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Differences in Developmental Education Enrollment and Reading Performance at Texas 4-Year Universities: A Multiyear, Statewide Study

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Abstract: In this investigation, the numbers and percentages of students enrolled in developmental education in reading at Texas 4-year universities were analyzed for the 2002-2003 through the 2009-2010 academic years. Determined in this analysis was whether numbers and percentages of students enrolled in developmental education in reading decreased or increased over time. Revealed in this analysis were statistically significant differences in the numbers and percentages for the 2002-2003 through the 2009-2010 academic years. The numbers and percentages of students enrolled in developmental education in reading decreased over this 8-year time period. Moreover, in the 2007-2008 academic year, over 70% of students in developmental education completed a college-level course in reading. Results, implications for policy, and recommendations for research were provided.

Keywords: Developmental Education, Reading, Texas, 4-Year Universities, College-Level Course Completion

1. Introduction

According to a survey performed by the [1], 94% of adults expected their own children to attend college and 86% believed their own degrees were a good investment. Surveys such as this one provide evidence that most Americans support the idea of a college degree and believe that attaining a 4-year college degree continues to be a contributing factor for employment success and financial stability. As further support for these views, The [2] indicated that the rate of unemployment in 2012 for individuals ages 25-34 with a bachelor's degree was only 4.1%. By comparison, 12.8% of those individuals who had earned only a high school diploma were unemployed. Adults with and without a college degree experienced substantial differences in their earnings [3]. Therefore, a 4-year college degree may provide the benefits associated with the so-called American Dream: home ownership, sustained employability, and financial independence. A college degree may contribute to career satisfaction, and given the widely held belief of the importance of the relationship between career and happiness, a college degree may assist to provide this benefit as well. Earning a 4-year college degree functions as an important component in providing American workers with stable employment and financial success.

1.1. College Readiness

Unfortunately, the United States is experiencing a crisis in college readiness, despite a widespread belief in and desire for a college degree. According to the [4], only 25% of students were college ready in the four subjects of reading, mathematics, science, and writing. Numerous researchers [e.g., 5, 6, 7, 8] have examined the issue of college readiness.

In a recent review of the literature, [6] identified several factors that may influence college readiness, including SAT and ACT scores, ethnicity, socioeconomic status, and self-determination. Because of these multiple factors, [5] suggested that a lack of college preparedness cannot be remedied by previous lockstep methods of "high-stakes testing and stringent accountability measures which have perpetuated the one-size-fits-all" (p. 3) philosophy of improving students' college readiness. In addition, [8] indicated that the methods used typically to assess college readiness, such as earning a high school diploma, completing

college preparatory courses, and passing state-required, exit-level examinations, were not reliable tools for determining actual college readiness. Many college students who had met these criteria were not college ready once enrolled in college courses. [7] concluded that although many methods are used to determine college readiness and much discussion among educators exists about solutions to this crisis, gaps in the literature remain, creating the need for more research to determine how to mitigate the effects of not being prepared for postsecondary education.

Identifying the challenges of college readiness is important because one of the most essential indicators of student success in college is their preparedness for college course work [9]. [10] declared that at least half, and perhaps more, of incoming college students were not college ready. An additional measure that may determine even more students lacking college readiness is the Common Core State Standards, set academic-achievement benchmarks adopted by 45 states. This assessment may demonstrate that an even larger number of students do not possess college readiness skills upon graduating from high school [11].

Reading proficiency is one critical area in which students lack college readiness. [5] documented that only 53.91% of graduating high school seniors in Texas in 2009 were college ready in reading. [12] identified that only 52% of high school graduates in 2012 were college ready in reading, and the college-readiness rates in reading among Black and Hispanic students were even lower according to the ACT. College students are reading less than ever, and their reading skills have deteriorated [13]. Therefore, the path of many students to a desired 4-year college degree may be hindered by poor reading skills. The ability to comprehend and analyze college-level reading is a basic skill necessary for success in most college-level courses. "Reading is the critical core skill underlying all the curriculum areas," said Schmeiser, ACT's vice president for research and development. "If kids are reading at a college level, they are also ready to go into, in greater proportions, college-level math and science courses" [14, p. 1).

One term often used to define reading skills is the word *literacy*, characterized as "the ability to access, evaluate, and integrate information from a wide range of textual sources" [15, p. 18]. These skills are acquired by students most rapidly during the elementary and middle school years [15]. However, many students lack literacy and fall behind during their early educational years and they are not able to improve their reading skills through high school and into college. [14] noted, "In terms of readiness for college-level reading, students are actually losing momentum during high school" (p. 1). The implication of lacking literacy goes beyond just the college classroom. Reading skills are foundational for individual success not only in school but also for future economic success [16].

1.2. Persistence as a Function of Developmental Education

In developmental education, efforts are made to bridge the gap between lacking college readiness and college preparedness. Sometimes referred to as remedial education, the intent behind these courses is to improve students' skills in reading, mathematics, and writing prior to students enrolling in credit-bearing courses. Unfortunately, many students are not benefitting from these courses despite the worthwhile goals of these courses [17]. Persistence rates, defined by the [18, p. 48] as students who "continue from one year in higher education to the succeeding year", have lagged for these students. Despite the well-intentioned efforts of postsecondary institutions to prepare students for college course work, many students were not persisting through these developmental courses [19]. Students were not progressing to credit-bearing courses, which indicated they were not on track to graduate.

Many researchers [e.g., 10, 19, 20, 21] have questioned the effectiveness of developmental education programs to improve persistence rates. Evenbeck, president of City University of New York's experimental community college, concurred, "When students go into remediation they never leave it. And among students who are in the bottom tier of remedial programs the graduation rate is less than 1 percent" [22, p. 187]. Developmental courses are designed to improve persistence rates among unprepared college students; however, extensive evidence exists that these courses are failing in that effort [10, 19, 17, 21].

One way that institutions are attempting to improve persistence rates through developmental education is by modifying the delivery methods of these courses. A review of the literature revealed that reformed models of developmental education were more effective than traditional models. According to [11], concurrent models are being tested in colleges. Students were able to take their developmental courses along with their college-credit courses. The accelerated model is another new type of reformed developmental course. These courses allow student to enroll in shorter developmental courses [23]. One goal of accelerated courses is developmental course requirements can be completed more quickly and students benefit from additional academic support [17]. An Accelerated Learning Program course "meets in the class period immediately following the college-level class" [19, p. 48). Students are enrolled in the college-credit course and the developmental course at the same time. These new types of developmental courses may be more effective than traditional approaches [24], and shorter completion times may encourage students to persist through them [25].

1.3. Statement of the Problem

According to [26], "Reading comprehension is a complex cognitive skill that is required for adults to succeed and keep up with societal demands" (p. 215). Unfortunately, numerous researchers [e.g., 27, 5, 28, 29] have documented a lack of proficiency in reading for college students. [14] claimed that a major problem for many college students is that they are often unable to read the required textbooks. Many college instructors noted that students not only did

not want to read their textbooks, but when they did, they were unable to understand the reading [30]. [27] reported that only 48% of college students were college ready in reading according to the College Board's ACT, and SAT reading scores had fallen to their lowest rate since 1972. Because reading proficiency is an important skill in most college courses, its absence can prevent students from achieving educational success.

Therefore, college students enroll in developmental reading courses as one strategy to prepare them for college-level course work. To address the challenges in reading faced by students, postsecondary institutions have designed developmental reading courses to improve student reading skills [31]. Therefore, developmental reading instruction in college constitutes an important part of achieving a degree for students who enter college with poor reading skills. This instruction is important because only about 10% of students who are not college ready and do not receive remediation will ever complete a degree [20].

1.4. Purpose of the Study

The purpose of this research study was to determine the numbers and percentages of students who were enrolled in developmental education in reading at Texas 4-year universities during the 2002-2003 through the 2009-2010 academic years. A second purpose was to ascertain the degree to which the numbers and percentages of students who were enrolled in developmental education in reading changed from the 2002-2003 through the 2009-2010 academic years in Texas 4-year universities. A third purpose was to determine the extent to which student completion of a college-level course in reading changed between the 2003 and the 2010 academic years. The final purpose of this research study was to ascertain the degree to which a trend might be present both in the numbers and percentages of students who were enrolled in developmental education in reading, as well as in student completion of a college-level course in reading, during the 2002-2003 through the 2009-2010 academic years. Given the emphases placed on retention and to 4-year college-degree attainment, an imperative exists to ascertain the relationship between developmental course enrollment in reading and student success.

1.5. Significance of the Study

Much research has already been conducted concerning ways to assist unprepared college readers through developmental education courses in reading in the hopes that students can experience success in college courses [32, 9, 33]. For this study, the phrase, success rates, was used to refer to completion of a college-level course in reading. Few researchers, to date, have focused their efforts on the relationship between developmental course enrollment in reading and college-level reading course completion at Texas 4-year universities over a period of time. Furthermore, an analysis of the relationship between developmental course enrollment in reading and success rates at Texas 4-year universities over time has not occurred to date. By examining the differences in the performance of students who enroll in a developmental reading course and their subsequent completion of a college-level reading course, a trend can be revealed. The findings of this study may have practical application for educational leaders in higher education, as well as in K-12 settings, to ensure all university students are proficient in reading. By determining the relationship between developmental course enrollment in reading and success rates, quality interventions could be created. Students lacking college-level reading skills could then benefit from a developmental course in reading.

1.6. Research Questions

The following research questions were addressed in this empirical investigation: (a) What are the numbers of students who were enrolled in developmental education in reading at Texas 4-year universities for the 2002-2003 through the 2009-2010 academic years?; (b) What are the percentages of students who were enrolled in developmental education in reading at Texas 4-year universities for the 2002-2003 through the 2009-2010 academic years?; (c) What is the difference in the average number of students who were enrolled in developmental education in reading at Texas 4-year universities between the 2002-2003 and 2009-2010 academic years?; (d) What is the difference in the average percent of students who were enrolled in developmental education in reading at Texas 4-year universities between the 2002-2003 and 2009-2010 academic years?; (e) What are the percentages of students who were enrolled in developmental education in reading and who completed a college-level course in reading in the 2002-2003 through the 2009-2010 academic years?; (f) What is the difference in the percentage of students who were enrolled in developmental education in reading at Texas 4-year universities and who completed a college-level course in reading between the 2002-2003 and 2009-2010 academic years?; (g) What trend is present, if any, in the numbers of students who were enrolled in developmental education in reading at Texas 4-year universities from the 2002-2003 through the 2009-2010 academic years?; (h) What trend is present, if any, in the percentages of students who were enrolled in developmental education in reading at Texas 4-year universities from the 2002-2003 through the 2009-2010 academic years?; and (i) What trend is present, if any, in the percentages of students who were enrolled in developmental education in reading and who completed a college-level course in reading at Texas 4-year universities from the 2002-2003 through the 2009-2010 academic years?

2. Method

2.1. Research Design

For this study, the research design was a longitudinal, explanatory investigation [34]. Archival data were used to

answer the research questions previously discussed. Both the independent variables and the dependent variables to be this investigation had already occurred and extraneous variables were not controlled in this study design [35]. The independent variable was the specific academic year in which data on developmental education in reading were available. The dependent variables were (a) the number of students who were enrolled in developmental education reading in each of the academic years, (b) the percentage of students enrolled in developmental education reading out of the total student enrollment, and (c) the percentages of students who completed a college-level course in reading.

2.2. Participants and Instrumentation

Archival data were obtained from the 2002-2003 through the 2009-2010 academic years from the [36] for all students at Texas 4-year universities who first enrolled in a developmental education course and then enrolled in a college-level course in reading. Completion of a college level course in reading, along with enrollment data, from the thirty-nine 4-year universities from the 2002-2003 through the 2009-2010 academic years were analyzed. In some instances, data were not available for some universities; however, all available data were analyzed herein.

Data for this study were downloaded from the [36], the Texas Higher Education Coordinating Board Developmental Education Accountability Measures Data website. The [36] is used to track performance of Texas universities on issues considered essential to the success of higher education. For this study, data specifically regarding developmental education courses in reading of students enrolled in 4-year Texas universities were analyzed. Developmental education is defined by the [18] as "courses, tutorials, laboratories, or other efforts to bring students' skill levels in reading, writing, and mathematics to entering college level" (p. 25). For this study, only college-level courses completed with a grade of A, B, or C were examined, according to the data provided by the [36].

3. Results

To answer the first research question, descriptive statistics were calculated for the numbers of students who were enrolled in developmental education in reading at Texas 4-year universities for the 2002-2003 academic year through the 2009-2010 academic year. The most students (n = 7,206) who were enrolled in developmental education in reading was in the 2003-2004 academic year. The fewest number of students (n = 4,735) who were enrolled in developmental education in reading was in the final year of the study, the 2009-2010 academic year. With respect to the average number of students who were enrolled in developmental education in reading at Texas 4-year universities, the highest average (M = 225.19) was also in the 2003-2004 academic year and the lowest average (M = 131.53) was in the 2009-2010 academic year. Readers are directed to Table 1 for these descriptive statistics for the numbers of students who were enrolled in developmental education in reading in Texas 4-year universities from the 2002-2003 through the 2009-2010 academic year.

Table 1. *Descriptive Statistics for the Number of Students Below State Standards in Reading at Texas 4-year Universities From the 2002-2003 Through the 2009-2010 Academic Year.*

Academic Year	*n* of 4-year universities	*M*	*SD*	Sum
2002-2003	31	204.13	246.42	6,328
2003-2004	32	225.19	287.56	7,206
2004-2005	31	219.97	263.24	6,819
2005-2006	31	183.48	222.16	5,688
2006-2007	32	136.91	160.05	4,381
2007-2008	32	164.38	179.46	5,260
2008-2009	34	142.97	170.45	4,861
2009-2010	36	131.53	166.28	4,735

To answer the second research question, the intention was to calculate descriptive statistics for the percentage of students who were enrolled in developmental education in reading at Texas 4-year universities for the 2002-2003 academic year through the 2009-2010 academic year. The data available on the Texas Higher Education Coordinating Board Interactive Accountability System, however, were not the percentages of students who were enrolled in developmental education in reading. Rather, the data that were available for downloading at the Texas Higher Education Coordinating Board Interactive Accountability System were the percentages of students who were not enrolled in developmental education in reading. Delineated in Table 2 are the descriptive statistics for the percentages of students who were not enrolled in developmental education in reading.

Table 2. *Descriptive Statistics for the Percent of Developmental Education Students Who Met the TSI Obligation in Reading at Texas 4-year Universities From the 2002-2003 Through the 2009-2010 Academic Year.*

Academic Year	*n* of 4-year universities	*M%*	*SD%*
2002-2003	31	68.13	19.21
2003-2004	30	65.87	18.31
2004-2005	30	67.77	20.97
2005-2006	31	75.83	14.55
2006-2007	31	77.71	13.10
2007-2008	31	83.76	15.44
2008-2009	32	71.68	21.36
2009-2010	33	75.74	17.84

Because the focus of the second research question was on the percentages of students who were enrolled in developmental education in reading, the average percentages in each academic year were subtracted from 100%. This subtraction yielded the percentages of students who were enrolled in developmental education in reading. The highest average percentage of students (M = 34.13%) who were enrolled in developmental education in reading was in the 2003-2004 academic year, with the lowest average percentage of students (M = 16.24%) who were enrolled in

developmental education was in the 2007-2008 academic year. Readers should note that in the most recent academic year of data, 2009-2010, approximately 25% of students in Texas 4-year universities remained enrolled in developmental education courses in reading.

With respect to research question three, prior to conducting inferential statistics to determine whether differences were present in the average number of students who were enrolled in developmental education in reading between the 2002-2003 academic year and the 2009-2010 academic year at Texas 4-year universities, checks were conducted to determine the extent to which these data were normally distributed [37]. Although some of the values were indicative of non-normally distributed data, a decision was made to use a parametric dependent samples *t*-test to answer the third research question. The parametric dependent samples *t*-test revealed a statistically significant difference in the average number of students who were enrolled in developmental education in reading, $t(30) = 2.46$, $p < .001$, between the 2002-2003 academic year and the 2009-2010 academic year at Texas 4-year universities. This difference represented a small effect size (Cohen's *d*) of 0.25 [38]. More than one-third fewer developmental education students were enrolled in reading in the 2009-2010 academic year than in the 2002-2003 academic year. Table 3 contains the descriptive statistics for this analysis.

Table 3. *Descriptive Statistics for the Average Number of Students Who Were Enrolled in Developmental Education in Reading in the 2002-2003 and the 2009-2010 Academic Year at Texas 4-year Universities.*

Academic Year	*n* of 4-year universities	*M*	*SD*
2002-2003	31	204.13	246.42
2009-2010	31	152.22	170.50

With respect to research question four, prior to conducting inferential statistics to determine whether differences were present in the average percent of students who were enrolled in developmental education in reading between the 2002-2003 academic year and the 2009-2010 academic year at Texas 4-year universities, checks were conducted to determine the extent to which these data were normally distributed [37]. Although some of the values were indicative of non-normally distributed data, a decision was made to use a parametric dependent samples *t*-test to answer the fourth research question. The parametric dependent samples *t*-test revealed a statistically significant difference in the average percent of students who were enrolled in developmental education in reading, $t(29) = -2.21$, $p < .001$ between the 2002-2003 academic year and the 2009-2010 academic year at Texas 4-year universities. This difference represented a small effect size (Cohen's *d*) of 0.43 [38]. A statistically significantly lower percentage of students were enrolled in developmental education in reading in the 2009-2010 academic year than in the 2002-2003 academic year. Delineated in Table 4 are the descriptive statistics for this analysis.

Table 4. *Descriptive Statistics for the Average Percent of Students Who Were Enrolled in Developmental Education in Reading in the 2002-2003 and the 2009-2010 Academic Year at Texas 4-year Universities.*

Academic Year	*n* of 4-year universities	*M%*	*SD%*
2002-2003	30	68.10	19.50
2009-2010	30	75.90	16.93

To answer the fifth research question, descriptive statistics were calculated for the percentages of students who were enrolled in developmental education in reading and who completed a college-level course in reading at Texas 4-year universities for the 2002-2003 academic year through the 2009-2010 academic year. The percentages of these students ranged in the mid-50 percentages in the 2002-2003 academic year through the 2006-2007 academic years. A noticeable increase was documented in the 2007-2008 academic year where 70.65% of students completed a college-level course in reading. In the last two academic years of data analyzed, the percentages of students who had completed a college-level course in reading decreased slightly from the high mark established in 2007-2008 academic year. Readers are directed to Table 5 for these descriptive statistics.

Table 5. *Descriptive Statistics for the Percent of Developmental Education Students Who Earned a Grade of A, B, or C in a College-level Course in Reading at Texas 4-year Universities From the 2002-2003 Through the 2009-2010 Academic Year.*

Academic Year	*n* of 4-year universities	*M%*	*SD%*
2002-2003	31	55.27	16.93
2003-2004	30	55.34	17.88
2004-2005	30	57.55	20.83
2005-2006	30	58.54	19.03
2006-2007	31	55.41	18.34
2007-2008	31	70.65	19.18
2008-2009	32	64.69	22.12
2009-2010	34	67.51	17.96

With respect to research question six, prior to conducting inferential statistics to determine whether a difference was present in the percentage of students who were enrolled in developmental education in reading and who completed a college-level course in reading between the 2002-2003 academic year and the 2009-2010 academic year at Texas 4-year universities, checks were conducted to determine the extent to which these data were normally distributed [37]. Although some of the values were indicative of non-normally distributed data, a decision was made to use a parametric dependent samples *t*-test to answer this research questions. The parametric dependent samples *t*-test revealed a statistically significant difference in the percentage of students who were enrolled in developmental education in reading and who completed a college-level course in reading, $t(29) = -5.06$, $p < .001$ between the 2002-2003 academic year and the 2009-2010 academic year at Texas 4-year universities. This difference represented a moderate effect size (Cohen's *d*) of 0.72 [38]. A statistically significantly higher percentage of students were enrolled in developmental education in reading and completed a college-level course in

reading in the 2009-2010 academic year than in the 2002-2003 academic year. Revealed in Table 6 are the descriptive statistics for this analysis.

Table 6. *Descriptive Statistics for the Percent of Students Enrolled in Developmental Education in Reading at Texas 4-year Universities and Who Completed a College-level Course in Reading in the 2002-2003 and 2009-2010 Academic Year.*

Academic Year	*n* of 4-year universities	*M%*	*SD%*
2002-2003	30	55.45	17.19
2009-2010	30	67.02	14.85

With respect to research questions seven, eight, and nine, an analysis of trends of all eight years of data for developmental education students in reading was conducted. As revealed in Figure 1 with respect to research question seven, trends were present in the average numbers of students enrolled in developmental education in reading at Texas 4-year universities for the 2002-2003 through the 2009-2010 academic years. In the first three years of the study, the average numbers of students enrolled in developmental education in reading were consistent. However, in the 2005-2006 academic year, the average numbers of students enrolled in developmental education in reading began to decrease. In the final year of this study, the 2009-2010 academic year, 36% fewer students were enrolled in developmental education in reading than in the first year of the study, the 2002-2003 academic year.

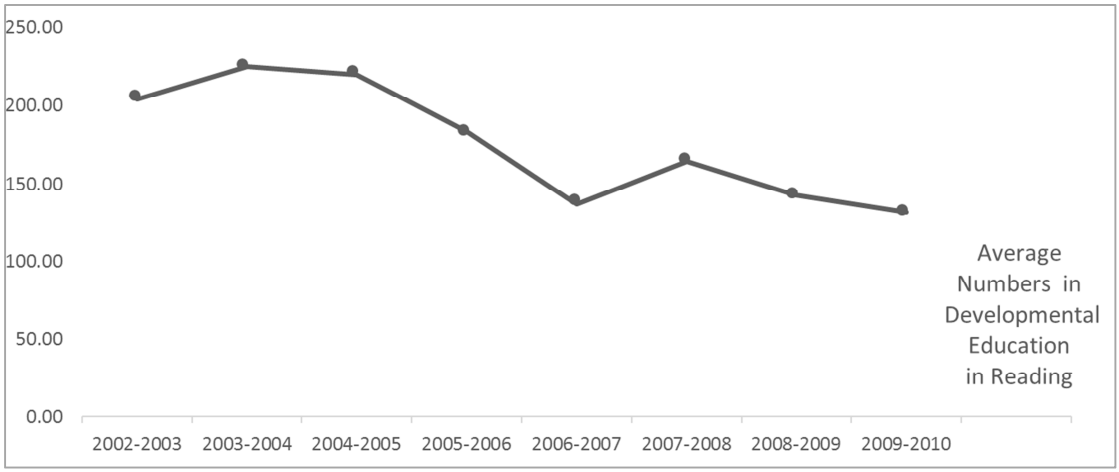

Figure 1. *Average numbers of students who were enrolled in developmental education in reading at Texas 4-year universities for the 2002-2003 through the 2009-2010 academic years.*

With respect to research question eight, trends were present in the average percentages of students who were enrolled in developmental education in reading at Texas 4-year universities from the 2002-2003 through the 2009-2010 academic years. As revealed in Figure 2, similar average percentages of students were enrolled in developmental education in reading in the first three academic years of this investigation. However, in the 2005-2006 academic year, the average percentages of students enrolled in developmental education in reading began to decrease. Over the 8-year period of this study, the 2007-2008 academic year represented the lowest average percentage of students enrolled in developmental education in reading, an 18% decrease from the highest average percentage in the 2003-2004 academic year.

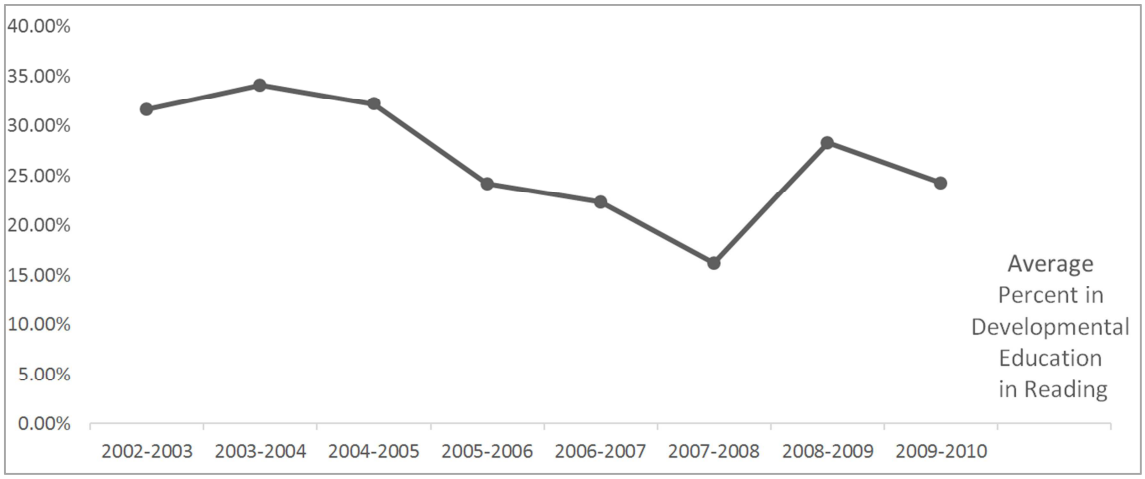

Figure 2. *Average percent of students who were enrolled in developmental education in reading at Texas 4-year universities for the 2002-2003 through the 2009-2010 academic years.*

The final research question involved the average percentages of students who were enrolled in developmental education in reading and who completed a college-level course in reading at Texas 4-year universities in the 2002-2003 through the 2009-2010 academic years. As revealed in Figure 3, similar average percentages of students were enrolled in developmental education in reading and completed a college-level course in reading in the first five academic years of this investigation. However, in the 2007-2008 academic year, the average percentage of students who were enrolled in developmental education in reading and who completed a college-level course in reading increased 15%. In the final two years of this study, the average percentages of students who were enrolled in developmental education in reading and who completed a college-level course in reading decreased; however, these average percentages remained approximately 10% higher than the average percentages in the first five years of the study.

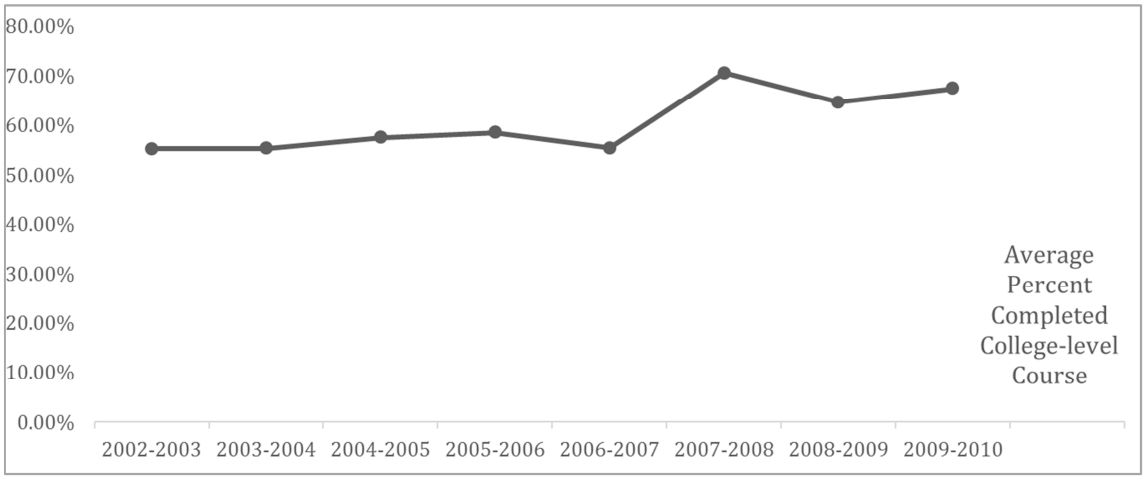

Figure 3. *Average percent of students who were enrolled in developmental education in reading and who completed a college-level course in reading at Texas 4-year universities for the 2002-2003 through the 2009-2010 academic years.*

4. Discussion

Presented in this investigation was an analysis of data on students who had been enrolled in developmental education in reading at Texas 4-year universities in the 2002-2003 through the 2009-2010 academic years. Eight years of archival data from the Texas Higher Education Coordinating Board Interactive Accountability System were obtained and analyzed. In this study, at least 30 Texas 4-year universities provided data that were analyzed from the 2002-2003 through the 2009-2010 academic years.

For the eight academic years of data that were analyzed, statistically significant differences were present. In this investigation, the average number of students enrolled in developmental education in reading ranged from a high of 225 in the 2003-2004 academic year to a low of 131 in the 2009-2010 academic year. The average percentage of students enrolled in developmental education in reading ranged from a high of 34% in the 2003-2004 academic year to a low of 16% in the 2007-2008 academic year. The average percentage of students who were enrolled in developmental education in reading and who completed a college-level course in reading ranged from a low of 55% in the 2002-2003, 2003-2004, and 2006-2007 academic years to a high of 71% in the 2007-2008 academic year.

4.1. Connections with Existing Literature

Previous researchers [23, 8, 25, 33] have analyzed data on students who were enrolled in developmental education in reading. In this multiyear, statewide investigation, the numbers and percentages of students enrolled in developmental education in reading at Texas 4-year universities decreased from the 2002-2003 to the 2009-2010 academic year. In this same time period, students who were enrolled in developmental education in reading and who completed a college-level course increased.

These results were consistent with [8] wherein the numbers of students enrolled in developmental education in reading have decreased over time. According to [8], these decreases may be the result of exemptions, such as passing exit-level examinations that allow students to bypass developmental education courses. Unfortunately, with the exception of student enrollment in dual credit programs, these exemptions do not ensure that students are actually college ready. Such exemptions simply permit students to avoid developmental education courses even though they may need these courses to be successful in college. [8] also noted changes in the Texas Education Agency's Texas Success Initiative program that permitted individual institutions to dictate their own standards for college readiness. These individual variations in what constitutes college readiness may contribute to lower numbers of students enrolled in developmental education. [8] suggested continued research to determine how students fared in college-level courses when they were exempted from developmental education courses. Although the lower numbers of students enrolled in developmental education

courses might indicate improved college readiness, exemptions and changing standards obscure a full and accurate picture of true preparedness for college courses [8].

4.2. Implications for Policy and Practice

In this investigation, the numbers and percentages of students enrolled in developmental education in reading at Texas 4-year universities decreased from the 2002-2003 academic year though the 2009-2010 academic year. The percentages of students who enrolled in developmental education in reading and who completed a college-level course in reading increased over time. However, these improvements were limited and inconsistent over an 8-year period. Although institutions have measures in place to improve college readiness, most students enrolled in developmental education do not persist and graduate [19]. Universities must be more purposeful to determine the reasons why developmental education students are not succeeding at higher rates.

Changes in curriculum, college-readiness assessment, and instructional practices should be a priority for universities to improve success rates for developmental education students. Innovative developmental education courses may be more effective than traditional methods [24]. Shorter courses that require less time to complete may encourage students to persist through them [25]. Also, increased evaluation of the validity of current college-readiness assessments and the consideration of alternative-education options outside of a 4-year bachelor's degree should be investigated [5].

4.3. Recommendations for Future Research

In this multiyear, statewide investigation, the numbers and percentages of developmental education students in reading at Texas 4-year universities were examined. As such, researchers are encouraged to extend this investigation to developmental education students in mathematics, as well as to developmental education students in writing. Such analyses could be used to ascertain the degree to which the results reported herein are similar to developmental education in mathematics and in writing. Although the focus of this study was on 4-year universities in Texas, researchers should extend this study to 4-year universities in other states. The degree to which the results delineated herein are generalizable to developmental education students in other states is not known. Another suggestion for future research is to extend this investigation to developmental education students who are enrolled in community colleges. Would results obtained for 4-year university students be similar for developmental education students at community colleges? In addition to conducting such a study in Texas, researchers are encouraged to extend studies into community colleges in other states.

In this investigation, data were not available by student demographic characteristic. That is, the extent to which ethnicity/race and gender were related to developmental education student performance could not be determined. Researchers are encouraged to obtain individual student level data for future analyses. Investigations are also encouraged to examine different types of delivery methods of developmental education in reading, such as compressed courses, which are shorter in length, or concurrent courses, which are designed to offer college-credit courses in tandem with developmental courses.

5. Conclusion

The purpose of this research study was to determine the extent to which differences were present in the numbers and percentages of students enrolled in developmental education in reading at Texas 4-year universities from the 2002-2003 academic year through the 2009-2010 academic year. Statistically significant differences were present in all years of the study. The numbers and percentages of students enrolled in developmental education in reading decreased over time. Students who were enrolled in developmental education in reading and who completed a college-level course in reading increased during the years of the study. Consistent with [8], the numbers and percentages of students enrolled in developmental education in reading has decreased. However, readers should note the presence of many questions and concerns regarding the underlying reasons for these decreases. Universities are tasked with assisting many students who are unprepared for college-level courses. In the 2003-2004 academic year of this study, nearly 35% of 4-year university students in Texas required developmental education in reading courses. Proficiency in reading is a cornerstone for college and career success [16]; therefore, universities face a considerable responsibility to improve student reading skills. Educators and policymakers charged with developmental education will continue to encounter enormous challenges to increase college readiness among students who lack these skills.

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