female/Woman

Male/Man

Transgender Female/Transgender Woman

Transgender Male/Transgender Man

Gender non-binary

Prefer not to respond

Another gender identity (please specify)

11. What is your race or ethnicity?

White or Caucasian

Black or African American

Hispanic or Latino

Asian or Asian American

American Indian or Alaska Native

Native Hawaiian or other Pacific Islander

Multi-racial or multi-ethnic

Prefer not to respond

Other (please specify)

12. In what age range are you currently?

Under 18

18-19

20-21

22-24

25-29

30-34

35-44

45-54

55-64

65 or over

Prefer not to respond

13. Do you receive financial aid through the federal Pell Grant program?

Yes

No

I'm not sure

Prefer not to respond

Appendix C: Faculty Survey Questions

1. Since the beginning of the Fall 2021 semester, have you known where to go to find the most up-to-date information about Wake Tech's COVID-19 policies and/or procedures?
Always
Usually
Sometimes
Rarely
Never

2. Are you facing any personal barriers in teaching your courses this semester? (Check all that apply)
Personal or family health issues
Financial cost burden
Transportation issues
Food insecurity
Housing instability
Work obligations
Childcare issues
Teaching course content
Accessing technology needed for courses
Using technology needed for courses
Accessing support services
Internet connectivity issues
Other
None (no barriers faced)

3. Please share here some more details about any of the items you checked above.

4. What are the biggest personal barriers you think your students are facing in succeeding in their courses this semester? (Check all that apply)

Personal or family health issues
Financial cost burden
Transportation issues
Food insecurity
Housing instability
Work obligations
Childcare issues
Learning course content
Accessing technology needed for courses
Using technology needed for courses
Accessing support services
Internet connectivity issues
Other
None (no barriers faced)

5. Please share here some more details about any of the items you checked above.

6. What are the biggest barriers or issues you have experienced at the college this semester that are making it difficult for you to teach your courses? (Check all that apply)
Communication about COVID-19 policies/procedures
Changing from seated to online instruction
Changing from online to seated instruction
Having access to the support services I need when I need them (e.g., eLearning supports, Library, technology)
Getting what I need from the support services so that I can teach effectively
Getting my courses scheduled at the times and days that work well for me
Being able to teach courses in the modalities I teach best (face-to-face or online)
Being flexible with assignment due dates
Being flexible with course requirements or policies
Getting compensated adequately
Feeling I am part of the college community

Other (please specify)
None

7. Please share here some more details about any of the items you checked above.

8. What are the biggest barriers or issues you think students have experienced at the college this semester that are making it difficult for them to successfully complete their courses? (Check all that apply)
Communication about COVID-19 policies/procedures
Changing from seated to online instruction
Changing from online to seated instruction
Having access to the support services they need when they need them (e.g., tutoring, advising, financial aid, career, wellness)
Getting what they need from the support services so that they do well in their courses (e.g., tutoring, advising, financial aid,
career, wellness)
Getting into the types of courses they need to move forward in their program
Getting the courses they need at the times and days they need them
Being able to take the courses in the modalities they learn best (face-to-face or online)
Getting what they need from their courses and instructors so they can do well
Having assignment due dates communicated far enough in advance so they can plan
Course requirements or policies that are inflexible
Getting the financial aid they need
Feeling they are part of the college community
Other (please specify)
None

9. Please share here some more details about any of the items you checked above.
If you do not think the majority of your students will complete all of your courses this semester, please share the main reasons why not:

10. Do you expect the majority of your students will complete your course(s) this semester?
Yes, I expect the majority of my students will complete all of my courses this semester.
I expect the majority of my students will complete some but not all of my courses this semester.
No, I do not expect the majority of my students will complete any of my courses this semester.

11. Have you helped your students access any of the following student services/resources? (Check all that apply)
Academic advising
Financial assistance (e.g., grants, scholarships, gift cards, etc.)
Housing assistance
Food assistance (e.g., The Nest, grocery gift cards)
Technology assistance (e.g., laptop or tablet access)
One-Stop Answer Center
Disability Support Services
Wellness (counseling and referral services)
Career and Employment Resources
Individualized Learning Center (ILC) tutoring
Library services
Rhetoric, Exposition, Argumentation, and Literature (REAL) Center
Science, Technology, Engineering, and Math (STEM) Center
Other (please specify)
None of the above
Faculty Check-in: Experiences and Perspectives During the COVID-19 Pandemic (Fall 2021)
Background and Demographic Questions

Please note: demographics questions are asked for the purpose of determining the extent that respondent demographics are representative of the overall population of faculty.
12. Which of the following describes your employment status at Wake Tech?
Full-time
Part-time
Full-time (temporary)

Part-time (temporary)
Other (please specify)

13. Please mark any of the following English or math courses you are teaching this semester. If none, mark
"N/A".
ENG-111
ENG-112
MAT-143
MAT-152
MAT-171
MAT-172
N/A

14. Which best describes your gender identity?
Female/Woman
Male/Man
Transgender Female/Transgender Woman
Transgender Male/Transgender Man
Gender non-binary
Prefer not to respond
Another gender identity (please specify)

15. Which best describes your race or ethnicity?
White or Caucasian
Black or African American
Hispanic or Latinx
Asian or Asian American
American Indian or Alaska Native
Native Hawaiian or other Pacific Islander
Multi-racial or multi-ethnic

Prefer not to respond

Other (please specify)

Appendix D: Student Representation

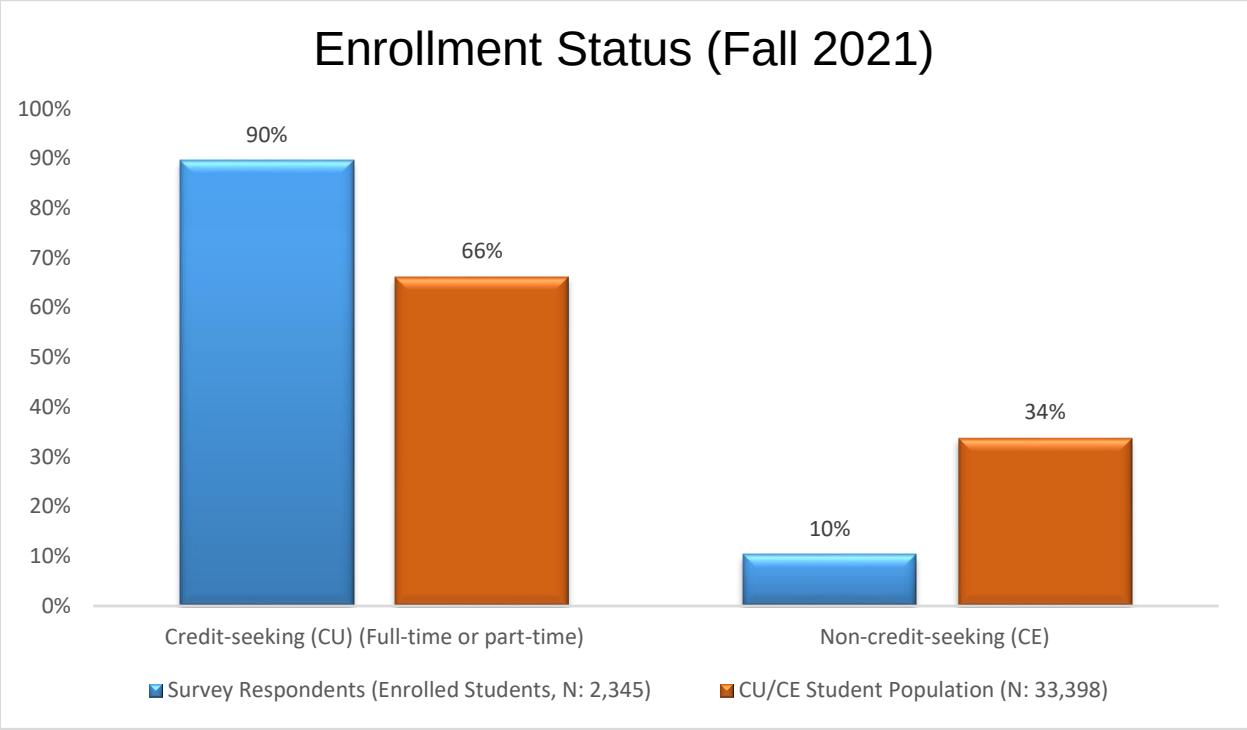

Figure 23:Enrollment status of survey respondents compared to student population.

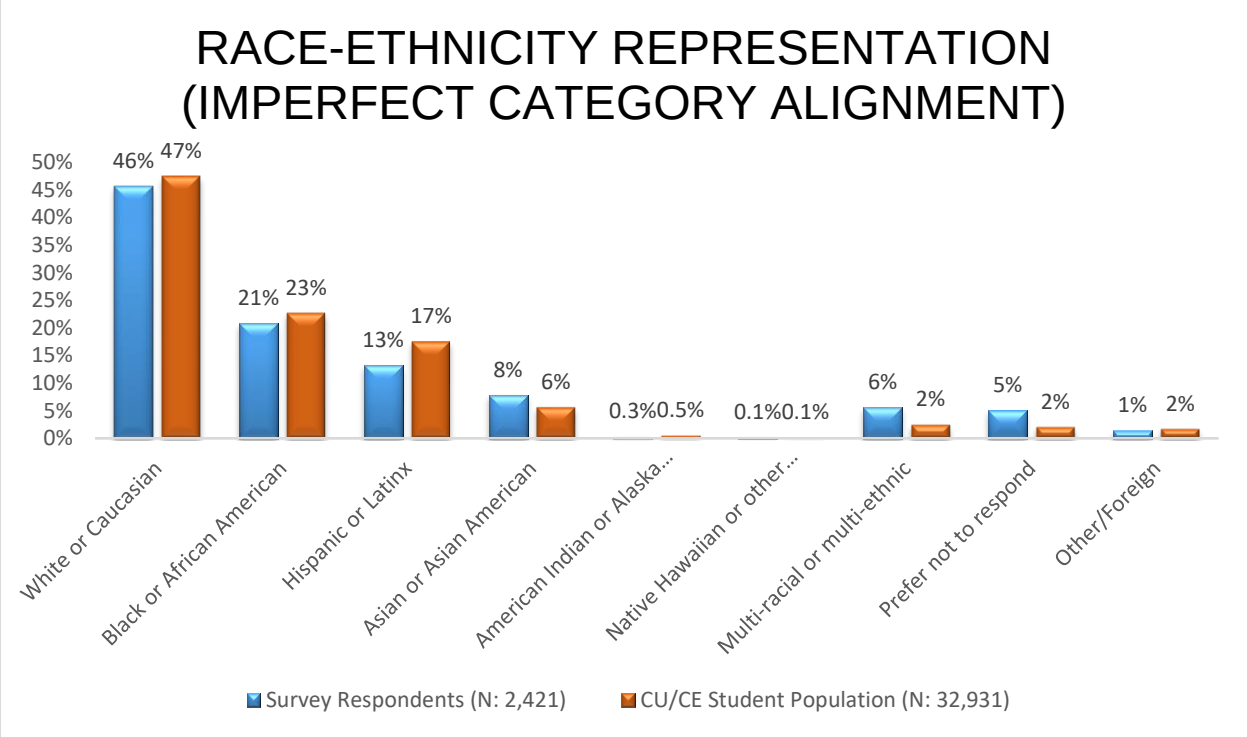

Figure 24: Race-ethnicity of survey respondents compared to student population.

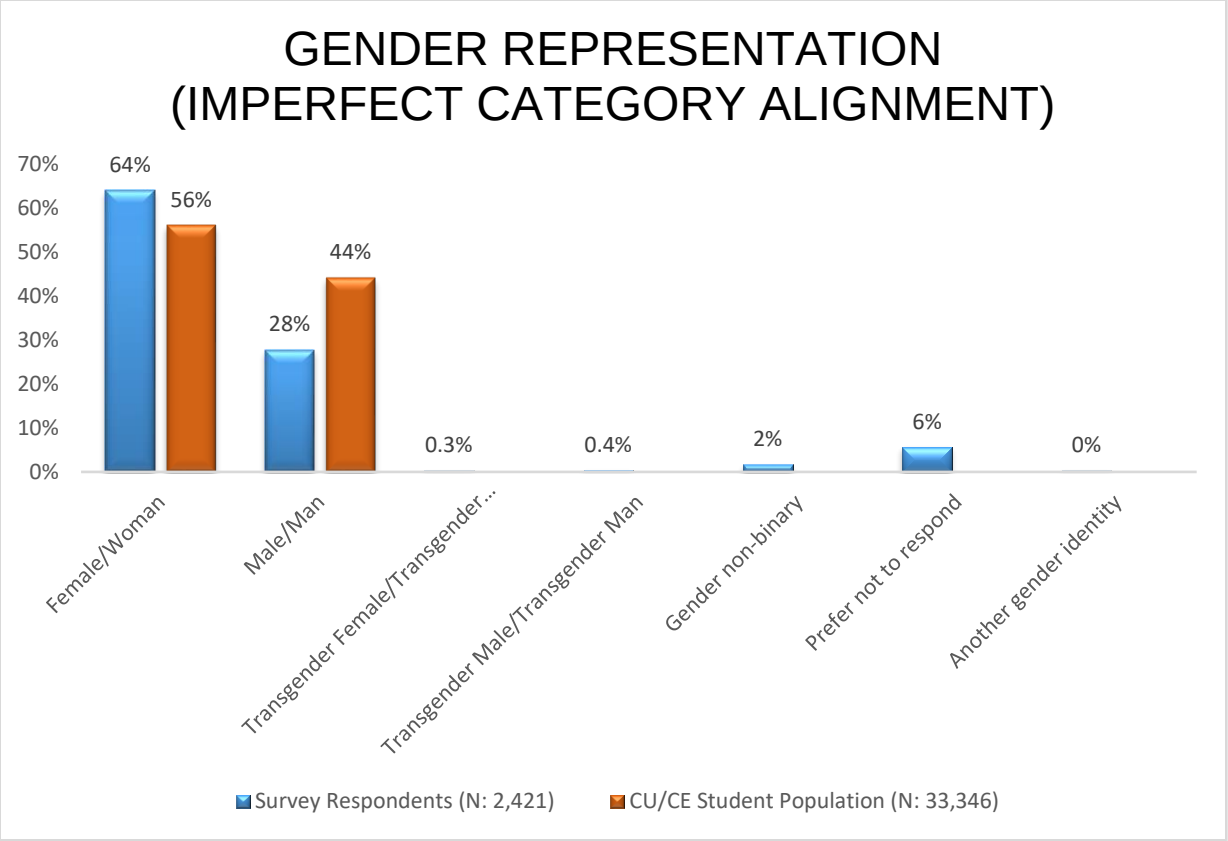

Figure 25: Gender identity of survey respondents compared to student population.

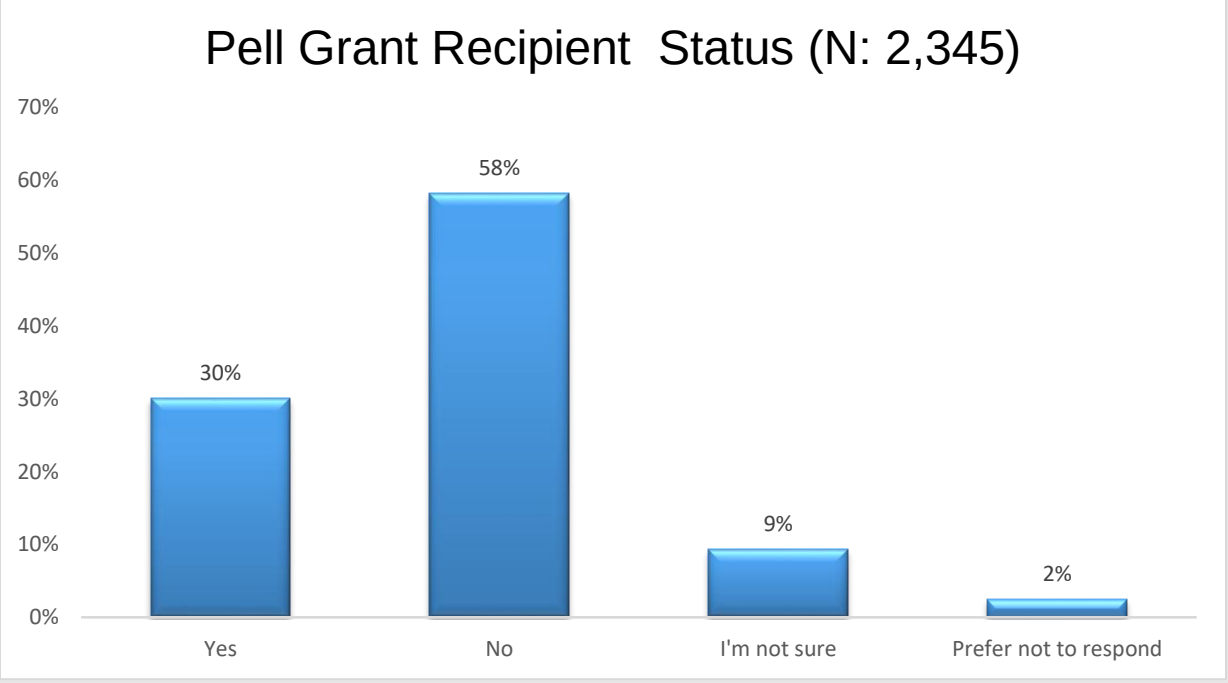

Figure 26: Pell grant status of survey respondents.

Appendix E: Faculty Representation

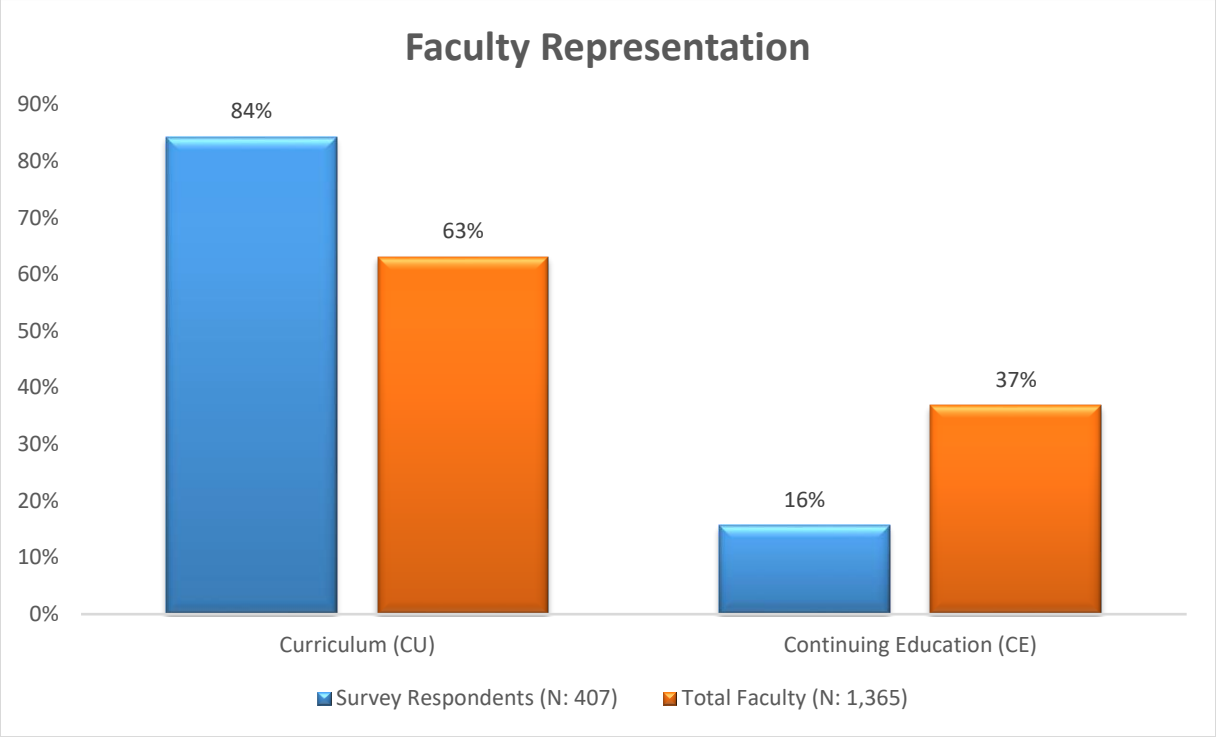

Figure 27: Division representation of survey respondents compared to faculty population.