

Dual Credit and Non-Dual Credit College Students: Differences in GPAs after the Second Semester

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Abstract

In this investigation, we ascertained the extent to which differences were present in the second semester GPAs by gender and by ethnicity as a function of dual credit enrollment for students enrolled in a Texas community college during a 4-year period. Both males and females who had been enrolled in dual credit courses while in high school had higher second semester GPAs than did males and females who had not been enrolled in dual credit courses while in high school. Similar statistically significant results were present for Hispanic, Black, and White students. As such, dual credit programs offer promise for enhancing student college readiness as determined by GPAs.

Keywords: dual credit, community college, percent increase, ethnic groups

Large numbers of high school graduates are not academically prepared to complete entry-level, credit-bearing courses successfully at community colleges or universities (Barnes & Slate, 2010, 2011, 2013; Moore et al., 2010). Barnes and Slate (2010) extensively documented this lack of academic preparedness, wherein “College students, despite extensive efforts to the contrary, continue to be under-prepared for the rigors of college” (Conclusion section, para. 1). In addition, Moore et al. (2010) established that over 50% of White high school seniors and approximately 80% of Black and Hispanic high school seniors who graduated from high school in Texas were not academically prepared.

High school students are clearly not meeting standards that allow them to be college-ready (Barnes & Slate, 2010, 2011, 2013; Grundmeyer, 2012; Moore et al., 2010).

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To obtain the standard of being college-ready or at least being more prepared for college than they currently are, state policies and programs should be developed to increase the rigor of high school courses and the probability of success in credit-bearing college courses (Conley, 2007; Moore et al., 2010). According to Moore et al. (2010), creating and implementing special programs could improve college readiness in high school students. The current “one-size-fits-all college-readiness agenda” (Barnes & Slate, 2013, p. 5) has not remediated the lack of college readiness. As such, other options or programs must be developed.

One academic program developed to improve student college readiness is that of dual credit. Dual credit, as defined by the Texas Higher Education Board (THECB, 2010), is a process that allows high school juniors and seniors to enroll in and receive high school and college credits for completed coursework. States adopted dual credit programs after reviewing statistical data in which dual credit courses, successfully completed while in high school, resulted in increased student self-confidence in college (Speroni, 2011). Successful completion of dual credit coursework in high school resulted in an increase of 16% in high school student enrollment in college (Lewis & Overman, 2008). Students who successfully completed dual credit courses enrolled in postsecondary institutions in greater numbers, had higher college readiness, and increased high school graduation rates (Hughes, 2010; Karp & Hughes, 2008; Lewis & Overman, 2008; Martin, 2013). Even after controlling for gender, high school rank, and high school courses taken, dual credit hours were statistically significantly related with college readiness in math in Texas, Florida, and Oregon (Kim & Bragg, 2008).

Documented benefits of dual credit enrollment and successful course completion include: (a) acquiring college credits in high school (THECB, 2010), (b) decreasing the time to college graduation (Kim & Bragg, 2008; THECB, 2008), (c) increasing college graduation rates (Ganzert, 2012), and (d) decreasing the costs of college for parents and students. Additional benefits of successful dual credit course completion include retention in high school, retention in college, and higher first semester college GPAs (THECB, 2008; Young, Slate, Moore, & Barnes, 2013).

Harnish and Lynch (2005) contended that when high school students are allowed to perform as an adult, as in dual credit courses, they rise to the occasion.

Students who were economically disadvantaged and who were first-generation college students increased their likelihood of attaining a two or four year college degree by 8% (An, 2013).

Sherman Valentine (2010) documented that participation in dual credit coursework positively influenced students' GPAs at the end of their first semester in college. Students who completed dual credit classes obtained statistically significant higher first semester GPAs than students who did not enroll in dual credit courses (Correa & Kouzekanani, 2011; Hughes, 2010; Young, Joyner, & Slate, 2013; Young, Slate, Moore, & Barnes, 2014b). Additionally, higher second semester cumulative GPAs were achieved by students who had successfully completed dual credit courses in high school compared to their counterparts who had not completed dual credit classes in high school (Young, Slate, Moore, & Barnes, 2014a; Jones, 2014). Regarding persistence, no difference was present between students who enrolled in dual credit courses and students who did not enroll in dual credit courses (Correa & Kouzekanani, 2011).

According to Sullivan-Ham (2001), students who had enrolled in dual credit courses in high school earned higher average first semester college GPA in high school. To corroborate the aforementioned assertion, Meld (2000) reported that students who participated in the dual credit program in high school earned higher first semester college GPAs than those students who did not participate in the dual credit program. Although a plethora of researchers provided evidence that students who successfully completed dual credit courses in high school attained higher first semester GPAs than students who did not complete dual credit courses (Andrews, 2001; Correa & Kouzekanani, 2011; Hughes, 2010; League for Innovation in the Community College, 2002; Meld, 2000; Morrison, 2008; Peterson, Anjewierden, & Corser, 2001; Sullivan-Ham, 2001; Young et al., 2013, 2014b), only minimal research is available in which GPAs after the first semester and graduation rates are examined (Kentucky Council on Postsecondary Education, 2006; Young et al., 2013). The purpose of this study is to address the dearth of research of the academic performance of students who were previously enrolled in dual credit programs and who had completed two semesters of college.

Purpose of the Study

The purpose of this investigation was to examine whether differences were present in student GPA at the end of the first two semesters for students who enrolled in dual credit courses while in high school from students who did not enroll in dual credit courses while in high school. For all of these analyses, the extent to which gender and ethnicity were related to dual credit enrollment was examined. This investigation was conducted using 4 years of data in an attempt to determine the extent to which consistencies and or trends were present.

Research Questions

In this study, the following research question was repeated for each of the 4 academic years (i.e., 2005-2006 through 2008-2009) of archival data available from a Texas community college. What is the difference in cumulative GPAs after two semesters of college between students who were enrolled in dual credit courses in high school and those students who were not enrolled in dual credit courses as a function of gender, ethnicity, and gender within ethnicity?

Method

Participants

Student data were obtained from a Texas community college for the 2004-2005 through the 2008-2009 academic years and were utilized in this study. Student records totaling 14,761 were used in this study, with 2,045 being dual credit students and 12,716 being non-dual credit students. Because of the limited sample size, Asian students and race reported as Other were excluded from the analysis. After initial filtering, 436 Hispanic students, 107 Black students, and 1,073 White students took dual credit classes. Additionally, with respect to ethnicity, 3,318 Hispanic students, 1,257 Black students, and 6,369 White students did not take dual credit classes.

Instrumentation and Procedures

Data were obtained from this community college's Office of Institutional Effectiveness & Planning, after permission to conduct the research study was procured from the institution's review board for human subjects.

After the data file was obtained from the Texas community college, it was imported and converted into an SPSS data file. In the next step of the process, we verified the accuracy of the dataset. Though previously defined, we will redefine dual credit for the reader. Dual credit, as defined by the Texas Higher Education Coordinating Board, is a process that allows a high school senior or junior to enroll in a college course and receive credit for the course in both high school and college (THECB, 2010).

Results

Descriptive statistics for dual credit students and non-dual credit students enrolled in a Texas community college from the 2005-2006 through the 2008-2009 academic year are included in Table 1. For the first research question, the focus was on the difference for males and females in their cumulative GPA after two semesters, between dual credit enrollment and non-dual credit enrollment.

Table 1: Descriptive Statistics for Dual Credit Students and Non-Dual Credit Students for the 2005-2006 Through the 2011-2012 Academic Years

| Academic Year | Dual Credit <i>n</i> (%) | Non-Dual Credit <i>n</i> (%) |
|---------------|--------------------------|------------------------------|
| 2005-2006 | 3,056 (19.44%) | 12,665 (80.56%) |
| 2006-2007 | 2,838 (19.71%) | 11,558 (80.29%) |
| 2007-2008 | 3,198 (21.09%) | 11,967 (78.91%) |
| 2008-2009 | 3,224 (19.95%) | 12,935 (80.05%) |

Males. In the 2005-2006 academic year, a parametric analysis of variance (ANOVA) did not yield a statistically significant difference, $F(1, 314) = 0.03, p = .853$. No difference was present for males in their cumulative GPAs after two semesters as a function of dual credit enrollment. Regarding the 2006-2007 academic year, the ANOVA yielded a statistically significant difference, $F(1, 1316) = 35.37, p < .001, \eta^2 = .003$, trivial effect size (Cohen, 1988). Males who took dual credit had higher cumulative GPAs after two semesters (2.90) than males who did not take dual credit courses (2.44).

With respect to the 2007-2008 academic year, the ANOVA yielded a statistically significant difference, $F(1, 2321) = 41.18, p < .001, \eta^2 = .02$, small effect size (Cohen, 1988).

Again, males who took dual credit courses had higher cumulative GPAs after two semesters (2.84) than males who did not take dual credit courses (2.38). Regarding the 2008-2009 academic year, the ANOVA yielded a statistically significant difference, $F(1, 2640) = 55.82, p < .001, \eta^2 = .02$, small effect size (Cohen, 1988). Similar to the previous two years, males who took dual credit courses had higher cumulative GPA after two semesters (2.93) than males who did not take dual credit courses (2.38). Readers are referred to Table 2 for the descriptive statistics for the cumulative GPAs for male students after two semesters for the 2005-2006 through the 2008-2009 academic years. Males who enrolled in dual credit had higher average cumulative GPAs after two semesters than did males who did not enroll in dual credit. The cumulative GPAs after two semesters for male students enrolled in dual credit and males students not enrolled in dual credit declined from 2005-2006 to 2008-2009.

Table 2: Descriptive Statistics for Male and Female Students' Cumulative GPAs After Two Semesters for the 2005-2006 Through the 2008-2009 Academic Years

| Gender and Academic Year | <i>n</i> | <i>M</i> | <i>SD</i> |
|--------------------------|----------|----------|-----------|
| Male Students | | | |
| 2005-2006 | | | |
| Non-Dual Credit | 110 | 2.96 | 0.89 |
| Dual Credit | 206 | 2.94 | 0.82 |
| 2006-2007 | | | |
| Non-Dual Credit | 1,137 | 2.44 | 0.96 |
| Dual Credit | 181 | 2.90 | 0.89 |
| 2007-2008 | | | |
| Non-Dual Credit | 2,132 | 2.38 | 0.96 |
| Dual Credit | 191 | 2.84 | 0.92 |
| 2008-2009 | | | |
| Non-Dual Credit | 2,450 | 2.38 | 0.99 |
| Dual Credit | 192 | 2.93 | 0.95 |
| Female Students | | | |
| 2005-2006 | | | |
| Non-Dual Credit | 220 | 3.00 | 0.83 |
| Dual Credit | 304 | 3.08 | 0.74 |
| 2006-2007 | | | |
| Non-Dual Credit | 1,443 | 2.64 | 0.93 |
| Dual Credit | 300 | 3.17 | 0.88 |
| 2007-2008 | | | |
| Non-Dual Credit | 2,413 | 2.67 | 0.90 |
| Dual Credit | 347 | 3.03 | 0.88 |
| 2008-2009 | | | |
| Non-Dual Credit | 2,821 | 2.59 | 0.96 |
| Dual Credit | 324 | 3.04 | 0.90 |

Females. In the 2005-2006 academic year, a parametric ANOVA did not yield a statistically significant difference, $F(1, 522) = 1.49, p = .223$. Females enrolled in dual credit did not differ in their cumulative GPAs after two semesters from females not enrolled in dual credit courses.

Regarding the 2006-2007 academic year, the ANOVA yielded a statistically significant difference, $F(1, 1741) = 82.13, p < .001, \eta^2 = .04$, small effect size (Cohen, 1988). Females who took dual credit courses had higher cumulative GPAs after two semesters (3.17) than females who did not take dual credit courses (2.64).

With respect to the 2007-2008 academic year, the ANOVA yielded a statistically significant difference, $F(1, 2758) = 46.54, p < .001, \eta^2 = .02$, small effect size (Cohen, 1988). Again, females who took dual credit courses had higher cumulative GPAs after two semesters (3.03) than females who did not take dual credit courses (2.67).

Regarding the 2008-2009 academic year, the ANOVA yielded a statistically significant difference, $F(1, 3143) = 64.50, p < .001, \eta^2 = .02$, small effect size (Cohen, 1988). Commensurate with the previous two years, females who took dual credit courses had higher cumulative GPAs after two semesters (3.04) than females who did not take dual credit courses (2.59). Readers are referred to Table 2 also, for the descriptive statistics for the cumulative GPAs for female students after two semesters for the 2005-2006 through the 2008-2009 academic years. Females who enrolled in dual credit had higher average cumulative GPAs after two semesters than did females who did not enroll in dual credit. The cumulative GPAs after two semesters for female students enrolled in dual credit and female students not enrolled in dual credit declined from 2005-2006 to 2008-2009.

Next, we analyzed cumulative GPAs after two semesters for dual credit enrollment and non-dual credit enrollment for each ethnic group (i.e., Hispanic, Black, and White). Descriptive statistics for dual credit students' cumulative GPA after two semesters from the 2005-2006 to the 2008-2009 academic years are reported separately by ethnic group.

Hispanic. In the 2005-2006 academic year, a parametric ANOVA did not yield a statistically significant difference, $F(1, 146) = 2.43, p = .122$.

Hispanic students enrolled in dual credit did not differ in their cumulative GPAs after two semesters from Hispanic students not enrolled in dual credit courses. Regarding the 2006-2007 academic year, the ANOVA yielded a statistically significant difference, $F(1, 684) = 14.40, p < .001, \eta^2 = .02$, small effect size (Cohen, 1988).

Hispanic dual credit students earned higher cumulative GPAs after two semesters (2.89) than did Hispanic non-dual credit students (2.49). With respect to the 2007-2008 academic year, the ANOVA revealed a statistically significant difference, $F(1, 1335) = 26.08, p < .001, \eta^2 = .02$, small effect size (Cohen, 1988). Hispanic dual credit students earned a higher cumulative GPAs after two semesters (2.94) than did Hispanic non-dual credit students (2.47).

Regarding the 2008-2009 academic year, a statistically significant difference was present, $F(1, 1581) = 18.92, p < .001, \eta^2 = .01$, small effect size (Cohen, 1988). Hispanic dual credit students earned higher cumulative GPAs after two semesters (2.79) than did Hispanic non-dual credit students (2.43). Readers are referred to Table 3 for the descriptive statistics for the cumulative GPAs for Hispanic students. Hispanic students who enrolled in dual credit had higher average cumulative GPAs after two semesters than did Hispanic students who did not enroll in dual credit. The average cumulative GPAs after two semesters averages for Hispanic students enrolled in dual credit and Hispanic students not enrolled in dual credit declined from 2005-2006 to 2008-2009.

Table 3: Descriptive Statistics by Ethnicity for Cumulative GPAs After Two Semesters for the 2005-2006 Through the 2008-2009 Academic Years

| Ethnicity and Academic Year | <i>n</i> | <i>M</i> | <i>SD</i> |
|-----------------------------|----------|----------|-----------|
| Hispanic Students | | | |
| 2005-2006 | | | |
| Non-Dual Credit | 42 | 2.70 | 0.68 |
| Dual Credit | 106 | 2.90 | 0.73 |
| 2006-2007 | | | |
| Non-Dual Credit | 602 | 2.49 | 0.90 |
| Dual Credit | 84 | 2.89 | 0.94 |
| 2007-2008 | | | |
| Non-Dual Credit | 1,233 | 2.47 | 0.89 |
| Dual Credit | 104 | 2.94 | 0.91 |
| 2008-2009 | | | |
| Non-Dual Credit | 1,441 | 2.43 | 0.94 |
| Dual Credit | 142 | 2.79 | 0.93 |
| Black Students | | | |
| 2005-2006 | | | |
| Non-Dual Credit | 14 | 2.33 | 1.04 |
| Dual Credit | 33 | 2.73 | 0.72 |
| 2006-2007 | | | |
| Non-Dual Credit | 230 | 2.15 | 0.97 |
| Dual Credit | 16 | 2.68 | 1.23 |
| 2007-2008 | | | |
| Non-Dual Credit | 399 | 2.26 | 0.97 |
| Dual Credit | 24 | 2.45 | 0.98 |
| 2008-2009 | | | |
| Non-Dual Credit | 614 | 2.20 | 0.95 |
| Dual Credit | 34 | 2.86 | 0.88 |
| White Students | | | |
| 2005-2006 | | | |
| Non-Dual Credit | 238 | 3.11 | 0.81 |
| Dual Credit | 268 | 3.10 | 0.79 |
| 2006-2007 | | | |
| Non-Dual Credit | 1,404 | 2.62 | 0.95 |
| Dual Credit | 283 | 3.11 | 0.89 |
| 2007-2008 | | | |
| Non-Dual Credit | 2,230 | 2.56 | 0.96 |
| Dual Credit | 306 | 3.01 | 0.88 |
| 2008-2009 | | | |
| Non-Dual Credit | 2,497 | 2.54 | 0.99 |
| Dual Credit | 216 | 3.14 | 0.86 |

Black. In the 2005-2006 academic year, a parametric ANOVA did not yield a statistically significant difference, $F(1, 45) = 2.23, p = .142$. Black students enrolled in dual credit did not differ in their cumulative GPAs after two semesters from Black students not enrolled in dual credit courses. Regarding the 2006-2007 academic year, the ANOVA yielded a statistically significant difference, $F(1, 244) = 4.27, p = .04, \eta^2 = .02$, small effect size (Cohen, 1988). Black dual credit students earned a higher cumulative GPAs after two semesters (2.68) than did Black non-dual credit students (2.15). With respect to the 2007-2008 academic year, the ANOVA did not reveal a statistically significant difference, $F(1, 421) = 0.90, p = .342$. Black students enrolled in dual credit did not differ in their cumulative GPAs after two semesters from Black students not enrolled in dual credit courses.

Regarding the 2008-2009 academic year, the ANOVA yielded a statistically significant difference, $F(1, 646) = 15.22, p < .001, \eta^2 = .02$, small effect size (Cohen, 1988). Black dual credit students earned higher cumulative GPAs after two semesters (2.86) than did Black non-dual credit students (2.20). Readers should note that the number of Black students who enrolled in dual credit courses was quite low for each year of data analyzed. Readers are referred to Table 3 for the descriptive statistics for the cumulative GPAs for Black students after two semesters. Black students who enrolled in dual credit had slightly higher average cumulative GPAs after two semesters than did Black students who did not enroll in dual credit. The average cumulative GPAs after two semesters for Black students enrolled in dual credit and Black students not enrolled in dual credit declined from 2005-2006 to 2007-2008 and then increased higher in 2008-2009 for Black dual credit students.

White. In the 2005-2006 academic year, a parametric ANOVA did not yield a statistically significant difference, $F(1, 504) = 0.10, p = .908$. White students enrolled in dual credit did not differ in their cumulative GPAs after two semesters from White students not enrolled in dual credit courses. Regarding the 2006-2007 academic year, the ANOVA revealed a statistically significant difference, $F(1, 1685) = 65.12, p < .001, \eta^2 = .04$, small effect size (Cohen, 1988). White dual credit students earned higher cumulative GPAs after two semesters (3.11) than did White non-dual credit students (2.62). With respect to the 2007-2008 academic year, the ANOVA yielded a statistically significant difference, $F(1, 2534) = 61.10, p < .001, \eta^2 = .02$, small effect size (Cohen, 1988). White dual credit students earned higher cumulative GPAs after two semesters (3.01) than did White non-dual credit students (2.56).

Regarding the 2008-2009 academic year, the ANOVA again yielded a statistically significant difference, $F(1, 2711) = 74.48, p < .001, \eta^2 = .03$, small effect size (Cohen, 1988). White dual credit students earned higher cumulative GPAs after two semesters (3.14) than did White students who were not enrolled in dual credit courses (2.54). Readers are referred to Table 3 for the descriptive statistics for the cumulative GPAs for White students after two semesters. White students who enrolled in dual credit had higher cumulative GPAs after two semesters than did White students who did not enroll in dual credit. The average cumulative GPAs after two semesters for White students enrolled in dual credit increased slightly from 2005-2006 to 2008-2009.

Following the analyses for cumulative GPAs conducted separately by gender and then by ethnicity, we analyzed cumulative GPAs between dual credit enrollment and non-dual credit enrollment by gender for each ethnic group. Results for each ethnic group by gender are reported separately.

Hispanic Males. Regarding differences for Hispanic males in their cumulative GPAs after two semesters between dual credit enrollment and non-dual credit enrollment, in the 2005-2006 academic year, a parametric ANOVA did not yield a statistically significant difference, $F(1, 49) = 0.67, p = .416$. Hispanic male students enrolled in dual credit did not differ in their cumulative GPAs after two semesters from Hispanic male students not enrolled in dual credit courses. Concerning the 2006-2007 academic year, the ANOVA yielded a statistically significant difference, $F(1, 286) = 7.64, p = .006, \eta^2 = .03$, small effect size (Cohen, 1988). Hispanic male dual credit students earned higher cumulative GPAs after two semesters (2.80) than did Hispanic male non-dual credit students (2.33). For the 2007-2008 academic year, the ANOVA yielded a statistically significant difference, $F(1, 609) = 24.31, p < .001, \eta^2 = .04$, small effect size (Cohen, 1988). Hispanic male dual credit students earned higher cumulative GPAs after two semesters (3.09) than did Hispanic male non-dual credit students (2.30).

Regarding the 2008-2009 academic year, the ANOVA again yielded a statistically significant difference, $F(1, 729) = 8.12, p = .005, \eta^2 = .01$, small effect size (Cohen, 1988). Hispanic male dual credit students earned a higher cumulative GPA after two semesters (2.72) than did Hispanic male non-dual credit students (2.32).

Readers should be aware that the number of Hispanic male students who had been enrolled in dual credit courses was low for all of the years of data analyzed. Readers are referred to Table 4 for the descriptive statistics for the cumulative GPAs for Hispanic male students after two semesters for the 2005-2006 through the 2008-2009 academic years. Hispanic male students who enrolled in dual credit had higher average cumulative GPAs after two semesters than did Hispanic male students who did not enroll in dual credit. The cumulative GPAs after two semesters for Hispanic male students enrolled in dual credit and Hispanic male students not enrolled in dual credit declined slightly from 2005-2006 to 2008-2009.

Table 4: Descriptive Statistics for Hispanic Male and Female Students' Cumulative GPAs After Two Semesters for the 2005-2006 Through the 2008-2009 Academic Years

| Gender and Academic Year | <i>n</i> | <i>M</i> | <i>SD</i> |
|---------------------------------|----------|----------|-----------|
| Hispanic Male Students | | | |
| 2005-2006 | | | |
| Non-Dual Credit | 15 | 2.65 | 0.54 |
| Dual Credit | 36 | 2.81 | 0.71 |
| 2006-2007 | | | |
| Non-Dual Credit | 257 | 2.33 | 0.91 |
| Dual Credit | 31 | 2.81 | 1.00 |
| 2007-2008 | | | |
| Non-Dual Credit | 579 | 2.30 | 0.89 |
| Dual Credit | 32 | 3.09 | 0.72 |
| 2008-2009 | | | |
| Non-Dual Credit | 681 | 2.32 | 0.94 |
| Dual Credit | 50 | 2.72 | 1.03 |
| Hispanic Female Students | | | |
| 2005-2006 | | | |
| Non-Dual Credit | 27 | 2.73 | 0.75 |
| Dual Credit | 70 | 2.95 | 0.74 |
| 2006-2007 | | | |
| Non-Dual Credit | 345 | 2.61 | 0.87 |
| Dual Credit | 53 | 2.94 | 0.92 |
| 2007-2008 | | | |
| Non-Dual Credit | 654 | 2.63 | 0.86 |
| Dual Credit | 72 | 2.87 | 0.98 |
| 2008-2009 | | | |
| Non-Dual Credit | 760 | 2.53 | 0.92 |
| Dual Credit | 92 | 2.83 | 0.88 |

Hispanic Females. Regarding differences for Hispanic females in their cumulative GPAs after two semesters between dual credit enrollment and non-dual credit enrollment, in the 2005-2006 academic year, a parametric ANOVA did not yield a statistically significant difference, $F(1, 95) = 1.69, p = .197$. Hispanic female students enrolled in dual credit had similar cumulative GPAs after two semesters to Hispanic female students not enrolled in dual credit courses. Concerning the 2006-2007 academic year, the ANOVA yielded a statistically significant difference, $F(1, 396) = 6.27, p = .013, \eta^2 = .02$, small effect size (Cohen, 1988). Hispanic female dual credit students earned higher cumulative GPAs after two semesters (2.93) than did Hispanic female non-dual credit students (2.61). For the 2007-2008 academic year, the ANOVA yielded a statistically significant difference, $F(1, 724) = 5.05, p = .025, \eta^2 = .01$, small effect size (Cohen, 1988). Hispanic female dual credit students earned higher cumulative GPAs after two semesters (2.87) than did Hispanic female non-dual credit students (2.63).

Regarding the 2008-2009 academic year, the ANOVA again yielded a statistically significant difference, $F(1, 850) = 8.79, p = .003, \eta^2 = .01$, small effect size (Cohen, 1988). Hispanic female dual credit students earned higher cumulative GPAs after two semesters (2.83) than did Hispanic female non-dual credit students (2.53). Readers are referred to Table 4 for the descriptive statistics for the cumulative GPAs for Hispanic female students after two semesters for the 2005-2006 through the 2008-2009 academic years. Hispanic female students who enrolled in dual credit had higher average cumulative GPAs after two semesters than did Hispanic female students who did not enroll in dual credit. The cumulative GPAs after two semesters for Hispanic female students enrolled in dual credit and Hispanic female students not enrolled in dual credit declined from 2005-2006 to 2008-2009.

Black Males. Regarding differences for Black males in their cumulative GPAs after two semesters between dual credit enrollment and non-dual credit enrollment, in the 2005-2006 academic year, a parametric ANOVA did not yield a statistically significant difference, $F(1, 11) = 0.12, p = .738$. Black male students enrolled in dual credit did not differ in their cumulative GPAs after two semesters from Black male students not enrolled in dual credit courses. Concerning the 2006-2007 academic year, the ANOVA did not yield a statistically significant difference, $F(1, 109) = 0.68, p = .411$.

Black male students enrolled in dual credit had similar cumulative GPAs after two semesters to Black male students not enrolled in dual credit courses. For the 2007-2008 academic year, the ANOVA again did not yield a statistically significant difference, $F(1, 183) = 1.71, p = .192$. Black male students enrolled in dual credit did not differ in their cumulative GPAs after two semesters from Black male students not enrolled in dual credit courses.

Regarding the 2008-2009 academic year, the ANOVA did not yield a statistically significant difference, $F(1, 289) = 1.68, p = .197$. For all of the academic years of data analyzed, Black male students enrolled in dual credit did not differ in their cumulative GPAs after two semesters from Black male students not enrolled in dual credit courses. Readers are referred to Table 5 for the descriptive statistics for the cumulative GPAs for Black male students after two semesters for the 2005-2006 through the 2008-2009 academic years. Black male students who enrolled in dual credit had slightly higher average cumulative GPAs after two semesters than did Black male students who did not enroll in dual credit, except in 2006-2007 academic year. The cumulative GPAs after two semesters averages for Black male students enrolled in dual credit and Black male students not enrolled in dual credit declined slightly from 2005-2006 to 2008-2009.

Table 5: Descriptive Statistics for Black Male and Female Students' Cumulative GPAs After Two Semesters for the 2005-2006 Through the 2008-2009 Academic Years

| Gender and Academic Year | <i>n</i> | <i>M</i> | <i>SD</i> |
|------------------------------|----------|----------|-----------|
| Black Male Students | | | |
| 2005-2006 | | | |
| Non-Dual Credit | 2 | 2.39 | 0.55 |
| Dual Credit | 11 | 2.58 | 0.75 |
| 2006-2007 | | | |
| Non-Dual Credit | 109 | 2.09 | 0.99 |
| Dual Credit | 2 | 1.50 | 1.65 |
| 2007-2008 | | | |
| Non-Dual Credit | 176 | 2.18 | 0.98 |
| Dual Credit | 9 | 2.62 | 0.77 |
| 2008-2009 | | | |
| Non-Dual Credit | 282 | 2.08 | 0.94 |
| Dual Credit | 9 | 2.49 | 0.97 |
| Black Female Students | | | |
| 2005-2006 | | | |
| Non-Dual Credit | 12 | 2.32 | 1.12 |
| Dual Credit | 22 | 2.80 | 0.71 |
| 2006-2007 | | | |
| Non-Dual Credit | 121 | 2.21 | 0.96 |
| Dual Credit | 14 | 2.85 | 1.14 |
| 2007-2008 | | | |
| Non-Dual Credit | 223 | 2.32 | 0.96 |
| Dual Credit | 15 | 2.35 | 1.09 |
| 2008-2009 | | | |
| Non-Dual Credit | 332 | 2.31 | 0.95 |
| Dual Credit | 25 | 2.99 | 0.82 |

Black Females. Regarding differences for Black females in their cumulative GPAs after two semesters between dual credit enrollment and non-dual credit enrollment, in the 2005-2006 academic year, a parametric ANOVA did not yield a statistically significant difference, $F(1, 32) = 2.29, p = .14$. Black female students enrolled in dual credit did not differ in their cumulative GPAs after two semesters from Black female students not enrolled in dual credit courses. Concerning the 2006-2007 academic year, the ANOVA yielded a statistically significant difference, $F(1, 133) = 5.41, p = .022, \eta^2 = .04$, small effect size (Cohen, 1988).

Black female dual credit students earned higher cumulative GPAs after two semesters (2.84) than non-dual credit students (2.21). For the 2007-2008 academic year, the ANOVA did not yield a statistically significant difference, $F(1, 236) = 0.02$, $p = .892$. Black female students enrolled in dual credit did not differ in their cumulative GPAs after two semesters from Black female students not enrolled in dual credit courses.

Regarding the 2008-2009 academic year, the ANOVA yielded a statistically significant difference, $F(1, 355) = 12.02$, $p = .001$, $\eta^2 = .03$, small effect size (Cohen, 1988). Black female dual credit students earned a higher cumulative GPA after two semesters (2.99) than non-dual credit students (2.31). Readers should note that the number of Black students who enrolled in dual credit courses was quite low for each year of data analyzed. Readers are referred to Table 5 for the descriptive statistics for the cumulative GPAs for Black female students after two semesters for the 2005-2006 through the 2008-2009 academic years. Black female students who enrolled in dual credit had slightly higher average cumulative GPAs after two semesters than did Black female students who did not enroll in dual credit. The cumulative GPAs after two semesters for Black female students enrolled in dual credit and Black female students not enrolled in dual credit increased slightly from 2005-2006 to 2008-2009.

White Males. Regarding differences for White males in their cumulative GPAs after two semesters between dual credit enrollment and non-dual credit enrollment, in the 2005-2006 academic year, a parametric ANOVA did not yield a statistically significant difference, $F(1, 190) = 0.51$, $p = .476$. White male students enrolled in dual credit did not differ in their cumulative GPAs after two semesters from White male students not enrolled in dual credit courses. Concerning the 2006-2007 academic year, the ANOVA yielded a statistically significant difference, $F(1, 723) = 19.44$, $p < .001$, $\eta^2 = .03$, small effect size (Cohen, 1988). White male dual credit students earned higher cumulative GPAs after two semesters (2.95) than did White male non-dual credit students (2.52). For the 2007-2008 academic year, the ANOVA yielded a statistically significant difference, $F(1, 1166) = 22.08$, $p < .001$, $\eta^2 = .02$, small effect size (Cohen, 1988). Congruent with the previous year, White, male dual credit students earned higher cumulative GPAs after two semesters (2.84) than did White male non-dual credit students (2.38).

Regarding the 2008-2009 academic year, the ANOVA again yielded a statistically significant difference, $F(1, 1237) = 28.03, p < .001, \eta^2 = .02$, small effect size (Cohen, 1988). White male dual credit students earned higher cumulative GPAs after two semesters (3.00) than did White male non-dual credit students (2.41). Readers are referred to Table 6 for the descriptive statistics for the cumulative GPAs for White male students after two semesters for the 2005-2006 through the 2008-2009 academic years. White male students who enrolled in dual credit had higher average cumulative GPAs after two semesters than did White male students who did not enroll in dual credit. The cumulative GPAs after two semesters for White male students enrolled in dual credit and White male students not enrolled in dual credit declined from 2005-2006 to 2008-2009.

Table 6: Descriptive Statistics for White Male and Female Students' Cumulative GPAs After Two Semesters for the 2005-2006 Through the 2008-2009 Academic Years

| Gender and Academic Year | <i>n</i> | <i>M</i> | <i>SD</i> |
|------------------------------|----------|----------|-----------|
| White Male Students | | | |
| 2005-2006 | | | |
| Non-Dual Credit | 82 | 3.12 | 0.94 |
| Dual Credit | 110 | 3.03 | 0.84 |
| 2006-2007 | | | |
| Non-Dual Credit | 614 | 2.53 | 0.96 |
| Dual Credit | 111 | 2.96 | 0.90 |
| 2007-2008 | | | |
| Non-Dual Credit | 1,055 | 2.38 | 0.99 |
| Dual Credit | 113 | 2.84 | 0.97 |
| 2008-2009 | | | |
| Non-Dual Credit | 1,155 | 2.41 | 1.00 |
| Dual Credit | 84 | 3.00 | 0.86 |
| White Female Students | | | |
| 2005-2006 | | | |
| Non-Dual Credit | 156 | 3.10 | 0.79 |
| Dual Credit | 158 | 3.14 | 0.75 |
| 2006-2007 | | | |
| Non-Dual Credit | 790 | 2.69 | 0.94 |
| Dual Credit | 172 | 3.21 | 0.88 |
| 2007-2008 | | | |
| Non-Dual Credit | 1,175 | 2.72 | 0.90 |
| Dual Credit | 193 | 3.11 | 0.80 |
| 2008-2009 | | | |
| Non-Dual Credit | 1,342 | 2.65 | 0.98 |
| Dual Credit | 132 | 3.23 | 0.85 |

White Females. Regarding differences for White females in their cumulative GPAs after two semesters between dual credit enrollment and non-dual credit enrollment, in the 2005-2006 academic year, a parametric ANOVA did not yield a statistically significant difference, $F(1, 312) = 0.26, p = .609$. White female students enrolled in dual credit did not differ in their cumulative GPAs after two semesters from White female students not enrolled in dual credit courses. Concerning the 2006-2007 academic year, the ANOVA yielded a statistically significant difference, $F(1, 960) = 44.90, p < .001, \eta^2 = .04$, small effect size (Cohen, 1988). White female dual credit students earned a higher cumulative GPA after two semesters (3.21) than did White female non-dual credit students (2.69). For the 2007-2008 academic year, the ANOVA yielded a statistically significant difference, $F(1, 1366) = 32.45, p < .001, \eta^2 = .02$, small effect size (Cohen, 1988). Commensurate with the previous year, White female dual credit students earned a higher cumulative GPAs after two semesters (3.11) than did White female non-dual credit students (2.72).

Regarding the 2008-2009 academic year, the ANOVA again yielded a statistically significant difference, $F(1, 1472) = 43.32, p < .001, \eta^2 = .03$, small effect size (Cohen, 1988). White female dual credit students earned a higher cumulative GPAs after two semesters (3.22) than did White female non-dual credit students (2.65). Readers are referred to Table 6 for the descriptive statistics for the cumulative GPAs for White female students after two semesters for the 2005-2006 through the 2008-2009 academic years. White female students who enrolled in dual credit had higher average cumulative GPAs after two semesters than did White female students who did not enroll in dual credit. The cumulative GPAs after two semesters for White female students enrolled in dual credit and White female students not enrolled in dual credit remained steady from 2005-2006 to 2008-2009.

Discussion

For this quantitative investigation, one research question was repeated for four years resulting in 12 research questions. To answer these research questions, archival data were obtained from a large Texas community college for the 2005-2006 through 2008-2009 academic years. Participants in this study were students who attended high school and then entered community college directly after high school. Participants were both dual credit students and non-dual credit students when they were in high school.

Differences in cumulative GPAs after two semesters between dual credit enrollment and non-dual credit enrollment as a function of gender were statistically significant. Male and female students who had been enrolled in dual credit courses had higher cumulative GPAs after two semesters than male and female students who had not enrolled in dual credit courses. Effect sizes for each of these comparisons were small. Also, differences in cumulative GPAs after two semesters between dual credit enrollment and non-dual credit enrollment as a function of ethnicity were statistically significant. Hispanic students and Black students who had been enrolled in dual credit courses had higher cumulative GPAs after two semesters than Hispanic students and Black students not enrolled in dual credit. White students who had been enrolled in dual credit courses had higher cumulative GPAs after two semesters than White students who had not enrolled in dual credit courses.

Differences in cumulative GPAs after two semesters between dual credit enrollment and non-dual credit enrollment between males and females within ethnicity were statistically significant. Hispanic male and female students who had been enrolled in dual credit courses had higher cumulative GPAs after two semesters than Hispanic male and female students who had not enrolled in dual credit courses. Black male students who had been enrolled in dual credit courses did not differ in cumulative GPAs after two semesters from Black male students who had not enrolled in dual credit courses. Black female students who had been enrolled in dual credit courses had higher cumulative GPAs after two semesters than Black female students who had not enrolled in dual credit courses. White male and female students who had been enrolled in dual credit courses had higher cumulative GPAs after two semesters than White male and female students who had not enrolled in dual credit courses. Effect sizes for each of these comparisons that were statistically significant were small.

In the first research question, the emphasis was on the extent to which males and females differed in their cumulative GPAs after two semesters as a function of dual credit course enrollment and non-dual credit course enrollment. With respect to cumulative GPAs after two semesters for males, statistically significant differences with trivial effect sizes were revealed for the last three academic years. Male students who took dual credit courses had higher cumulative GPAs after two semesters than males who did not take dual credit courses.

Delineated in Table 7 is a summary of results, including effect sizes, for males regarding cumulative GPAs after two semesters as a function of dual credit course enrollment and non-dual credit course enrollment.

Table 7: Summary of Male and Female Students' Cumulative GPAs Results After Two Semesters as a Function of Dual Credit Course Enrollment and Non-Dual Credit Course Enrollment for the 2005-2006 Through the 2008-2009 Academic Years

| Gender and Academic Year | Statistically Significant | η^2 | Effect Size | Higher Cumulative GPA |
|--------------------------|---------------------------|----------|-------------|-----------------------|
| Male Students | | | | |
| 2005-2006 | No | n/a | n/a | Dual Credit |
| 2006-2007 | Yes | .003 | Small | Dual Credit |
| 2007-2008 | Yes | .02 | Small | Dual Credit |
| 2008-2009 | Yes | .02 | Small | Dual Credit |
| Female Students | | | | |
| 2005-2006 | No | n/a | n/a | Dual Credit |
| 2006-2007 | Yes | .04 | Small | Dual Credit |
| 2007-2008 | Yes | .02 | Small | Dual Credit |
| 2008-2009 | Yes | .02 | Small | Dual Credit |

With respect to cumulative GPAs after two semesters for females, statistically significant differences with trivial effect sizes were revealed for the last three academic years. Female students who took dual credit courses had higher cumulative GPAs after two semesters than females who did not take dual credit courses. Revealed in Table 7 is a summary of results, including effect sizes, for females regarding cumulative GPAs after two semesters as a function of dual credit course enrollment and non-dual credit course enrollment.

The extent to which differences were present among the four ethnic groups in cumulative GPAs after two semesters for dual credit course enrollment or non-dual credit course enrollment was analyzed next. With respect to cumulative GPAs after two semesters for Hispanic students, statistically significant differences were revealed for the last three academic years, albeit small effect sizes. Hispanic students who took dual credit courses had higher cumulative GPAs after two semesters than Hispanic students who did not take dual credit courses.

Delineated in Table 8 is a summary of results, including effect sizes, for Hispanic students regarding cumulative GPAs after two semesters as a function of dual credit course enrollment and non-dual credit course enrollment.

Table 8: Summary by Ethnicity of Cumulative GPA Results After Two Semesters as a Function of Dual Credit Course Enrollment and Non-Dual Credit Course Enrollment for the 2005-2006 Through the 2008-2009 Academic Years

| Ethnicity and Academic Year | Statistically Significant | η^2 | Effect Size | Higher Cumulative GPA |
|-----------------------------|---------------------------|----------|-------------|-----------------------|
| Hispanic Students | | | | |
| 2005-2006 | No | n/a | n/a | Dual Credit |
| 2006-2007 | Yes | .02 | Small | Dual Credit |
| 2007-2008 | Yes | .02 | Small | Dual Credit |
| 2008-2009 | Yes | .01 | Small | Dual Credit |
| Black Students | | | | |
| 2005-2006 | No | n/a | n/a | Dual Credit |
| 2006-2007 | Yes | .02 | Small | Dual Credit |
| 2007-2008 | No | n/a | n/a | Dual Credit |
| 2008-2009 | Yes | .02 | Small | Dual Credit |
| White Students | | | | |
| 2005-2006 | No | n/a | n/a | Non-Dual Credit |
| 2006-2007 | Yes | .04 | Small | Dual Credit |
| 2007-2008 | Yes | .02 | Small | Dual Credit |
| 2008-2009 | Yes | .03 | Small | Dual Credit |

Concerning cumulative GPAs after two semesters for Black students, statistically significant differences were revealed for two academic years, although with small effect sizes. Black students who took dual credit courses had higher cumulative GPAs after two semesters than Black students who did not take dual credit courses. Delineated in Table 8 is a summary of results, including effect sizes, for Black students regarding cumulative GPAs after two semesters as a function of dual credit course enrollment and non-dual credit course enrollment.

With respect to cumulative GPAs after two semesters for White students, statistically significant differences were revealed for two of the three academic years, albeit small effect sizes.

White students who took dual credit courses had higher cumulative GPAs after two semesters than White students who did not take dual credit courses. Delineated in Table 8 is a summary of results, including effect sizes, for White students regarding cumulative GPAs after two semesters as a function of dual credit course enrollment and non-dual credit course enrollment.

Concerning cumulative GPAs after two semesters for Hispanic male students, statistically significant differences were revealed for the last three academic years, again with small effect sizes. Hispanic male students who took dual credit courses had higher cumulative GPAs after two semesters than Hispanic male students who did not take dual credit courses. This result was similar to the previous finding of Hispanic male students who took dual credit courses having higher first semester GPAs than Hispanic male students who did not take dual credit courses. Delineated in Table 9 is a summary of results, including effect sizes, for Hispanic male and female students regarding cumulative GPAs after two semesters as a function of dual credit course enrollment and non-dual credit course enrollment.

For cumulative GPAs after two semesters for Hispanic female students, statistically significant differences were revealed for the last three academic years, albeit small effect sizes. Hispanic female students who took dual credit courses had higher cumulative GPAs after two semesters than Hispanic female students who did not take dual credit courses. This result was similar to the previous finding of Hispanic female students who took dual credit courses having higher first semester GPAs than Hispanic female students who did not take dual credit courses. Presented in Table 9 is a summary of results, including effect sizes, for Hispanic male and female students regarding cumulative GPAs after two semesters as a function of dual credit course enrollment and non-dual credit course enrollment.

Table 9: Summary of Hispanic Male and Female Students' Cumulative GPAs Results After Two Semesters as a Function of Dual Credit Course Enrollment and Non-Dual Credit Course Enrollment for the 2005-2006 Through the 2008-2009 Academic Years

| Academic Year | Statistically Significant | η^2 | Effect Size | Higher Semester GPA | First Semester GPA |
|---------------------------------|---------------------------|----------|-------------|---------------------|--------------------|
| Hispanic Male Students | | | | | |
| 2005-2006 | n/a | n/a | n/a | Dual Credit | |
| 2006-2007 | Yes | .03 | Small | Dual Credit | |
| 2007-2008 | Yes | .04 | Small | Dual Credit | |
| 2008-2009 | Yes | .01 | Small | Dual Credit | |
| Hispanic Female Students | | | | | |
| 2005-2006 | n/a | n/a | n/a | Dual Credit | |
| 2006-2007 | Yes | .02 | Small | Dual Credit | |
| 2007-2008 | Yes | .01 | Small | Dual Credit | |
| 2008-2009 | Yes | .01 | Small | Dual Credit | |

Regarding Black males' cumulative GPAs after two semesters as a function of dual credit course enrollment, no statistically significant differences were present. This result was congruent with the previous results for Black males' first semester GPAs. Of note is that the number of Black students enrolled in dual credit courses was quite low for each year of data analyzed. Due to no statistically significant differences a table is not presented.

With respect to Black female students' cumulative GPAs after two semesters, statistically significant differences were revealed for the last two academic years, albeit small effect sizes. Black female students who took dual credit courses had higher cumulative GPAs after two semesters than Black female students who did not take dual credit courses. Delineated in Table 10 is a summary of results, including effect sizes, for Black female students regarding cumulative GPAs after two semesters as a function of dual credit course enrollment and non-dual credit course enrollment.

Table 10: Summary of Black Female Students' Cumulative GPAs Results After Two Semesters as a Function of Dual Credit Course Enrollment and Non-Dual Credit Course Enrollment for the 2005-2006 Through the 2008-2009 Academic Years

| Academic Year | Statistically Significant | η^2 | Effect Size | Higher First Semester GPA |
|---------------|---------------------------|----------|-------------|---------------------------|
| 2005-2006 | n/a | n/a | n/a | Dual Credit |
| 2006-2007 | Yes | .04 | Small | Dual Credit |
| 2007-2008 | n/a | n/a | n/a | Dual Credit |
| 2008-2009 | Yes | .03 | Small | Dual Credit |

Concerning White students' cumulative GPAs after two semesters, statistically significant differences were revealed for the last three academic years, albeit small effect sizes. White male students who enrolled in dual credit courses had higher cumulative GPAs after two semesters than White male students who did not take dual credit courses. This result was commensurate with White male students who took dual credit courses having higher first semester GPAs than White male students who did not take dual credit courses. Contained in Table 11 is a summary of results, including effect sizes, for White male and female students regarding cumulative GPAs after two semesters as a function of dual credit course enrollment and non-dual credit course enrollment.

Table 11: Summary of White Male and Female Students' Cumulative GPAs Results After Two Semesters as a Function of Dual Credit Course Enrollment and Non-Dual Credit Course Enrollment for the 2005-2006 Through the 2008-2009 Academic Years

| Gender and Academic Year | Statistically Significant | η^2 | Effect Size | Higher First Semester GPA |
|------------------------------|---------------------------|----------|-------------|---------------------------|
| White Male Students | | | | |
| 2005-2006 | n/a | n/a | n/a | Non-Dual Credit |
| 2006-2007 | Yes | .03 | Small | Dual Credit |
| 2007-2008 | Yes | .02 | Small | Dual Credit |
| 2008-2009 | Yes | .02 | Small | Dual Credit |
| White Female Students | | | | |
| 2005-2006 | n/a | n/a | n/a | Dual Credit |
| 2006-2007 | Yes | .04 | Small | Dual Credit |
| 2007-2008 | Yes | .02 | Small | Dual Credit |
| 2008-2009 | Yes | .03 | Small | Dual Credit |

Regarding White female students' cumulative GPAs after two semesters, statistically significant differences, with small effect sizes, were revealed for the last three academic years. White female students who enrolled in dual credit courses had higher cumulative GPAs after two semesters than White female students who did not take dual credit courses. This result was congruent with the previous finding of White female students who took dual credit courses having higher first semester GPAs than White female students who did not take dual credit courses. Delineated in Table 11 is a summary of results including effect sizes, for White male and female students regarding cumulative GPAs after two semesters as a function of dual credit course enrollment and non-dual credit course enrollment.

Implications

Student support and positive outcomes of dual credit course enrollment may help legislators make educational crucial decisions as they relate to dual credit programs. Additional support for student enrollment in dual credit programs has the potential to increase the academic preparedness of high school graduates. The number of dual credit courses completed may decrease college costs and increase the students' GPA at the end of two semesters. However, with the successful completion of a dual credit course in Texas, college level credit is earned, without any additional testing.

A similar investigation could be conducted for second semester GPAs at community colleges, and further investigations could be conducted for longer periods at universities. Similar to the demographic characteristics analyzed herein for dual credit enrollment, the same variables should be analyzed for students attending 4-year institutions. Given the low numbers of Black students available for this investigation, researchers are encouraged to obtain data on Black student enrollment in dual credit courses and their GPAs at 4-year institutions. Additional qualitative research at high schools in Texas should be completed to shed light on the low enrollment rate of Black students in dual credit courses and to consider factors to increase their enrollment numbers. Another possibility for future research is to determine reasons for the documented declining GPAs for Hispanic, Black, and White dual credit students. In the present study, most groups declined in their cumulative GPA after two semesters.

One hypothesis for this result may be that many community college students enroll in community college just long enough to obtain a GPA to transfer to a 4-year institution. As such, it may be that students with higher GPAs transfer out of the community college and into 4-year institutions, leaving behind those students with lower GPAs. The decline in GPAs may be explained by more rigorous dual credit coursework completed at community college campuses as opposed to the rigor of dual credit courses completed at high school campuses. Researchers are encouraged to conduct research studies related to these hypotheses.

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