

**Misrepresentation of Marginalized High School Graduates Enrolling in Higher Education:
Longitudinal Evidence from Texas**

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Abstract

Demographic shifts in the United States have increased higher education enrollment for marginalized populations, specifically women and minorities. Despite attempts of colleges and universities to accommodate the needs of diverse student populations, misrepresentation of minority groups, specifically Hispanic students enrolled in HSIs (Hispanic-serving institutions) and Black students enrolled in HBCUs (historically Black colleges and universities), continue to remain a concern in higher education. The purpose of this study is to investigate if enrollment patterns (4-year universities, 2-year colleges, or not located) among Texas graduating high school students differ by gender, ethnicity/race, and time. The following questions were used to guide the study: (1) Do females and males differ in the type of higher education institution for the academic years 1990-1991, 2003-2004, or 2016-2017? (2) Do Asians, Blacks, Hispanics, and Whites differ in the type of higher education institution for the academic year 1990-1991, 2003-2004, or 2016-2017? (3) Do Asians, Blacks, Hispanics, and Whites differ in institution type when enrolled in higher education across time? and (4) Do males and females differ in institution type when enrolled in higher education across time?

Data for the study, obtained from a report titled High School Graduates Enrolled in Higher Education-Statewide by Ethnicity and Gender, was obtained from Texas Public Education Resource (TPEIR) on the Texas Education Agency (TEA) website. The variables for the study observed the following: (1) frequency of females and males enrolled in 4-year institutions, 2-year institutions, and not located during the academic years 1990-1991, 2003-2004, and 2016-2017; and (2) frequency of Asians, Blacks, Hispanics, and Whites enrolled in 4-year institutions, 2-year institutions, and not located during the academic years 1990-1991, 2003-2004, and 2016-2017. Total population sampling was used for the study to observe Texas high school graduates who

applied to a college or university within one year of graduating. Chi-square test of independence was used to determine whether two variables measured at the nominal level were independent, and Cramer's V determined the strength of association. The strength between the observed and expected values was considered significant if the value was above +2 or below -2.

Findings from the study indicated: (1) during the academic years 1990-1991 and 2003-2004, females were overrepresented in 4-year universities and 2-year colleges, but underrepresented in not located yet, in 2016-2017, females were underrepresented in 4-year universities and not located, but overrepresented in 2-year colleges; (2) during the academic years 1990-1991 and 2003-2004, males were underrepresented in 4-year universities and 2-year colleges, but overrepresented in not located yet, in 2016-2017, males were overrepresented in 4-year universities and not located, but underrepresented in 2-year colleges; (3) during the academic years 1990-1991, 2003-2004, and 2016-2017 Asians were overrepresented in 4-year universities while underrepresented in 2-year colleges and not located; (4) over the three academic years Blacks were underrepresented in 4-year universities and 2-year colleges, but overrepresented in not located, yet we see a movement toward more representation in 4-year universities and 2-year college in recent years; (5) overall, across the three academic years Hispanics have been underrepresented in 4-year universities and 2-year colleges, but overrepresented in not located; (6) overall, across the three academic years Whites were overrepresented in 4-year universities and 2-year colleges, but underrepresented in not located. Observing patterns among groups enrolling in higher education will provide opportunities for future research, determining factors that may affect enrollment. Examples of future practice include further research of marginal groups such as undocumented students and individuals identifying as LGBTQ. Future scholarly practice can be applied to examining relationships between higher education enrollment and

Critical Race Theory (CRT). Appropriate policy reform in the future will be crucial in maintaining a high level of marginalized student enrollment, including examination of university procedures utilizing strategic enrollment plans.

Keywords: higher education enrollment, marginalized populations, Texas

Research Problem

The correlation between an economically secure life and obtaining a higher education degree continues to be an important aspect of America (Torche, 2011, as cited in Baker et al., 2018). The desire to attend college has increased significantly among marginalized groups over the years. According to Baker et al. (2018), successful graduation from high school essentially provides students with open access to most colleges and universities in the United States. As campuses' image continuously changes, colleges and universities need to meet new diverse student groups' needs.

Bieibly et al. (2014) states that female representation in postsecondary education has skyrocketed since 1972. Women and minorities have increased their interest in attending higher education institutions as equally as more predominant groups over the years. Between 1986 and 2014, gaps in college enrollment between Black-White and Hispanic-White students have shrunk significantly (Baker et al., 2018). The percentage of Black and Hispanic students enrolling in college has increased, despite White students remaining the predominant group enrolling in college (Berkner & Chavez, 1997; Kane 1994, 2004; Perna, 2000, as cited in Baker et al., 2018). Higher education enrollment among marginalized groups has advanced over the years. However, methods of tracking related data remain a concern. Tracking race-based gaps in college enrollment have become an easy task, yet findings indicating *whether* and *where* students enroll remain a concern (Baker et al., 2018).

In 2012, a significant demographic shift occurred among U.S. colleges and universities, resulting in Latino/a students replacing African Americans as the largest minority group attending two and four-year institutions (Fry & Lopez, 2012, as cited in Flores & Park, 2013). Texas demographics have continued to shift, resulting in a more diverse representation of the

student body in education over the years. A fascinating microcosm of postsecondary diversity has occurred in Texas, providing a rich source of organization data for enrollment and degree completion among Hispanic-serving institutions (HSIs) and historically Black colleges and universities (HBCUs) (Flores & Park, 2013). Student enrollment at HSIs in Texas consists of 55% Hispanic, 27% White, 9% African American, and 9% Asian American (Fletcher & Webster, 2010, as cited in Flores & Park, 2013). The population of students enrolled in HBCUs in Texas consists of 62% African American, 21% Hispanic, and 14% White while Asian and Foreign students account for the remaining percentage of student enrollment (Harmon, 2012, as cited in Flores & Park, 2013). As a trend in enrollment for HBCUs and HSIs continues to rise, overall enrollment in all public higher education institutions has significantly increased. Flores and Park (2013) indicated that the overall enrollment from 1997 to 2008 for white students increased from 53.3% to 58.5%, Hispanics from 40.7% to 45.7%, and Blacks from 39.1% to 48.4%.

According to Biebly et al. (2014), prior research suggests that the underrepresentation of women in higher education is due to gender disparities in pre-collegiate academic achievement, gender disparities in student application patterns, and/or gender disparities in institutional preferences. Since 1970, women have had the advantage of surpassing men with high grades and courses taken in colleges (Biebly et al., 2014). Female populations have also seen a significant increase in achievement in higher education over the years. Women also represent over 53% of the applicant pools in liberal arts colleges, yet, males have a higher probability of enrollment in higher education (Biebly et al., 2014). Studies suggest that the imbalance in admissions for women is due to the institution's practice of gender-sensitive admissions that favor males or male affirmative action (Baum and Goodstein 2005; Conger and Dickson 2011; Lewin 2006;

Whitmire 2009, as cited in Flores & Park, 2013). Despite setbacks women face when enrolling in higher education, the data suggests that women's enrollment continues to rise.

Race and ethnicity gaps continue in higher education despite increased enrollment and completion rates among marginalized groups in the United States (Melguizo, 2010, as cited in Flores & Park, 2013). Colleges' climate attributes to various factors such as teachers' instructional ability, student ambitions, and guidance counselors' general knowledge and organization (Hill, 2008; McDonough, 1997, as cited in Conger and Long, 2013) affecting enrollment in higher education. Policy changes, specifically in Texas higher education, have undergone significant changes in assessing college readiness, education access, and completion since 1997 (Domina 2007, as cited in Flores and Park, 2013). As colleges and universities continue to revamp their admissions policies, it is important to consider the groups represented in these populations. Colleges and universities must prepare for racially and ethnically diverse populations of students (Flores & Park, 2013) entering their campuses.

Research Purpose

The purpose of this study is to investigate if enrollment patterns (4-year universities, 2-year colleges, or not located) among Texas graduating high school students differ by gender, ethnicity/race, and time.

Research Questions

The following twelve questions were used to guide this study:

1. Do females and males differ in the type of higher education institution for the academic year 1990-1991?

2. Do females and males differ in the type of higher education institution for the academic year 2003-2004?
3. Do females and males differ in the type of higher education institution for the academic year 2016-2017?
4. Do Asian, Black, Hispanic, and White differ in the type of higher education institution for academic year 1990-1991?
5. Do Asian, Black, Hispanic, and White differ in the type of higher education institution for academic year 2003-2004?
6. Do Asian, Black, Hispanic, and White differ in the type of higher education institution for academic year 2016-2017?
7. Do Asians differ in institution type when enrolled in higher education across time?
8. Do Blacks differ in institution type when enrolled in higher education across time?
9. Do Hispanics differ in institution type when enrolled in higher education across time?
10. Do Whites differ in institution type when enrolled in higher education across time?
11. Do males differ in institution type when enrolled in higher education across time?
12. Do females differ in institution type when enrolled in higher education across time?

Technical Terms

The following technical terms and definitions were used in this study:

1. *Institution Type*. Higher education enrollment refers to high school graduates in Texas who enrolled in Texas public 4-year universities, Texas public 2-year colleges, or not located in Texas public higher education. High school graduates listed as not located in Texas public higher education include students that were not found in either public universities or 2-year institutions within a year of graduation, students enrolled in out-of-

state colleges or universities, and students enrolled in Texas independent institutions of higher education.

2. *Gender*. Type of gender refers to male or female students based on the reported data from Texas Education Agency.
3. *Race*. The data retrieved from Texas Education Agency lists the ethnicity for students based on each academic year. Within the study, ethnicity is described as race using the terms Asian, Black, Hispanic, and White. Students listed as Asian for the academic year 2016-2017 and Asian/Pacific Islander for the academic years 2003-2004 and 1990-1991 are referred to as Asian in the study. Students listed as Black or African American for the academic year 2016-2017 and African American for the academic years 2003-2004 and 1990-1991 are referred to as Black in the study. Students listed as Hispanic/Latino-Ethnic for the academic year 2016-2017 and Hispanic for the years 2003-2004 and 1990-1991 are referred to as Hispanic in the study. Students listed as White for the academic years 2016-2017, 2003-2004, and 1990-1991 are referred to as White in the study.

Description of Data

Data obtained for the purpose of this study was located under the reports section of Texas Public Education Resource (TPEIR) on the Texas Education Agency (TEA) website. A report titled High School Graduates Enrolled in Higher Education-Statewide by Ethnicity and Gender was used to obtain the data for the study. The information gained from the report investigated the relationship between institution, race, and gender over time.

The study includes eighteen variables described below:

1. Frequency of females in 4-year institutions during the academic years 1990-1991, 2003-2004, and 2016-2017.
2. Frequency of females in 2-year institutions during the academic years 1990-1991, 2003-2004, and 2016-2017.
3. Frequency of females not located during the academic years 1990-1991, 2003-2004, and 2016-2017.
4. Frequency of males in 4-year institutions during the academic years 1990-1991, 2003-2004, and 2016-2017.
5. Frequency of males in 2-year institutions during the years 1990-1991, 2003-2004, and 2016-2017.
6. Frequency of males not located during the academic years 1990-1991, 2003-2004, and 2016-2017.
7. Frequency of Asian in 4-year institutions during the academic years 1990-1991, 2003-2004, and 2016-2017.
8. Frequency of Asian in 2-year institutions during the academic years 1990-1991, 2003-2004, and 2016-2017.
9. Frequency of Asian not located during the academic years 1990-1991, 2003-2004, and 2016-2017.
10. Frequency of Black in 4-year institutions during the academic years 1990-1991, 2003-2004, and 2016-2017.
11. Frequency of Black in 2-year institutions during the academic years 1990-1991, 2003-2004, and 2016-2017.

12. Frequency of Black not located during the academic years 1990-1991, 2003-2004, and 2016-2017.
13. Frequency of Hispanic in 4-year institutions during the academic years 1990-1991, 2003-2004, and 2016-2017.
14. Frequency of Hispanic in 2-year institutions during the academic years 1990-1991, 2003-2004, and 2016-2017.
15. Frequency of Hispanic not located during the academic years 1990-1991, 2003-2004, and 2016-2017.
16. Frequency of White in 4-year institutions during the academic years 1990-1991, 2003-2004, and 2016-2017.
17. Frequency of White in 2-year institutions during the academic years 1990-1991, 2003-2004, and 2016-2017.
18. Frequency of White not located during the academic years 1990-1991, 2003-2004, and 2016-2017.

Method of Data Analysis

IBM Statistics (version 26) predictive analytics software (SPSS) was used to analyze the data. The study used chi-square test for independence (R X C) to determine whether two variables measured at the nominal level were independent and their association level (Laerd Statistics, 2016). Crosstabulation was used to create twelve contingency tables with actual counts, observed counts, and standard residuals. The tables were used to answer the questions related to the study. Questions 1-3 used 3x2 tables to observe the relationship between institution type and gender (female and male) during the academic years 1990-1991, 2003-2004, and 2016-2017. Questions 4-7 used 3x4 tables to observe the relationship between all races (Asian, Black,

Hispanic, and White) and institution type during the academic years 1990-1991, 2003-2004, and 2016-2017. Questions 8-10 used 3x3 tables to observe the relationship between each race individually and institution type over all selected academic years (1990-1991, 2003-2004, and 2016-2017). Questions 11-12 used 3x3 tables to observe the relationship between gender and institution over all academic years (1990-1991, 2003-2004, and 2016-2017).

Cramer's V was used to determine the association between the variables and determine the strength of association. Pearson chi-square was used to determine the correlation between variables. Four assumptions met by the study include the use of two nominal variables, independence of observations between variables, and the use of cross-sectional sampling. All expected cell counts were greater than five, and chi-square was used to test the null hypothesis. The null hypothesis is H_0 : Variable A and Variable B are independent, and the alternative hypothesis is H_A : Variable A and Variable B are not independent. The relationship between the variables was considered significant based on a level of 0.05. Standardized residuals were used to determine the strength between the observed values and expected values. Residuals above +2 or below -2 were not used for data analysis because the values in this range are considered insignificant on small tables.

Sampling Strategy

The secondary data used for the study was obtained through TEA, and the sampling strategy utilized total population sampling. Etikan et al. (2016) describes total population sampling as a method of purposive sampling that includes the entire population meeting the selected research criteria. The study population consisted of Texas high school graduates that applied to colleges or university within one year of graduating. Nonrandom techniques that do not require a set number of participants allow researchers the opportunity to use a sampling

method that does not require a set number of participants (Eitkan et al., 2016). The population consisted of the total number of high school graduates from the academic years 1990-1991, 2003-2004, and 2016-2017. Groups with a low number of responses were excluded from the purpose of the study. This population was chosen based on an interest in observing the correlation between variables, gender, race, or time, and enrollment in higher education institutions across several academic years.

Research Procedures

The procedures used in the research study include the following:

1. Paperwork for the research project was submitted to the Internal Review Board (IRB) at Stephen F. Austin State University.
2. A search was conducted to obtain information on the Texas Education Agency TPIER reports website using the terms 'College Admissions & Enrollment'.
3. The report titled High School Graduates Enrolled in Higher Education-Statewide by Ethnicity and Gender for the academic years 1990-1991, 2003-2004, and 2016-2017 were downloaded.
4. After evaluation of the report, the frequencies and variables determined the parameters for the research project. Gender, race, and time were selected as variables and institution time for the frequency.
5. Twelve separate files using Statistical Package for Social Sciences (SPSS) software were created (version 26) using corresponding titles.
6. Research questions were written based on the selected data.
7. Chi-square test of independence (R x C) was determined to be the most effective test for the research study.

8. Findings were observed using expected and actual counts to determine if there was a significant association between variables. Adjusted residuals below -2 or above +2 were excluded from the research.
9. Quantitative analysis was used to compare gender, race, or time to the type of higher education institution enrolled in over specific academic years.

Findings

The findings for the research study included questions, tables, and chi-square test results as listed below:

Questions 1: Do females and males differ in the type of higher education institution for the academic year 1990-1991?

A chi-square test of independence was conducted between institution type and gender for the academic year 1990-1991. The expected cell count frequencies were all greater than five. The association between institution type and gender type were statistically significant, $\chi^2(2) = 732.21, p < .001$. The association was weak (Cohen, 1988, as cited in Laerd Statistics, 2016), Cramer's $V = .67$.

Table 1

Crosstabulation of Institution Type and Gender for Academic Year 1990-1991

Type of Institution in Texas	Gender	
	Female	Male
4-year Universities	19981	17093
	18753	18321
	(14.5)	(-14.5)
2-year Colleges	24786	21220
	23271	22735
	(16.6)	(-16.6)
Not located	38420	42958
	41163	40215
	(-27.1)	(27.1)

Note. Actual counts are listed first, expected counts are listed below actual counts*, and adjusted residuals appear in parenthesis below expected counts. Adjusted residuals determine the strength of difference between expected and actual counts. Adjusted residuals above +2 or below -2 are considered insignificant for this study.

Question 2: Do females and males differ in the type of higher education institution for the academic year 2003-2004?

A chi-square test of independence was conducted between institution type and gender type for the academic year 2003-2004. The expected cell count frequencies were all greater than five. The association between institution type and gender type were statistically significant, $\chi^2(2) = 1060.23, p < .001$. The association was weak (Cohen, 1988, as cited in Laerd Statistics, 2016), Cramer's $V = .066$.

Table 2

Crosstabulation of Institution Type and Gender for Academic Year 2003-2004

Type of Institution in Texas	Gender	
	Female	Male
4-year Universities	27387	22524
	25350	24560
	(20.5)	(-20.5)
2-year Colleges	40298	35257
	38375	37180
	(16.9)	(-16.9)
Not located	55953	62007
	59912	58047
	(-32.1)	(32.1)

Note. Actual counts are listed first, expected counts are listed below actual counts*, and adjusted residuals appear in parenthesis below expected counts. Adjusted residuals determine the strength of difference between expected and actual counts. Adjusted residuals above +2 or below -2 are considered insignificant for this study.

Questions 3: Do females and males differ in the type of higher education institution for the academic year 2016-2017?

A chi-square test of independence was conducted between institution type and gender type for the academic year 2016-2017. The expected cell count frequencies were all greater than five. The association between institution type and gender type were statistically significant, $\chi^2(2) = 2766.17, p < .001$. The association was weak (Cohen, 1988, as cited in Laerd Statistics, 2016), Cramer's $V = .088$.

Table 3

Crosstabulation of Institution Type and Gender for Academic Year 2016-2017

Type of Institution in Texas	Gender	
	Female	Male
4-year Universities	39192	57112
	44626	51677
	(-41.2)	(41.2)
2-year Colleges	46622	41494
	40832	47283
	(45.1)	(-45.1)
Not located	77932	91010
	78286	90655
	(-2.4)	(2.4)

Note. Actual counts are listed first, expected counts are listed below actual counts*, and adjusted residuals appear in parenthesis below expected counts. Adjusted residuals determine the strength of difference between expected and actual counts. Adjusted residuals above +2 or below -2 are considered insignificant for this study.

Question 4: Do Asian, Black, Hispanic, and White differ in the type of higher education institution for academic year 1990-1991?

A chi-square test of independence was conducted between institution type and race for the academic year 1990-1991. The expected cell count frequencies were all greater than five. The association between institution type and race were statistically significant, $\chi^2(6) = 4636.90$, $p < .001$. The association was weak (Cohen, 1988, as cited in Laerd Statistics, 2016), Cramer's $V = .119$.

Table 4

Crosstabulation of Institution Type and Race for Academic Year 1990-1991

Type of Institution in Texas	Race			
	Asian	Black	Hispanic	White
4-year Universities	1619	4250	7504	23701
	925	4838	10301	21008
	(26.2)	(-10.3)	(-36.9)	(32.1)
2-year Colleges	1065	4542	11342	29057
	1148	6004	12783	26070
	(-2.9)	(-23.8)	(-17.7)	(33.1)
Not located	1420	12671	26851	40436
	2030	10620	22612	46114
	(-19.3)	(30)	(46.7)	(-56.5)

Note. Actual counts are listed first, expected counts are listed below actual counts*, and adjusted residuals appear in parenthesis below expected counts. Adjusted residuals determine the strength of difference between expected and actual counts. Adjusted residuals above +2 or below -2 are considered insignificant for this study.

Questions 5: Do Asian, Black, Hispanic, and White differ in the type of higher education institution for academic year 2003-2004?

A chi-square test of independence was conducted between institution type and race for the academic year 2003-2004. The expected cell count frequencies were all greater than five. The association between institution type and race were statistically significant, $\chi^2(6) = 6510.94$, $p < .001$. The association was weak (Cohen, 1988, as cited in Laerd Statistics, 2016), Cramer's $V = .116$.

Table 5

Crosstabulation of Institution Type and Race for Academic Year 2003-2004

Type of Institution in Texas	Race			
	Asian	Black	Hispanic	White
4-year Universities	3108	6871	11893	28039
	1702	6809	17512	23886
	(38.9)	(.9)	(-59.1)	(41.7)
2-year Colleges	2278	8788	25571	38918
	2577	10308	26510	36158
	(-7.2)	(-19.4)	(-8.6)	(24.2)
Not located	2918	17554	47948	49540
	4024	16094	41389	56452
	(-24.7)	(17.2)	(55.7)	(-56.1)

Note. Actual counts are listed first, expected counts are listed below actual counts*, and adjusted residuals appear in parenthesis below expected counts. Adjusted residuals determine the strength of difference between expected and actual counts. Adjusted residuals above +2 or below -2 are considered insignificant for this study.

Question 6: Do Asian, Black, Hispanic, and White differ in the type of higher education institution for academic year 2016-2017?

A chi-square test of independence was conducted between institution type and race for the academic year 2016-2017. The expected cell count frequencies were all greater than five. The association between institution type and race were statistically significant, $\chi^2(6) = 6387.00$, $p < .001$. The association was weak (Cohen, 1988, as cited in Laerd Statistics, 2016), Cramer's $V = .099$.

Table 6

Crosstabulation of Institution Type and Race for Academic Year 2016-2017

Type of Institution in Texas	Race			
	Asian	Black	Hispanic	White
4-year Universities	5906	9303	27986	26109
	2980	8946	34920	22455
	(61.7)	(4.5)	(-59.4)	(33.4)
2-year Colleges	2923	10493	45948	28752
	3789	11375	44399	28551
	(-16.8)	(-10.4)	(12.2)	(1.7)
Not located	5207	22336	90512	50887
	7265	21809	85125	54740
	(-35.5)	(5.5)	(37.7)	(-28.8)

Note. Actual counts are listed first, expected counts are listed below actual counts*, and adjusted residuals appear in parenthesis below expected counts. Adjusted residuals determine the strength of difference between expected and actual counts. Adjusted residuals above +2 or below -2 are considered insignificant for this study.

Question 7: Do Asians differ in institution type when enrolled in higher education across time?

A chi-square test of independence was conducted between institution type for Asians and time for the academic years 1990-1991, 2003-2004, and 2016-2017. The expected cell count frequencies were all greater than five. The association between institution type for Asians and academic year were statistically significant, $\chi^2(4) = 143.85, p < .001$. The association was weak (Cohen, 1988, as cited in Laerd Statistics, 2016), Cramer's $V = .052$.

Table 7

Crosstabulation of Asians Over Time

Type of Institution in Texas	Academic Year		
	1990-1991	2003-2004	2016-2017
4-year Universities	1619	3108	5906
	1650	3339	5643
	(-1.1)	(-6.2)	(6.6)
2-year Colleges	1065	2278	2923
	972	1967	3325
	(3.7)	(9.7)	(-11.7)
Not located	1420	2918	5207
	1481	2997	5066
	(-2.2)	(-2.2)	(3.6)

Note. Actual counts are listed first, expected counts are listed below actual counts*, and adjusted residuals appear in parenthesis below expected counts. Adjusted residuals determine the strength of difference between expected and actual counts. Adjusted residuals above +2 or below -2 are considered insignificant for this study.

Question 8: Do Blacks differ in institution type when enrolled in higher education across time?

A chi-square test of independence was conducted between institution type for Blacks and time for the academic years 1990-1991, 2003-2004, and 2016-2017. The expected cell count frequencies were all greater than five. The association between institution type for Blacks and academic year were statistically significant, $\chi^2(4) = 304.70, p < .001$. The association was weak (Cohen, 1988, as cited in Laerd Statistics, 2016), Cramer's $V = .040$.

Table 8

Crosstabulation of Blacks Over Time

Type of Institution in Texas	Academic Year		
	1990-1991	2003-2004	2016-2017
4-year Universities	4250	6871	9303
	4528	7007	8888
	(-5.3)	(-2.3)	(6.6)
2-year Colleges	4542	8788	10493
	5281	8173	10368
	(-13.3)	(9.7)	(-1.9)
Not located	12671	17554	22336
	11653	18032	22875
	(15.8)	(-6.5)	(-7.0)

Note. Actual counts are listed first, expected counts are listed below actual counts*, and adjusted residuals appear in parenthesis below expected counts. Adjusted residuals determine the strength of difference between expected and actual counts. Adjusted residuals above +2 or below -2 are considered insignificant for this study.

Questions 9: Do Hispanics differ in institution type when enrolled in higher education across time?

A chi-square test of independence was conducted between institution type for Hispanics and time for the academic years 1990-1991, 2003-2004, and 2016-2017. The expected cell count frequencies were all greater than five. The association between institution type for Hispanics and academic year were statistically significant, $\chi^2(4) = 709.45, p < .001$. The association was weak (Cohen, 1988, as cited in Laerd Statistics, 2016), Cramer's $V = .035$.

Table 9

Crosstabulation of Hispanics Over Time

Type of Institution in Texas	Academic Year		
	1990-1991	2003-2004	2016-2017
4-year Universities	7504	11893	27986
	7326	13693	26363
	(2.5)	(-19.9)	(16.4)
2-year Colleges	11342	25571	45948
	12811	23945	46103
	(-16.6)	(14.7)	(-1.3)
Not located	26851	47948	90512
	25559	47773	91978
	(13.2)	(1.4)	(-10.9)

Note. Actual counts are listed first, expected counts are listed below actual counts*, and adjusted residuals appear in parenthesis below expected counts. Adjusted residuals determine the strength of difference between expected and actual counts. Adjusted residuals above +2 or below -2 are considered insignificant for this study.

Questions 10: Do Whites differ in institution type when enrolled in higher education across time?

A chi-square test of independence was conducted between institution type for Whites and time for the academic years 1990-1991, 2003-2004, and 2016-2017. The expected cell count frequencies were all greater than five. The association between institution type for Whites and academic year were statistically significant, $\chi^2(4) = 1185.60, p < .001$. The association was weak (Cohen, 1988, as cited in Laerd Statistics, 2016), Cramer's $V = .043$.

Table 10

Crosstabulation of Whites Over Time

Type of Institution in Texas	Academic Year		
	1990-1991	2003-2004	2016-2017
4-year Universities	23701	28039	26109
	22999	28751	26098
	(6.3)	(-6.1)	(.1)
2-year Colleges	29057	38918	28752
	28577	35722	32426
	(4.1)	(25.6)	(-30.1)
Not located	40436	49540	50887
	41616	52023	47223
	(-9.3)	(-18.4)	(27.8)

Note. Actual counts are listed first, expected counts are listed below actual counts*, and adjusted residuals appear in parenthesis below expected counts. Adjusted residuals determine the strength of difference between expected and actual counts. Adjusted residuals above +2 or below -2 are considered insignificant for this study.

Question 11: Do males differ in institution type when enrolled in higher education across time?

A chi-square test of independence was conducted between institution type for males and time for the academic years 1990-1991, 2003-2004, and 2016-2017. The expected cell count frequencies were all greater than five. The association between institution type for males and academic year were statistically significant, $\chi^2(4) = 1145.77, p < .001$. The association was weak (Cohen, 1988, as cited in Laerd Statistics, 2016), Cramer's $V = .042$.

Table 11

Crosstabulation of Males Over Time

Type of Institution in Texas	Academic Year		
	1990-1991	2003-2004	2016-2017
4-year Universities	17093	22524	30112
	17244	24133	28351
	(-1.5)	(-14.4)	(15.3)
2-year Colleges	21220	35257	41494
	24229	33907	39834
	(-26.6)	(10.8)	(12.9)
Not located	42958	55953	62007
	39796	55693	65427
	(25.6)	(1.9)	(-24.3)

Note. Actual counts are listed first, expected counts are listed below actual counts*, and adjusted residuals appear in parenthesis below expected counts. Adjusted residuals determine the strength of difference between expected and actual counts. Adjusted residuals above +2 or below -2 are considered insignificant for this study.

Questions 12: Do females differ in institution type when enrolled in higher education across time?

A chi-square test of independence was conducted between institution type for females and time for the academic years 1990-1991, 2003-2004, and 2016-2017. The expected cell count frequencies were all greater than five. The association between institution type for females and academic year were statistically significant, $\chi^2(4) = 602.33, p < .001$. The association was weak (Cohen, 1988, as cited in Laerd Statistics, 2016), Cramer's $V = .029$.

Table 12

Crosstabulation of Females Over Time

Type of Institution in Texas	Academic Year		
	1990-1991	2003-2004	2016-2017
4-year Universities	19981	27387	39192
	19431	28880	38248
	(5.1)	(-12.3)	(7.4)
2-year Colleges	24786	40298	46622
	25076	37269	49360
	(-2.5)	(23.0)	(-19.7)
Not located	38420	55953	77932
	38679	57488	76137
	(-2.0)	(-10.7)	(11.9)

Note. Actual counts are listed first, expected counts are listed below actual counts*, and adjusted residuals appear in parenthesis below expected counts. Adjusted residuals determine the strength of difference between expected and actual counts. Adjusted residuals above +2 or below -2 are considered insignificant for this study.

Comparative Analysis

Questions 1-3 compared the relationship between gender and the type of institution enrolled. Both females and males were more likely to enroll in 2-year colleges during the academic years 1990-1991 and 2003-2004. During the academic year 1990-1991, females represented a total enrollment of 24,786 in 2-year colleges and 19,981 in 4-year universities. Enrollment continued to increase for both females and males in 2-year colleges and 4-year universities. During the academic years 1990-1991, 2003-2004, and 2016-2017, females were underrepresented in enrollment at 2-year colleges while men were overrepresented. Although more males enrolled in 4-year universities during the academic year 2016-2017, females experienced an increase in enrollment over all academic years.

For questions 4-6, race and type of institution were examined to identify if there was a relationship over various academic years. During the academic years 1990-1991, 2003-2004, and 2016-2017, Asian students continued to have the highest enrollment in 4-year universities compared to Blacks, Hispanics, and Whites. In 2003-2004 and 2016-2017, Blacks and Hispanics continued to see the largest enrollment in 2-year colleges. Whites remained highest in not located across 1990-1991, 2003-2004, and 2016-2017 despite having the highest enrollment in 2-year colleges in the academic years 1990-1991 and 2003-2004.

Questions 7-10 compared race over time. Asians continued to have the highest enrollment in 4-year universities across time. There was a significant underrepresentation of Asians enrolled in 4-year institutions and a higher overrepresentation of enrollment in 2-year colleges during the academic year 2016-2017. Black students had the most significant overrepresentation of enrollment for 2-year-colleges during the academic year 1990-1991, and the lowest underrepresentation in not located in 2016-2017 with the expected count of 22,875

and an actual count of 22,336. Hispanic students remained underrepresented in enrollment of 4-year universities during the academic years 1990-1991 and 2016-2017. The highest underrepresentation for Hispanics in 2-year colleges was in 2003-2004 with an actual count of 25,571 and an expected count of 23,945. White students remained underrepresented in 2-year college enrollment in 1990-1991 and 2003-2004. The highest enrollment level for whites in 4-year universities was in 2003-2004, with an actual count of 28,039.

Questions 11-12 compared gender and determined if males or females differ in institution type over time. Females and males enrolled in 2-year colleges more than 4-year universities across time. Males were underrepresented in enrollment for 2-year colleges for the academic years 2003-2004 and 2016-2017. Males also had the highest enrollment in higher education in 2016-2017, with an actual count of 41,494. Enrollment for females increased over time in both 2-year colleges and 4-year universities, with the highest enrollment in 2-year colleges during the academic year 2016-2017 with an actual count of 46,622.

Implications

Over time minorities and women have continued to be underrepresented in terms of enrollment in 4-year institutions. As college campuses continue to grow in diversity, the findings in the study allude to the question of how many different marginalized groups continue to be underrepresented in college admissions. Two other populations to consider in future research would be individuals identifying as undocumented students and those representing groups such as lesbian, bisexual, gay, transgender, or queer (LBGTQ). Additional factors are essential to consider when determining special populations to consider. For example, undocumented students may seek out universities that support HSIs or offer students support if they experience deportation among themselves or family. Students identifying as LBGTQ may seek colleges or

universities that have student groups representing the LGBTQ community. These factors play a significant role in determining the type of institution to enroll in and specifically reached.

Additional research can be used to observe patterns that relate to student enrollment. Finding a correlation between demographics and enrollment is a significant resource to future studies.

Exploring graduates in a specific location, such as upper or middle-class neighborhoods, provides opportunities in determining if socioeconomic status plays a role in the type of education achieved a student chose to pursue college after high school graduation.

Critical Race Theory (CRT) can be applied to examine how race relates to the success of minority student's education. This framework is important in considering inequalities and injustices that may contribute to the misrepresentation of minorities in higher education. Students need to be provided with equal opportunities to obtain an education. Considering minorities are often underrepresented in the college admissions process, administrators need to view concerns through different theoretical lenses. Understanding the barriers students face can assist in the development of more effective policies for marginalized groups. Taking the time to understand the concerns expressed by these students and reach out to these populations proactively will ensure underrepresented groups continue applying to higher educational institutions in the future.

Colleges and universities will need to take time to review strategic enrollment plans and other policies that discourage marginalized groups from enrolling in higher education. Cross-campus collaboration is crucial as a proactive outreach method to meet the needs of marginalized groups. When an institution takes the time to understand the structure of their organization from multiple perspectives, it allows them the opportunity to focus on the needs of individuals rather than assuming policies are a 'one size fits all' approach. Additional considerations to individuals that are not familiar with processes can aid in increasing awareness. Minority individuals

attempting to enroll in college for the first time, also known as first-generation students, face additional obstacles and challenges when navigating through the college application process. Taking additional measures to ensure underrepresented students are confident with the processes, providing students and parents with additional support. As enrollment increases continue from marginalized groups, considerations around student engagement opportunities can help reshape the university's image. Perspective students that tour campuses can connect with the institutions through the image it is representing. As circumstances change, colleges and universities must remain flexible to students' needs, especially populations located in areas lacking adequate resources. Utilizing recruitment and retention techniques, underrepresented groups can continue to contribute to the rise in college admissions and awarding of degrees ensuring continued diversity for educational institutions.

Limitations

The limitations that apply to the research study are as follows:

1. Students attending out-of-state colleges and universities were included in not located instead of being excluded from the data. The information provided for not located students lacks accuracy due to the failure to include out-of-state students.
2. The data was limited to colleges and universities in Texas. Data from multiple regions will need to be observed to yield results that impact overall enrollment across the United States.
3. Additional information that contributes to external factors, such as recessions, global pandemics, etc., may be a factor in the decline of enrollment. Notating extreme factors are important as they may lead to a decline in enrollment.

4. The study does not consider high school graduates that have completed 2-year degrees or dual credit while enrolled in high school. Students that already have a 2-year degree are more likely to enroll in 4-year colleges.
5. The information available from previous studies observes race and gender as separate entities. Additional data is needed that reflects females and minorities as an entire marginalized group.
6. The data obtained for the study was not available after the year 2016-2017. Recent data may yield different results due to the increase in student's desire to obtain a college degree.

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