

**Student Performance in Four Teaching Modalities and Covid-19
in a Research Course at a Hispanic Serving Institution**

Linton, Kristen Faye ¹

¹ California State University Channel Islands
kristen.linton@csuci.edu

Abstract

This study aimed to assess the differential outcomes of students at a Hispanic Serving Institution based on ethnicity, teaching modality, and pre-post pandemic. Descriptive statistics of students' ($N = 117$) writing scores, course grades, and retention were reported. All student grades were best for the asynchronous modalities whether virtual or face-to-face. The Hispanic students' grades were best in course sections with face-to-face interactions; they struggled more than others during the Covid-19 pandemic.

Keywords: teaching modality; blended teaching; higher education; virtual teaching; online teaching

Introduction

The Covid-19 pandemic caused a rapid shift in higher education to the use of online learning; the shift disparately impacted underrepresented minorities and first-generation students who fared worse in remote learning, had greater responsibilities to help siblings with remote learning, and had economic challenges and food insecurity (Barber et al., 2021). As we move

into a post-pandemic time, data disaggregated by race, ethnicity, gender, generation status, and income should inform teaching modality choices. Teaching modalities can include face-to-face and online learning with various degrees of asynchronous, synchronous, and blended or hybrid teaching methods. Research has found that the course topic and student population are associated with student outcomes based on teaching modalities. This study's location was at an interdisciplinary undergraduate program including social work at a small Hispanic-Serving Institution (HSI), which is a qualified educational institution that serves 25% or more Hispanic students. HSIs have grown on average by 29 institutions per year since 2013, which demonstrates the need to use teaching modalities that are effective for Hispanic students (HACU, 2017).

Teaching Modalities & Student Outcomes

Research on teaching modalities and student outcomes has primarily compared online asynchronous courses to face-to-face synchronous courses. This research shows that the relationship between teaching modalities and student outcomes is dependent upon the course topic. Two large scale studies had opposite results. Paul and Jefferson (2019) conducted a comparative analysis of an environmental science course taught online asynchronous versus face-to-face synchronous in multiple sections between 2009 and 2016. Total scores of 548 students (401 from face-to-face sections and 147 from online sections) were used to assess if one teaching modality generated better student performance. No significant difference in student performance between online and face-to-face learners was found controlling for gender and class rank (Paul & Jefferson, 2019). Whereas a study of five years of an online asynchronous and face-to-face synchronous social work program compared students' comprehensive exam scores and

GPA's ($N = 883$; Cummings et al., 2019). Cummings and colleagues found that students that received face-to-face classes had higher educational scores. Paul and Jefferson's (2019) study assessed only one environmental science course, which most likely includes learning objective content on geology, chemistry, physics, ecology, biology, and/or earth science. Social work includes abstract, subjective topics, which may be more difficult to grapple with in an online-only course.

Three other studies support the notion that students may be more likely to succeed academically in online, asynchronous courses with objective content. One study compared two sections of a graduate research methods course taught face-to-face synchronous versus online asynchronous; both groups of students scored significantly higher on a post-test than on a pretest of research methods knowledge, but there was no significant difference in performance between the two groups (Holmes & Reid, 2017). Another study compared online asynchronous versus face-to-face synchronous of a chemistry lecture and lab course ($N = 823$) from 2015-2016 academic year. Student pass and withdrawal rates were similar based on teaching modality. However, contrary to the authors expectations, online students were more likely to earn As in both lecture and lab while face-to-face students were more likely to earn Cs or Ds (Falcouner et al., 2018). A third study, a comparison of students in three different sections of a child development course using different teaching modalities (Online asynchronous, face-to-face synchronous, and blended online asynchronous and face-to-face synchronous) found that students in each section performed equally well in assignment and final grades (Yen et al., 2018).

Teaching Modalities & Hispanic Student Outcomes

Scant research has assessed the relationship between teaching modalities and Hispanic student outcomes. Most of the studies conducted on this topic occurred in the state of California, which has many HSIs and large Hispanic population. In a novel study of a research methods course comparing students' grades in a synchronous face-to-face synchronous course, an online asynchronous course, and blended face-to-face synchronous and online asynchronous course, Latino students' grades were the lowest in the asynchronous online only course (Linton et al., 2021). Kraupp (2012) found that, Latino students receiving online asynchronous instruction at the California Community College System experienced a nine-percentage point lower success rate, grades that averaged two-tenths of a grade point lower, and withdrawal rates over twice as high as compared to Latino students in face-to-face synchronous sections. Another study from the California Community College system specifically assessed differences in modality by men and ethnicity; Palacios and Wood (2016) found that Latino men had higher success outcomes in face-to-face synchronous courses compared to online.

Interviews with Latino students at the institution found that the absence of a strong student-instructor relationship was identified as key to their success (Kraupp). Linton and colleagues' (2021) also found that Latino students reported less connectedness in the online-only section than other students. Perez and Taylor (2016) concurred that relationships with mentors and peers helped sustain Latino males in college (Perez & Taylor, 2016). A recent survey of 626 students of color in college found that more diverse peer interactions and positive perceptions of institutional commitment to diversity buffer against the negative effects of discrimination and bias on sense of belonging for students of color (Hussain & Jones, 2021).

Study Purpose

While many studies have compared two teaching modalities, few studies have compared multiple teaching modalities of the same course and compared outcome by ethnicity. This study aimed to 1) compare student learning outcomes, grades, and retention in a research methods course by four teaching modalities (face-to-face synchronous, online asynchronous, blended online synchronous and online asynchronous, and blended face-to-face synchronous and online asynchronous) for all students, 2) compare student learning outcomes, grades, and retention in a research methods course by four teaching modalities among Hispanic and non-Hispanic students, and 3) compare learning outcomes, grades, and retention between Hispanic and non-Hispanic students during a blended online synchronous and online asynchronous course taught in the pandemic to pre-pandemic course sections.

Methods

This study was approved as exempt from the university Institutional Review Board. Four sections ($N = 117$ students) of the same research methods course taught by the same white instructor were taught in four different teaching modalities in Spring 2018 (one face-to-face synchronous), Spring 2019 (one blended 50% face-to-face synchronous and 50% online asynchronous and one online asynchronous) and Spring 2021 (50% online synchronous via Zoom and 50% online asynchronous). Frequencies and percentages of students' course letter grades were also collected and reported for each section. Students were retained if they completed the course after course assignments had been turned in. A student who enrolled in the course yet dropped it before assignments were collected was not considered to be enrolled at all. Students could drop and enroll through the third week of courses. The final assignment in the course is a Methodological Literature Review in which students are asked to synthesize five

research studies on a specific health intervention or health policy. Students were graded using a rubric on synthesis writing proficiency: 4 = highly developed, 3 = developing, 2 = emerging, and 1 = initial. Descriptive statistics and one-way ANOVAs were used for analysis.

Results

All student grades were best for the blended 50% face-to-face synchronous and 50% online asynchronous section followed by the face-to-face synchronous section. Students in the face-to-face synchronous section experienced statistically lower synthesis writing proficiency scores than those in the blended 50% face-to-face synchronous and 50% online asynchronous ($p = .013$), online asynchronous ($p = .001$), and 50% online synchronous via Zoom and 50% online asynchronous ($p = .001$) modalities. No statistically significant differences were found between the writing in blended 50% face-to-face synchronous and 50% online asynchronous, online asynchronous, and 50% online synchronous via Zoom and 50% online asynchronous sections. Only one student was not retained, and that student was in the blended 50% face-to-face synchronous and 50% online asynchronous (Table 1).

A t-test was run to see if there were statistically significant differences in Synthesis Writing Proficiency by ethnicity. No statistically significant differences were found. When student data was divided by Hispanic and non-Hispanic students, the Hispanic students' grades were best in the face-to-face only and Blended synchronous face-to-face and asynchronous online sections. Hispanic students particularly struggled in the Spring 2021 semester, which was taught 50% synchronous online and 50% asynchronous online (Table 2).

Discussion

Overall, all students fared the best in the blended face-to-face synchronous and online asynchronous section since their grades were best in that course and those students also did statistically significantly better on synthesis writing than students in the face-to-face synchronous course. Hispanic students' grades were best in the face-to-face synchronous section as well blended face-to-face synchronous and online asynchronous sections. The findings of this study are consistent with qualitative and survey research showing that relationships are key to Hispanic student success in college (Kraupp, 2012; Perez & Taylor, 2016). Course modalities choices at HSIs should prioritize face-to-face and/or online synchronous sessions to provide space for relationship development that enhances the academic success of Hispanic students.

The face-to-face synchronous section in this study was the first semester that the instructor taught this research methods course. Additional research needs to be conducted to compare a more recent face-to-face synchronous section to the other teaching modalities used to control for experience in teaching the course.

It is also important to note that the Spring 2021 course was taught during the Covid-19 pandemic; the study university was primarily taught virtually with few exceptions. Forty-six percent of the Hispanic students received A grades while 62-76% of Hispanic students received A grades in previous semesters. This corroborates Barber and colleagues (2021) study that showed that underrepresented minorities and first-generation students fared worse in remote learning.

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Table 1

Research Methods HLTH 309

Description of the Sample, Grades, Retention, and Synthesis Proficiency based on Teaching Modality (N = 117)

	Spring 2018	Spring 2019	Spring 2019	Spring 2021	
	Face-to-Face & Textbook (n = 24)	Blended (50% Face- to-face and 50% Online; n = 23)	Asynchronous Online Only (n = 44)	Synchronous Online and 50% Online (n = 26)	
	<i>f(%)</i>				
Gender					
Female	21 (87.5)	21 (91.3)	38 (86.4)	21 (80.7)	
Male	3 (12.5)	2 (8.7)	6 (13.5)	5 (19.23)	
Ethnicity					
Hispanic	13 (54.2)	13 (56.5)	24 (54.5)	16 (61.5)	
Non-Hispanic	11 (45.8)	10 (43.5)	20 (45.5)	10 (38.4)	
Retention					
Retained	24(100)	22(96.65)	44(100)	26 (100)	
Not Retained	0(0)	1(4.34)	0(0)	0 (0.0)	
Grades					
A	19(79.16)	19(86.36)	28(63.63)	17 (65.38)	
B	4(16.66)	3(13.63)	11(25.0)	4 (15.38)	
C	1(4.16)		4(9.09)	5 (19.23)	
D					
F				1 (3.8)	
Incomplete			1(2.27)		
	<i>M(SD)</i>				<i>F</i>
Synthesis Writing Proficiency*	2.5 (0.88)	3.39 (1.07)	3.54 (0.77)	3.45 (1.04)	6.32(.001)

Note. Valid percentages reported. Writing Proficiency measured students' ability to synthesize five peer-reviewed articles studies' methodologies; the scale ranged from highly developed = 4 to initial = 1.

Table 2

Grades, Retention, and Synthesis Proficiency based on Teaching Modality and Ethnicity

	Spring 2018		Spring 2019		Spring 2019		Spring 2021	
	Face-to-Face & Textbook (n = 24)		Blended (50% Face-to-face and 50% Online; n = 23)		Asynchronous Online Only (n = 44)		Synchronous Online and 50% Online (n = 26)	
	f(%)							
	Hispanic (n = 13)	Non (n = 11)	Hispanic (n = 13)	Non (n = 10)	Hispani c (n = 24)	Non (n = 20)	Hispanic (n = 16)	Non (n = 10)
Retention Retained Not	13(100) 0(0)	11(100) 0(0)	13 (100) 0(0)	9 (100) 1 (0)	20(100) 0(0)	20(100) 0(0)	16(100) 0(0)	10(100) 0(0)
Grades A B C D F Incomplete	10(76.9) 2(15.4) 1(7.7)	9(81.8) 2(18.2) 0(0)	10(76.9) 3(23.1) 0(0)	9(100) 0(0)	15(62.5) 5(20.8) 3(12.5) 1(4.2)	15(75) 3(15) 2(10)	7(46.7) 3(20) 4(26.7)	8(80) 1(10) 1(10)
Synthesis Writing Proficiency	2.5(0.96)	2.45(0.82)	3.46(1.05)	3.30(1.15)	3.29(1.16)	3.65(.87)	3.57(.93)	3.5(.52)