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## **ACADEMIC OUTCOMES OF UNDERGRADUATES LEARNING AT THE AGE OF COVID-19 PANDEMIC**

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### **Abstract**

*Starting the year 2020, COVID-19 has become a global epidemic affecting 188 countries worldwide. As of October 10, 2020, there are 37,046,590 cases globally and 7,702,783 in the United States. COVID-19 has changed how universities operate, how teachers teach, and how students learn. Although many studies are exploring how teaching and learning operate in higher education institutions, little research has examined how COVID-19 impacted students' academic outcomes at higher education institutions. This study explores how COVID-19 impacted learning among a student cohort enrolled in several sections of a yearlong course taught by the same instructors at the same university. Tableau is used to mine and analyze data as well as report results. Accounting for both demographic and language backgrounds data distinguishes differences in the impacts of the COVID-19 pandemic within a diverse student population. Once we recognize who bore the greatest burden of COVID's impact, we can address the needs revealed.*

## **Keywords**

COVID-19 Pandemic, Student Learning, Higher Education, Ecological Theory, Academic Outcomes, Data Analytics

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## **1. Introduction**

Starting 2020, COVID-19 has become a global epidemic affecting 191 countries worldwide. As of November 30, 2020, there are 63,118,430 cases globally and 13,511,194 in the United States, almost twice compared to October 10, 2020 (COVID-19 Dashboard by the Center for Systems Science and Engineering (CSSE) at John Hopkins University, 2020). As of December 23, 2020, the US has accumulated 18,465,880 cases, where California accounts for 11%, with 38% new cases in two weeks. In California, the state government announced shelter-in place again on December 16, 2020. After a week of shelter in place, the intensive care unit (ICU) decreased from 15% to 2%. Under these circumstances, all California State University campuses operated virtually until Summer 2021. The campus may reopen face-to-face instruction in Fall 2021.

COVID-19 has changed how universities operate, how teachers teach, and how students learn. Before COVID-19, most 4-year universities convene classes where first-year students reside, learn, and interact with faculty and their peers on campus. After COVID-19, first-year students reside off-campus, learn, and interact with faculty and their peers virtually. This learning modality impacted how students learn, and how faculty teach First-Year Writing (FYW). FYW is mainly comprised of two writing courses; one of them is a one-semester writing course, and the other one is a year-long, two-semester version. This entry-level college writing course is required for all freshmen. This study looks at the year-long version since students in these courses had been achieving excellent learning outcomes pre-COVID with two enhancements to instruction: time and support (Baer, 2020a).

Before COVID-19, students were enrolled as a cohort in a class where they were taught by faculty. Faculty, whether tenured or not, were also undergoing the same professional development training. Thus, students took a year-long writing course where the faculty implemented an equity pedagogy and designed a shared curriculum. After COVID-19, students took the course online, a learning modality where students interact with faculty and their peers virtually. This study presents data on student outcomes during the semester in which, due to COVID-19, instruction shifted from a face-to-face to a virtual environment. The data track academic outcomes among a student cohort

enrolled across several sections of the yearlong course taught by the same group of cohort instructors at the same university. Such a setting allows the participants of this study to be similar and had gone through coherent instruction by the same group of cohort instructors.

This paper contextualizes these research questions in the theoretical framework of ecological theory. The method section presents the sources of data, survey instrument, the population of the study, and how data was analyzed. The findings of this study are reported in the result section, and the conclusion will further the implication and conclusion based on the findings.

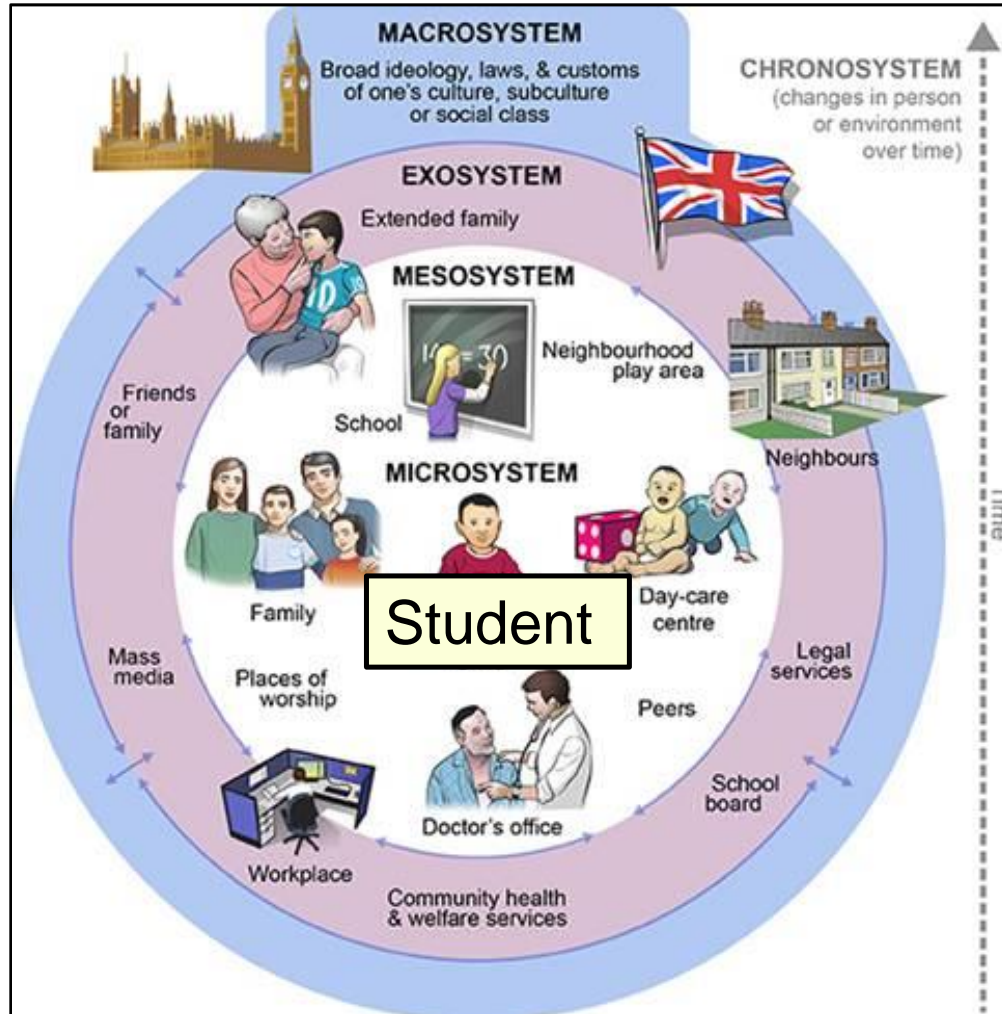
## **2. Literature Review**

The literature introduces the related literature as well as theoretical framework and backgrounds of this study.

### **2.1 Ecological Theory**

The ecological theory increasingly used in educational research describes learning in terms of equity in students' writing (Cowie & Khoo, 2018), opportunity, and outcome (Lee, 2010, 2017), second language learning (e.g., Van Lier, 2010), and the role of both informal and formal learning settings and opportunities (Russell et al., 2012; Falk et al., 2015). Such theory articulates how networked factors within a learning system interplay to affect outcomes, in this case in a writing course during the COVID-19 epidemic.

Urie Bronfenbrenner (1979) ecological systems theory explains how everything in a student's environment affects growth and development, as Figure 1 shows. This theory helps us to enumerate factors influencing the current environment during COVID-19 to study effects on students' learning, specifically their academic outcomes.



**Figure 1:** *Ecological Theory*

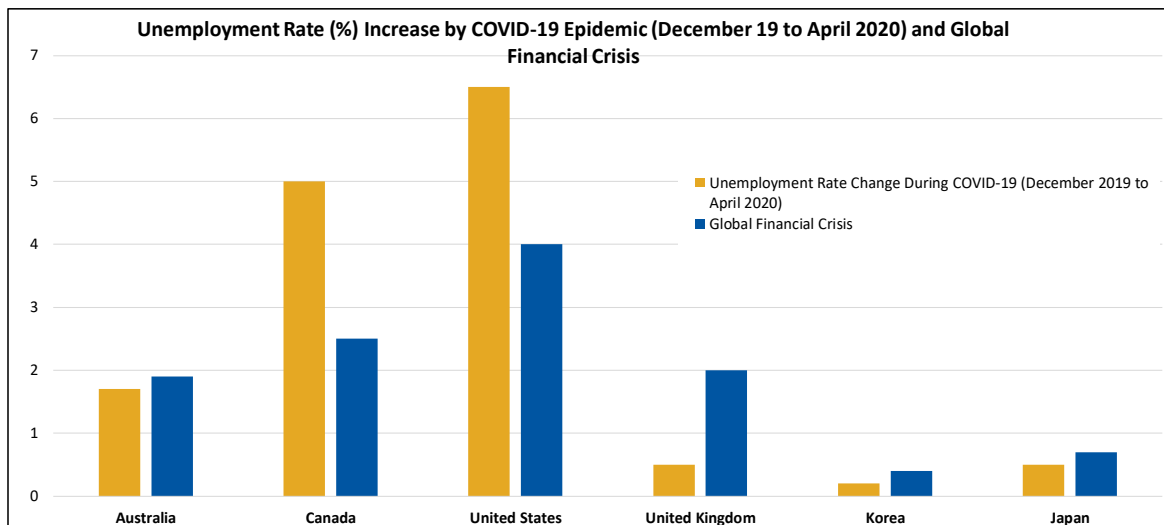
*(Adapted from Source: King's College London, Florence Nightingale School of Nursing and Midwifery)*

According to Bronfenbrenner, the microsystem is the small, immediate environment in which the student lives. In this microsystem, students interact with family, peers, faculty, and school; how these groups or organizations interact will also affect students. For example, students interact with family, peers, faculty, and staff mostly face to face before the COVID-19. After COVID-19, students interact with peers, faculty, and staff mostly in a virtual modality. As for family, students might interact with family members virtually if they do not live together during their academic year. Such isolation from family and friends might impact students' learning and growth in general. During COVID-19, many students returned home, studying remotely. How does learning from home affect their academic outcomes? Bronfenbrenner indicated the more

encouraging and nurturing those relationships and places are, the better the students will be. Will the online modality provide a similar encouraging and nurturing environment for students with different demographic and linguistic backgrounds?

In between microsystem and macrosystem, another layer contains parents' workplaces, extended family members, media, community health services, the neighborhood, and community, etc. Before the COVID-19 pandemic, students might not have interacted with this system. After COVID-19, students have had more immediate contact with this system. For example, both parents working from home might affect students' routines and lifestyles. Community health services might also affect students' well-being. Take the Bay Area as an example. These six counties in California announced the shelter-in-place order back on March 17<sup>th</sup> 2020, which was then extended another month to May 31<sup>st</sup>. How students coped with the sudden changes and adjusted to the new environment might also impact their learning and overall well-being.

The macrosystem includes government policies, cultural values, and the economy. COVID-19 impacted government policies regarding border control, student visas, and the economy. The Organisation for Economic Co-operation and Development (OECD, 2020) researched G20 countries and found that the unemployment rate increased during the COVID-19 was even higher than the global financial crisis in some countries. As figure 2 shows, the unemployment rate doubled in the United States and Canada from December 2019 to April 2020 compared to the previous global financial crisis.



**Figure 2:** *Unemployment Rate During the COVID-19 Pandemic*

*(Image Adapted from Source: OECD Calculations Based on Data from National Labor Force Surveys)*

The United States had around 4% increase in the unemployment rate since November 2018, then reached the peak of 15% in May 2020 and decreased to 7 % as of November 2020 (The U.S. Bureau of Labor Statistics, 2020). May 2020 was toward the end of the Spring 2020 semester in the United States, and 15 out of 100 Americans were out of jobs. The work-study opportunity on campus also decreased after March 2020 as part of the general hiring freeze of the California State University system (Smith, 2020). Under such circumstances, many students might potentially lose their jobs or lose economic support from the school, family, or other grants, which may subsequently affect their learning.

Ecological theory tells us that student learning is impacted by many spheres of the world around students. The death of George Floyd on May 25, 2020, and the following protests impacted U.S. society and expanded globally. People gathered for justice despite the COVID-19 pandemic across the United States (Harris & Gagne, 2021). The related hashtag “protest” also constituted 15 million posts when analyzing Twitter traffic (Blankenship & Reeves, 2020). In the Spring 2020 semester, the students and the faculty experienced multiple tensions from across several spheres of their environment: biological, social, and instructional. For students who also have home lives complicated by socioeconomic pressures, those pressures increased as well. Such events and social movements affected the range of systems outlined in figure 1: from microsystem to macrosystem.

## **2.2 Research Issue**

The motivation behind this study came from the 10-year longitudinal study of the First-Year Writing Program at San Jose State University. The timeline of this study is from Fall 2010 to Spring 2020, when the COVID-19 epidemic took place in the middle of the semester. One of the classes is Stretch, which has many successes nationwide (Glau, 2007). Since the academic outcomes of Spring 2020 were not consistent with the previous semesters, this study decided to explore possible reasons behind the inconsistency. Stretch was implemented then achieved excellent academic outcomes in the academic year (AY) 2014. The average course pass rate in Fall semesters is 96% and 93% in Spring semesters from AY 2014 to AY 2020. Most importantly, it also successfully transitioned students from remedial writing courses into a college writing course. Previously, students could enroll in 3-8 extra units to complete their college writing requirement (Baer, 2020b). Students who completed AY 19-20 Stretch also had a 2% higher general course pass rate in subsequent writing courses compared to students who did not, according to Fall 2020 data.

In response to the effort of California State University's promise to eliminate equity gaps, Stretch had successfully closed the equity gap for underrepresented minority students in Spring 2019. When the COVID-19 pandemic raged through the United States in Spring 2020, the academic outcomes in this course decreased. Compared to the average of 93% from AY 2014 to AY 2020, the course pass rate was 89% in Spring 2020— a 4% decrease. Although such differences might not be statistically significant, it might be worthwhile to explore such data further. Given such differences, the purpose of this study is to reveal how academic outcomes differed before and after the pandemic and in what way. Given the context, this study explores the following questions:

- To what extent does COVID-19 impact students compare to the pre-pandemic era?
- Which groups of students have been affected most during the COVID-19 pandemic?
- What are the implications for teaching online in the post-COVID-19 era?

The COVID-19 pandemic has brought many impacts since the end of 2019; this study intends to explore whether that has impacted students' academic outcomes. The academic outcomes do not reflect all aspects of student learning; thus, the result of this study might not be able to generalize other aspects of student learning. Chen and Roldan (2021) also found that COVID-19 has created unintended benefits and opportunities for students in different disciplinary areas with a virtual learning environment. The method and the data analysis sections will describe the sampling population.

### **3. Method**

This study aimed to explore student learning, particularly academic outcomes under the age of COVID-19. The Institutional Review Board (IRB) approved the collection of data and its purpose. Tableau is used to analyze the data of this study. The following section will introduce the population and data of this study.

#### **3.1 Population**

The enrollment of this one-year cohort course is 538 students where course completion grades included credit (CR), no credit (NC), and withdrawal (W). Among the 516 students who passed the course with CR, 491 of them continued this course in the sequential Spring semester. In the Spring semester, students earn grades ranging from A to F; students must earn a grade of C- or better to complete the graduation requirement.

Due to COVID-19, the University adjusted policy to accommodate new strains on student learning: students were allowed to choose CR/NC grading rather than A- F grading in Spring 2020. In addition, students could also withdraw from classes with a refund in that semester. Demographics refer to gender, underrepresented minority (URM) status, Pell-eligibility, and first-generation status based on the students’ college applications. The URM status includes African American, Native American, and Latinx students.

### 3.2 Data

The data is comprised of two datasets from Fall 2019 to Spring 2020. One data set includes students’ grades and demographics, while the other is about their language backgrounds. The final data combined students’ grades, demographics, and Language Background Survey.

#### 3.2.1 Students’ Grades and Demographics

This set of data includes students who enrolled and completed the course. Among the 538 students, only 3 students enrolled and dropped the class after the pandemic with a withdrawal grade— W. Most students used the COVID grade policy instead of dropping courses. This set of data includes students’ grade information and demographics. Demographics in this study include gender, low-income status, First-Generation status, and underrepresented minority status (URM Status) based on students’ college applications. The URM students are those who identified as African American, Native American, or Latinx. Non-URM students are those who identified as Asian, Caucasian, Pacific Islander, international students, or those who did not identify their ethnicity (unknown). The ethnicity breaks down is shown in Table 1.

**Table 1: Population by Ethnicity headcounts and Percentage**

	Fall 2019		Spring 2020	
	# of Students	% of Ethnicity	# of Students	% of Ethnicity
<b>African American</b>	46	9%	44	9%
<b>Asian</b>	135	25%	129	26%
<b>Caucasian</b>	46	9%	44	9%
<b>International Students</b>	33	6%	29	6%
<b>Latinx</b>	236	44%	208	42%
<b>Pacific Islander</b>	3	0.6%	3	1%
<b>Unknown</b>	39	7%	34	7%
<b>Total</b>	<b>538</b>	<b>100%</b>	<b>491</b>	<b>100%</b>



Students who reported that they are the first in their family to attend college are considered to be First-Generation students. The first-Generation status refers to students who self-identified themselves as the first in their family attending college. Pell Grant Program provides need-based grants to low-income undergraduate and certain post-baccalaureate students to promote access to postsecondary education (Benefits.gov, 2021 February 22). Thus, this study uses the Pell Grants to distinguish students' groups of low-income and those who are not low-income students.

### **3.2.2 Language Backgrounds**

The language background survey is built in the Canvas Learning Management System (LMS). Students filled out the Language Background Survey via Canvas voluntarily. Language Background survey data were joined with the other dataset of grade and demographics. The Language Background Survey is adapted from Dana Ferris' language background survey (Ferris, 2010). Students who enrolled and completed the course but did not participate in the language background survey are not included in this study. The total number of participants is 530 students in the fall semester, then 485 students in the spring semester.

As for students' language backgrounds, English as the first language comes from the item, "Was English the first or primary language in your home as you grew up?" Multilingual and monolingual comes from the other item, "Was English spoken in your home when you were a young child?" Both items were from a language background survey designed by Dana Ferris (Ferris, 2009). If students did not respond to the survey, then their responses would not be recorded.

### **3.3 Data Analysis**

The academic outcome is reported in the percentage as a rounded-up number with headcounts of students who earned a grade in the range. Course completion rates include the following three indicators:

- Pass rate: percentage of students who earned a CR or at least a C-
- Fail rate: percentage of students who earned NC, D, or F grades
- Withdrawal rate: percentage of students who withdrew from class or earned an I (Incomplete) grade

The following descriptive statistic was applied to data analysis. These descriptive statistics were applied to explore the differences by examining the average of each factor.

- Final grades
- Gender

- Ethnicity
- Financial Status (Pell-eligibility status)
- Parents’ level of education by First-Generation Status
- English as the first language
- Multilingual versus monolingual

The descriptive statistics of each factor are compared via groups from Fall 2019 to Spring 2020. For example, the pass rate of female students was compared with male students to determine whether there are any differences between genders and/or between semesters.

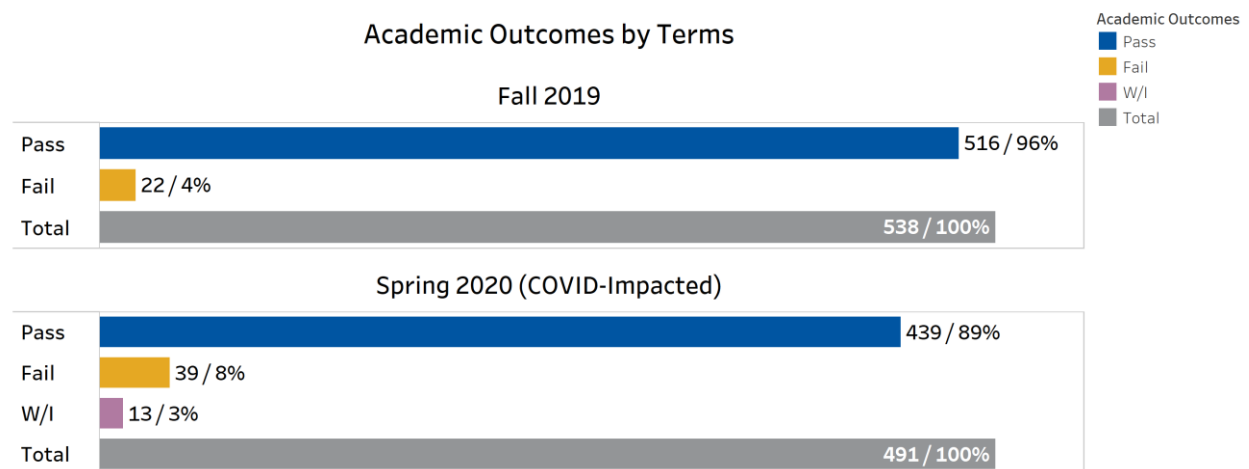
## 4. Results

This section report results from academic outcomes by terms and demographic backgrounds. The section ends with academic outcomes by language backgrounds.

### 4.1 Fall 2019 and Spring 2020 Grade Distribution

The grade distribution is shown by the number and percentage of students. The percentage is reported as a rounded-up number. Take Fall 2019 as an example, 516 out of 538 students passed the course; thus, the pass rate was 96% in Fall 2019. Pass rate differences are compared between the academic outcomes of Fall 2019 and Spring 2020, as shown below.

- Pass rate: Spring 2020 is 7% lower than that of Fall 2019.
- Fail rate: Spring 2020 is 4% higher than that of Fall 2019.
- Withdrawal rate: Spring 2020 is 3% higher than that of Fall 2019.

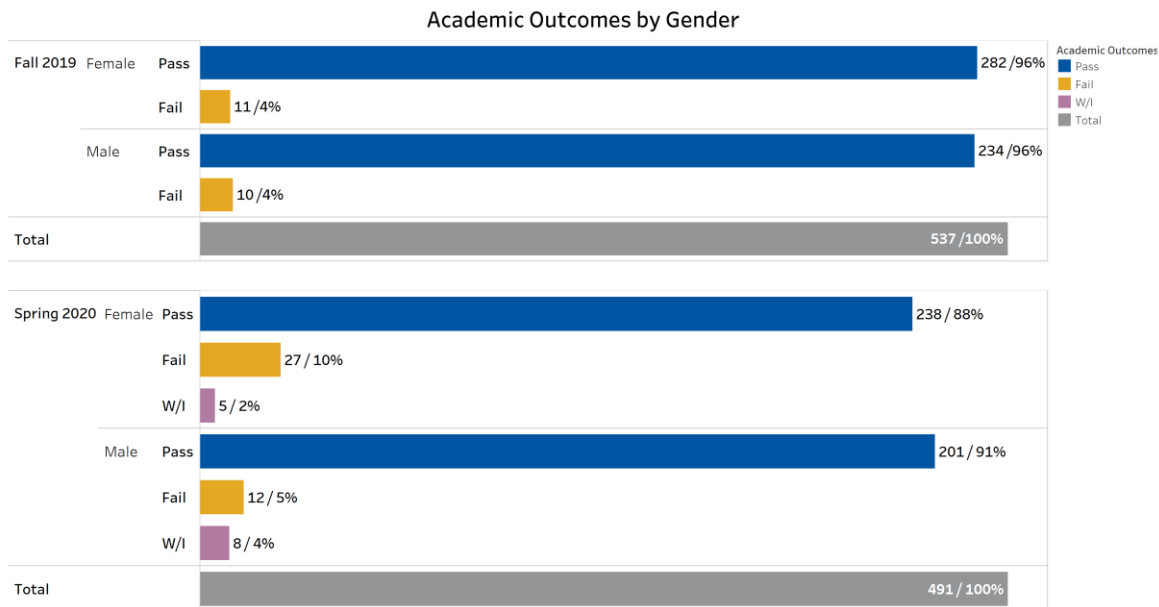


**Figure 3: Academic Outcomes by Terms**

The results showed a 7% decrease in the pass rate when comparing Fall 2019 and Spring 2020. There was a 3% increase in the withdrawal rate in Spring 2020. The fail rate also doubled from 4% in Fall 2019 to 8% in Spring 2020. In addition, the withdrawal rate also increased from 0% in Fall 2019 to 3% in Spring 2020. When furthering the COVID-19 Grading policy, only 6% of students in this course changed their grades to CR/NC. When furthering the result, we found that NC accounts for 35% of the fail rate while CR accounts for 4% of the pass rate.

**4.2 Gender**

One student did not reveal their gender in Fall 2019 and did not continue the course in Spring 2020. Thus, we did not include such data in the following graph. The gender data in this study include female and male students.

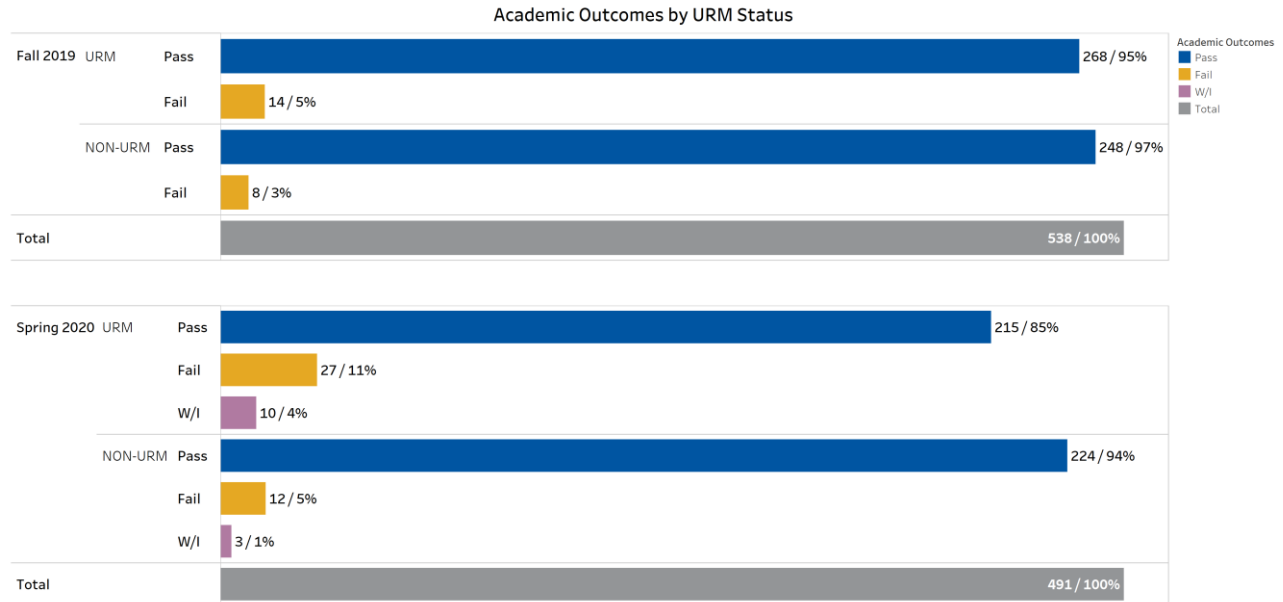


**Figure 4:** *Fall 2019 and Spring 2020 Academic Outcomes by Gender*

There is no difference in pass rate when comparing male and female students in Fall 2019. In Spring 2020, the average pass rate of female students was 3% lower compared to that of male students.

**4.3 Ethnicity**

Ethnicity is separated into two groups: Students with URM status and students with non-URM status.

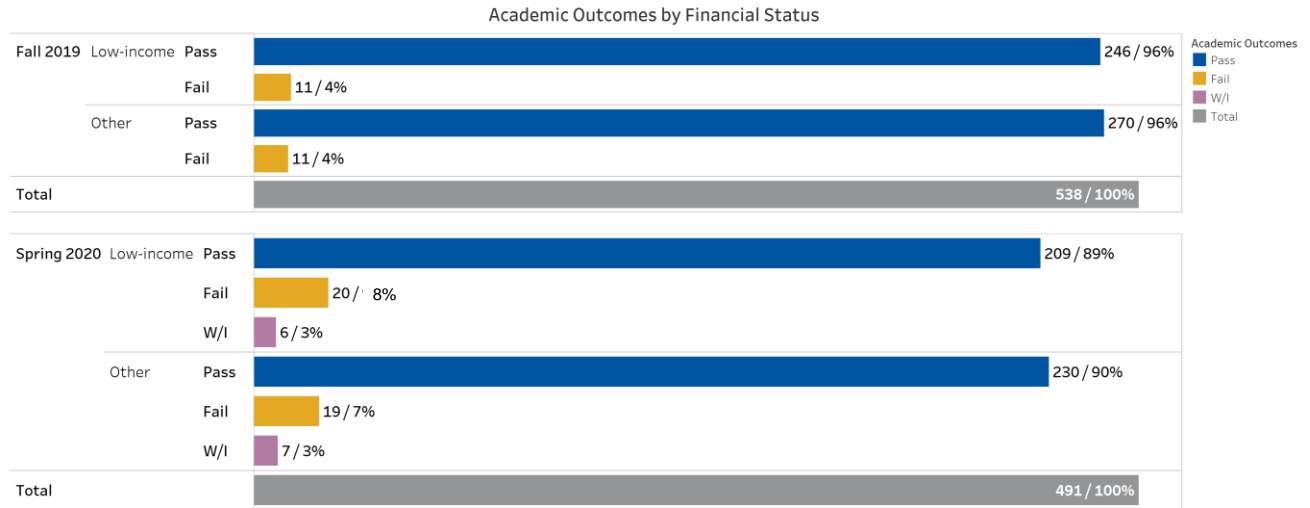


**Figure 5:** *Fall 2019 and Spring 2020 Academic Outcomes by URM Status*

In Fall 2019, the average pass rate of students with a URM status was 2% lower compared to students with a non-URM status. In Spring 2020, the average pass rate of students with a URM status is 9% lower compared to students with non-URM status: a difference of 7% in the pass rate from Fall 2019 to Spring 2020. In Spring 2019, there is no difference in pass rates when compare students with a different URM status. On average, there is usually a 2% difference in pass rates for students with a different URM status from Spring 2015 to Spring 2019. Thus, the 9% difference in Spring 2020 is much higher than the 5-year average as well as the 0% difference in Spring 2019. Such difference suggests that COVID-19 and related events might bring more impacts on students with a URM status compared to their peers.

#### **4.4 Financial Status**

Financial status is categorized into two groups. Students who are eligible in receiving Pell Grants are coded as low-income while those who are ineligible in receiving Pell Grants as Other. Around 48% of the class are low-income while the other 52% are not low-income.

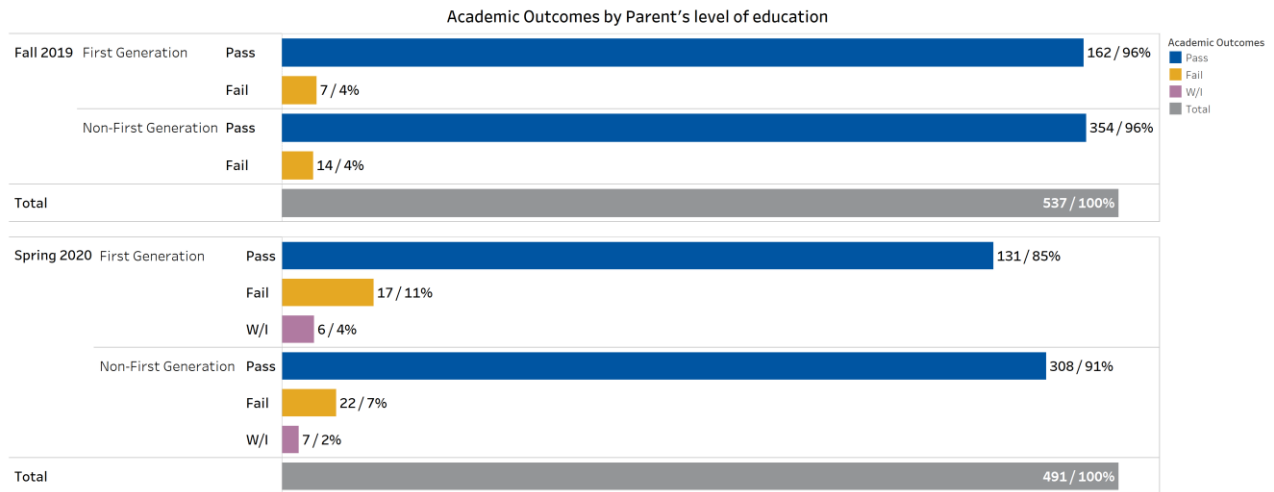


**Figure 6:** *Fall 2019 and Spring 2020 Academic Outcomes by Financial Status*

In Fall 2019, the average pass rate of low-income students was the same as students who are not. In Spring 2020, the average pass rate of low-income students is 1% lower than students who are not. There are no significant differences while comparing the two groups. Although there are no significant differences between the two groups in Spring 2020, both groups had a 6% decrease in pass rates. Fall 2014 to Spring 2020 data showed that there is usually a 2% decrease in pass rates from Fall semesters to Spring semesters. Thus, the 6% decrease suggests that the impact of COVID-19 on students whether they are low-income or not.

### 4.5 Parents' Level of Education

Parents' level of education is categorized into two groups as First-Generation and non-First-Generation status. The First-Generation status is assigned to students when students responded that they are the first ones to go to college.

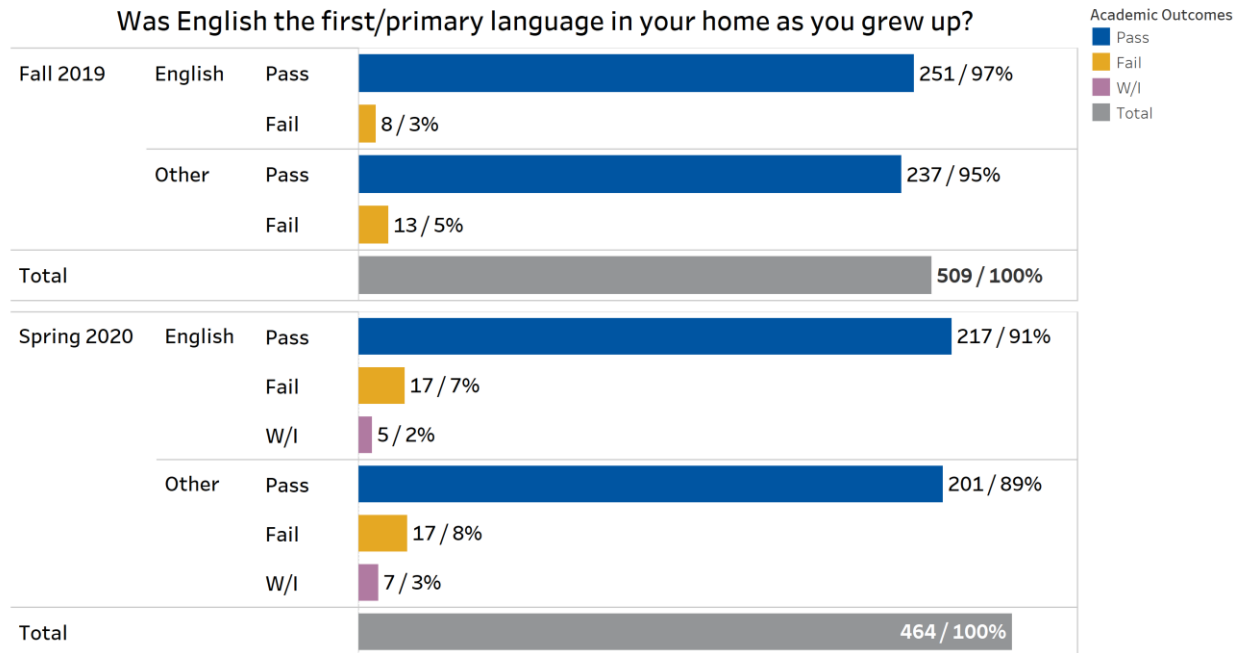


**Figure 7:** *Fall 2019 and Spring 2020 Academic Outcomes by Parents' Level of Education*

In Fall 2019, the average pass rate of First-Generation students was the same compared to their peers. In Spring 2020, the average pass rate of students with a First-Generation status is 6% lower. The result shows that COVID-19 might have more impact on First-Generation students compared to their peers.

### 4.6 English as First Language

Students who responded to English as their first language are categorized into English. Students who responded to other languages as their first language are categorized into Other as shown in Figure 8.

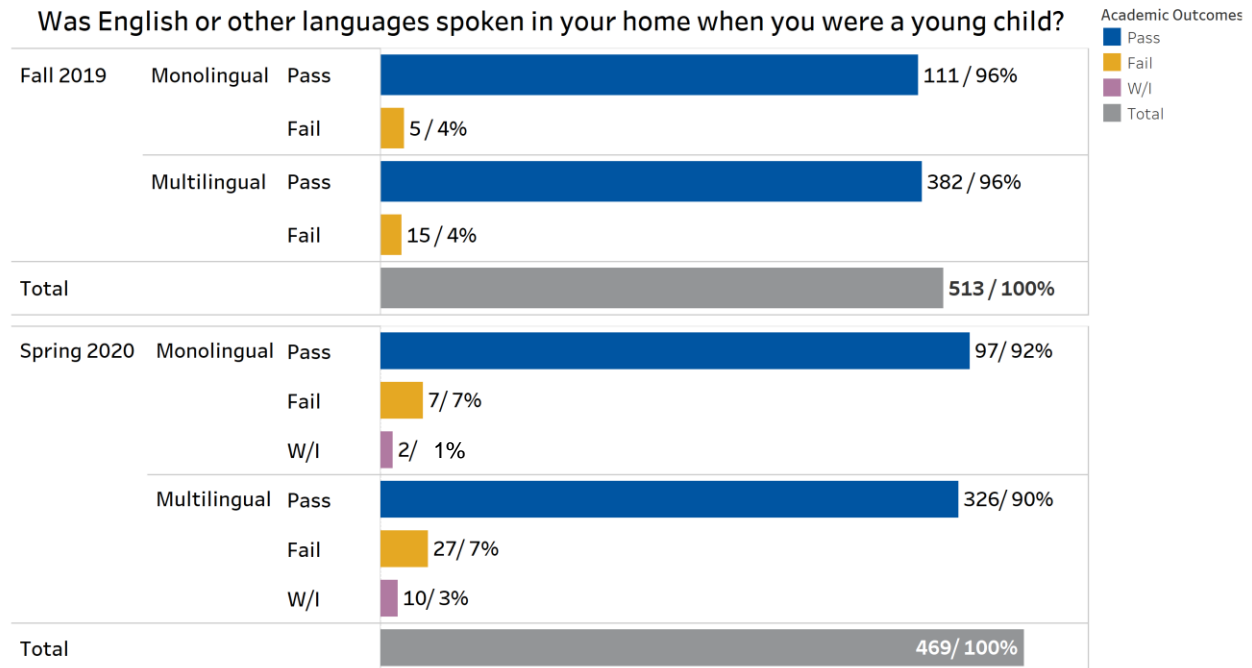


**Figure 8:** *Fall 2019 and Spring 2020 Academic Outcomes by First Language*

In Fall 2019, the average pass rate of students who spoke English as the first language was 2% higher than those who speak other languages as their first languages. In Spring 2020, the average pass rate of students who spoke English as the first language is also 2% higher than those who speak other languages as first languages. Thus, there are no differences between students with different first languages.

#### **4.7 Monolingual and Multilingual**

Students who responded that they only speak one language are categorized into monolingual. Students who responded that they speak more than one language are categorized into multilingual. In this sampling population, 77% of the students are multilingual while 23% of them are monolingual.



**Figure 9:** *Fall 2019 and Spring 2020 Academic Outcomes by Language Backgrounds*

In Fall 2019, the average pass rate of monolingual students was the same as multilingual students. In Spring 2020, the average pass rate of monolingual students had a 2% higher pass rate compared to multilingual students. Although the difference in pass rates is not significant, it shows that multilingual students might experience more impact during COVID-19 compared to their monolingual peers.

## 5. Conclusion

Due to COVID-19, students changed from in-person to virtual courses in the middle of Spring 2020, while instructors also modified their lessons into all virtual/online modalities. This study explored whether such changes might impact students’ learning. The results suggest that students’ language backgrounds do not affect their academic outcomes before or after COVID-19. The differences are within 2% in both language backgrounds before or after COVID-19. In contrast, COVID-19 seems to bring more effects on academic outcomes based on students’ demographic backgrounds. Specifically, students with URM status, First-Generation status, and female students.

The results suggest that COVID-19 impacted students’ academic outcomes regardless of their financial status. It also reconsiders what factors might affect equity pedagogy in the virtual



learning environment for URM, First-Generation, and female students during COVID-19. As Ecological theory suggests that curriculum is one of many factors affecting student learning. The campus itself plays a role in mitigating the socio-economic obstacles to learning: A campus's admission policies, grading policies, family outreach programs, and extracurricular supports and resources stabilize the learning environment for students who struggle to overcome socio-economic obstacles to their learning. The result raises questions about how we can translate the campus supports for learning into a virtual learning environment. The results provide implications to rethink 1) the current campus-wide policies, such as admission policy and grading policy, 2) the structure of university family outreach programs. For example, did the adopted COVID-19 grading policy allow students to guard their GPA by choosing a Credit/No Credit grade student successfully accommodate students' learning needs? The results showed that students who changed to an NC grade constituted 35% of students who failed the course.

As COVID-19 continues in 2021, it will be worthwhile to produce a similar study of 2020 to 2021 academic year: Does the impact we saw in the mid-semester transition to online persist when the course originates online from the beginning of term: when faculty have originally designed and prepared the lessons for online learning, and when students began their studies online and completed them online. In what way(s) did the impact persist and for which particular student populations: impacts in access, in course learning outcomes, in academic outcomes, etc.?

This study reports on the academic outcomes for one undergraduate writing cohort in a program with a shared curriculum during a singular transition to online learning as the COVID 19 pandemic surged. Thus, the results may not generalize for upper-division students, nor for countries whose mode of instruction was not impacted much by COVID-19.

## REFERENCES

- Baer, C. (2020a). SJSU's Transition out of Remediation: A Longitudinal Study of Entry-Level Writing at SJSU, AY 2011-12 to AY 2019-20. Vol 1. Stretch English as an Equity Pedagogy. Unpublished report submitted to SJSU University Writing Committee.
- Baer, C. (2020b). SJSU's Transition out of Remediation: A Longitudinal Study of Entry-Level Writing at SJSU, AY 2011-12 to AY 2019-20. Vol 1. Stretch English as an Equity Pedagogy. Unpublished report submitted to SJSU University Writing Committee.
- Benefit.gov. (2021, February 22). *Federal Pell Grants*. <https://www.benefits.gov/benefit/417>

- Blankenship, M., & Reeves, R. (2020). From the George Floyd moment to a Black Lives Matter movement, in tweets. *Brookings*. <https://www.brookings.edu/blog/up-front/2020/07/10/from-the-george-floyd-moment-to-a-black-lives-matter-movement-in-tweets/>
- Bronfenbrenner, U. (1979). *The Ecology of Human Development: Experiments by Nature and Design*. Cambridge, MA: Harvard University Press
- Chen, Y., & Roldan, M. (2021). Digital Innovation during COVID-19: Transforming Challenges to Opportunities. *Communications of the Association for Information Systems*, 48, pp-pp. <https://doi.org/10.17705/1CAIS.04803>
- Falk, J., Dierking, L., Osborne, J., Wenger, M., Dawson, E., and Wong, B. (2015). Analyzing science education in the United Kingdom: taking a system-wide approach. *Sci. Educ.* 99, <https://doi.org/10.1002/sce.21140>
- Ferris, D. (2009). *Teaching college writing to diverse student populations*. University of Michigan Press. <https://doi.org/10.3998/mpub.263445>
- Ferris, D. (2010). Second language writing research and written corrective feedback in SLA: Intersections and practical applications. *Studies in Second Language Acquisition*, 32(2), 181-201. <https://doi.org/10.1017/S0272263109990490>
- Glau, G. (2007). "Stretch" at 10: A Progress Report on Arizona State University's "Stretch Program". *Journal of Basic Writing*, 26 (2), 30-48. Retrieved March 18, 2021, from <http://www.jstor.org/stable/43444083>
- Harris, D., & Gagne, T. (2021). *Justice for George Floyd*. Abdo Publishing, a division of ABDO.
- King's College London. (2020). *Ecological Theory*. Florence Nightingale School of Nursing and Midwifery. [http://keats.kcl.ac.uk/pluginfile.php/737715/mod\\_resource/content/1/page\\_07.htm](http://keats.kcl.ac.uk/pluginfile.php/737715/mod_resource/content/1/page_07.htm)
- Lee, C. (2010). Soaring above the clouds, delving the ocean's depths. *Educ. Res.* 39, 643–655. <https://doi.org/10.3102/0013189X10392139>
- Lee, C. (2017). Integrating research on how people learn and learning across settings as a window of opportunity to address inequality in educational processes and outcomes. *Rev. Res. Educ.* 41, <https://doi.org/10.3102/0091732X16689046>
- Organisation for Economic Co-operation and Development. (2020). The impact of the COVID-19 pandemic on jobs and incomes in G20 economies. *ILO-OECD paper prepared at the request of G20 Leaders Saudi Arabia's G20 Presidency 2020*. Retrieved from

[https://www.ilo.org/wcmsp5/groups/public/---dgreports/---cabinet/documents/publication/wcms\\_756331.pdf](https://www.ilo.org/wcmsp5/groups/public/---dgreports/---cabinet/documents/publication/wcms_756331.pdf)

- Russell, J. L., Knutson, K., and Crowley, K. (2012). Informal learning organizations as part of an educational ecology: lessons from collaboration across the formal-informal divide. *J. Educ. Change* 14, <https://doi.org/10.1007/s10833-012-9203-4>
- Smith, A. (2020, October 26). *More than half of California State University campuses saw enrollment gains this fall, despite pandemic*. <https://edsource.org/2020/more-than-half-of-csu-campuses-saw-enrollment-gains-this-fall-despite-pandemic/642072>
- The U.S. Bureau of Labor Statistics. (2020). The employment situation — November 2020. Retrieved from <https://www.bls.gov/news.release/pdf/empsit.pdf>
- Van Lier, L. (2010). The ecology of language learning: practice to theory, theory to practice. *Procedia - Social and Behavioral Sciences* 3, <https://doi.org/10.1016/j.sbspro.2010.07.005>