

Texas GEAR UP: Beyond Grad

Biennial Impact Report

Evaluation of Years 1 and 2

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Acronyms and Abbreviations

AP	Advanced Placement
COVID-19	Coronavirus Disease 2019
ED	U.S. Department of Education
EL	English Learner
ES	Effect Size
ESC	Education Service Center
FAFSA	Free Application for Federal Student Aid
GEAR UP	Gaining Early Access to Undergraduate Programs
IB	International Baccalaureate
ISD	Independent School District
MLM	Multilevel Model
NA	Not Applicable
ns	Non-Significant
OR	Odds Ratio
PD	Professional Development
PEIMS	Public Education Information Management System
PSAT	Preliminary SAT
PSM	Propensity Score Matching
STAAR	State of Texas Assessments of Academic Readiness
TAPR	Texas Academic Performance Report
TEA	Texas Education Agency
TEKS	Texas Essential Knowledge and Skills
THECB	Texas Higher Education Coordinating Board
TNTP	Formerly referred to as The New Teacher Project, the organization changed its name to simply TNTP after its mission expanded beyond only serving new teachers.
WWC	What Works Clearinghouse



Executive Summary

The Texas Education Agency’s (TEA) Gaining Early Awareness and Readiness for Undergraduate Programs (GEAR UP): Beyond Grad grant program (referred to as “GEAR UP” in this report) serves approximately 10,000 students from six Texas independent school districts (ISDs), including 12 middle schools and high schools in rural communities in West Texas, Southeast Texas, and the Coastal Bend.¹

GEAR UP provides targeted services to a grade-specific **primary cohort** of students who were in Grade 7 during the 2018–19 school year and expected to graduate at the end of Grade 12 in the 2023–24 school year (i.e., the **class of 2024**) through their first year of postsecondary education. Services aimed at both the middle and high school level included targeted academic tutoring, teacher professional development to increase academic rigor, individualized college and career counseling, and workshops/events aimed at students and parents. Middle school students had access to a college and career exploration course and additional support for Algebra I completion in Grade 8.

GEAR UP also provides basic services to a **priority cohort** of students consisting of all other students in Grade 9–12 attending participating high schools in the grantee districts during each year of the seven-year grant (i.e., from school years 2018–19 to 2024–25).

Evaluating GEAR UP and Purpose of this Report

This report presents findings from the impact evaluation during the first two program years—school years 2018–19 (Year 1) and 2019–20 (Year 2) and focuses on the following evaluation questions:

- What outcomes are associated with participation in GEAR UP? How do these differ by district?
- How do trends in outcomes for the class of 2024 GEAR UP cohort students differ in comparison to the state average?
- How do trends in outcomes for the class of 2024 GEAR UP cohort students differ in comparison to the students in a matched comparison group created through propensity score matching (PSM)?
- How do trends in outcomes for the class of 2024 students differ from students who attended the same schools one year prior to program implementation (i.e., the class of 2023)?
- How do trajectories of outcomes differ based on the length of time students attended GEAR UP schools? For example, do students who participate in GEAR UP in all grades differ compared to students who enter GEAR UP schools at a later grade level?

¹ The school districts participating in TEA’s GEAR UP grant include Cleveland ISD, Culberson County-Allamore ISD, Education Service Center 19 with San Elizario ISD, Mathis ISD, Sheldon ISD, and Sinton ISD.

The external evaluation is a longitudinal design that spans seven years and follows a cohort model. There are five key cohort groups in the study:

- The **class of 2024 GEAR UP cohort** includes students at the six GEAR UP districts to whom services were provided.
- The **matched comparison cohort** consists of a statistically matched sample of students who are attending similar districts that did not participate in GEAR UP. These students are also from the class of 2024.
- The **retrospective cohort** includes students who attended GEAR UP districts one year prior to the start of the grant (i.e., the class of 2023).
- The two **follow-on cohorts** include students who attended the GEAR UP districts one and two years after implementation (although listed here for illustrative purposes, students in these follow-on cohorts are not included in the analyses in this report). These students are from the classes of 2025 and 2026.

This report focuses on Year 2, when the class of 2024 was in Grade 8. Findings regarding outcomes in the class of 2024 GEAR UP cohort are compared to those from the matched comparison and retrospective cohorts. The number of years in the class of 2024 GEAR UP cohort is also analyzed as a predictive factor for better outcomes.

The outcomes examined are limited to Algebra I completion by the end of Grade 8 and promotion from Grade 8 to Grade 9. It was intended that this evaluation would also examine results on the Grade 8 State of Texas Assessments of Academic Readiness (STAAR) assessment in mathematics, reading, and science. However, due to the Coronavirus Disease 2019 (COVID-19) pandemic, STAAR was not administered in the spring of 2020, limiting the scope of this report.

Summary of Findings

Algebra I Completion

A primary objective for GEAR UP in the middle school years was to increase Algebra I completion by the end of Grade 8. Project Objective 1.1 sets the target for Algebra I completion by the end of Grade 8 at 30%. GEAR UP districts made progress toward this goal, increasing the percentage of students completing Algebra I from 18% (class of 2023) to 22% (class of 2024). Statistical models indicated that students who participated in GEAR UP were almost twice as likely as students in the retrospective cohort to complete Algebra I, once covariates like district, prior achievement on STAAR, and student characteristics were included in the models. Additionally, students who participated in the program for two years completed Algebra I at twice the rate as students who participated only one year. However, when examining the results comparing a sample of the class of 2024 GEAR UP cohort students to a PSM-matched comparison sample, there were no differences between groups in the multilevel models.

On-Time Promotion

On-time promotion rates from Grade 8 to Grade 9 were almost 100% for the class of 2024 GEAR UP cohort, exceeding the state average of 99.5%. These rates were similar for students

in the matched comparison and retrospective cohorts. With rates near 100% for all groups, statistical analyses could not be conducted.

Limitations

There were several important limitations in the study.

- **Availability and reliability of outcome data were affected by the COVID-19 pandemic.** Because the COVID-19 pandemic forced districts to close for a time, and then resume services virtually, the annual STAAR assessments were cancelled for 2020. The STAAR assessment provides reliable statewide information on student academic achievement, and without it, the number of outcomes that could be explored was limited. Additionally, there may be missing data among the outcomes that were able to be collected. For example, one district in the class of 2024 GEAR UP cohort did not submit middle school course completion data in spring 2020, and thus Algebra I completion data were not available.
- **The quasi-experimental study design cannot prove causality.** That is, even when analyses are carefully controlled, it is not possible to state with certainty that participation in GEAR UP actually caused any observed differences between cohorts. That is, it can only be said that GEAR UP implementation was *associated* (or not) with differences in outcomes, and not that the program *caused* the changes.
- **Prior Algebra I completion in Grade 8 was not considered in the selection of districts for the matched comparison group.** The districts for the matched comparison cohort were carefully selected to be as similar as possible to the GEAR UP districts. However, they were not selected based on prior Algebra I completion levels for Grade 8 students. It is possible that the comparison districts had higher levels of Grade 8 Algebra I completion in the years prior to the analysis due to other districtwide programs, policies, and initiatives. A large level of variation by district for this outcome was observed.
- **Some of the observed differences in Algebra I completion may have been due to differences in course offerings and not differences in student interest and capacity to succeed in the course.** In the retrospective cohort, for example, several of the districts had near 0% completion of Algebra I in prior years, which may indicate that the course was not available for students to take.
- **The study may underestimate the magnitude of effects favoring the class of 2024 GEAR UP cohort.** For purposes of this study, students were considered to be a part of the class of 2024 GEAR UP cohort if they were enrolled in a GEAR UP district during fall snapshot in Grade 8. They were not required to have received services to be part of the cohort. Additionally, all students from the retrospective cohort who were retained in Grade 8 became part of the class of 2024 GEAR UP cohort. Therefore, this study may underestimate the magnitude of effects favoring the class of 2024 GEAR UP cohort.
- **Length of time in cohort as an indicator of program impact is complicated by additional factors.** Length of time in cohort was found to be significantly positively

related to Algebra I completion in Grade 8. However, students who participated only in Grade 8 may have differed from their counterparts in important ways. For example, students who moved between Grade 7 and Grade 8 may have had family members with job changes or other disruptions that may have affected their ability to succeed in school. In addition, enrolling in Algebra I often occurs at the end of Grade 7. If students were not in a GEAR UP campus in Grade 7, they may not have received encouragement to enroll in the course.

- **This report focuses on short-term outcomes that are very specific and measurable.** Predictors used in the analyses were also measurable (e.g., gender, economic status). Other variables that may also have an impact on outcomes may not be measurable, such as student motivation and family structure. Some of the GEAR UP activities that occurred in Grades 7 and 8 may not be associated with outcomes to date but may eventually be associated with the longer-term goals of the program including enrolling in and attending a postsecondary educational institution.

Recommendations

- **Ensure an adequate number of Grade 9 students are enrolled in Algebra I and provide academic supports as needed to meet the Grade 9 Algebra I completion goal.** Improving Algebra I completion is a goal for GEAR UP through Grade 9. Project Objective 1.1 sets a target of 85% Algebra I completion by the end of Grade 9. Because the majority of districts did not meet the Grade 8 target of 30%, many districts will have some extra catching up to do to meet the goal. Districts should consider ensuring that an adequate number of students are enrolled in the course and should consider providing academic supports, such as tutoring and offering extra resources, to ensure that, once enrolled, students successfully complete Algebra I by the end of Grade 9.
- **Sustain increases in Algebra I completion in Grade 8.** Despite missing the target of 30% Algebra I completion by the end of Grade 8, there was a significant increase in completion of Algebra I in GEAR UP districts once the program began. Sustaining the practices that caused the increase could lead to lasting improvements in Algebra I completion that can be observed in future reports by analyzing the results of the follow-on cohorts.
- **Consider Algebra I completion as a factor when selecting comparison districts in future studies.** There was a large amount of variation in Algebra I completion by district for students at both the GEAR UP campuses and in the matched comparison group. Some of these differences in Algebra I completion may have been due to differences in course offerings and not differences in student interest and capacity to succeed in the course. In future studies, consider choosing comparison districts that have similar levels of Algebra I completion to intervention districts in the year prior to intervention.

1. Introduction

It is widely believed that earning a bachelor's degree provides a pathway to financial stability, especially for individuals from economically disadvantaged backgrounds (Lauff & Ingels, 2013; The Pew Charitable Trusts, 2012). However, students from rural schools and schools designated as high poverty continue to be at a disadvantage for entering and completing college. According to a 2020 study from the National Student Clearinghouse Research Center, only 55% of students from high-poverty schools compared to 75% of students from low-poverty schools entered college.² The picture is similar in Texas; although Texans who are classified as economically disadvantaged graduate high school at only slightly lower rates than those who are not classified as economically disadvantaged (87% vs. 93%, respectively; Texas Education Agency [TEA], 2020), a recent cohort analysis conducted by the Texas Higher Education Coordinating Board (THECB; 2020) revealed that only 43% of students classified as economically disadvantaged enrolled in higher education in Texas (compared to 65% of their counterparts).

Once in college, there is only a small chance of students from high-poverty schools completing a four-year degree: nationally, for the high school class of 2013, only 23% of students from high-poverty schools completed college within six years, compared to 60% of students from low-poverty schools (National Student Clearinghouse Research Center, 2020). Students from rural schools are also at a disadvantage compared to their suburban counterparts, completing college at a rate of 41% (vs. 47%). In Texas, the chance of an individual classified as economically disadvantaged graduating from college is alarmingly small: only 14%, compared to 34% of students who are not classified as economically disadvantaged (THECB, 2020).

One reason for both the lower enrollment and graduation rates for students from rural and high-poverty schools is lack of preparation for college coursework. The United States Government Accountability Office has found that high-poverty schools are less likely to offer courses that prepare students for college, such as calculus, physics, and those that can help students earn college credit, such as Advanced Placement and dual credit courses (Nowicki, 2018). Indeed, while in high school, Texas students who were classified as economically disadvantaged were less prepared for college, with only 34% earning college credit in high school, compared to 66% of their counterparts (Texas Public Education Information Resource, 2021).

As a strategy to overcome the college achievement gap for many low-income students, the U.S. Department of Education's (ED) Gaining Early Awareness and Readiness for Undergraduate Programs (GEAR UP) discretionary grant program provides six- or seven-year grants to states to provide services to students in high-poverty middle and high schools and through the first year of postsecondary education. The most recent GEAR UP state grant awarded to TEA in

² "high poverty" = schools with greater than 75% of students classified as economically disadvantaged; "low poverty" = schools with less than 25% of students classified as economically disadvantaged.

2017 provides \$24.5 million over seven years to close the college achievement gap for low-income students in Texas.³

1.1. The Texas GEAR UP: Beyond Grad Program

TEA’s GEAR UP: Beyond Grad grant program (referred to as “GEAR UP” in this report) serves approximately 10,000 students from six Texas independent school districts (ISDs) at 12 schools in West Texas, Southeast Texas, and the Coastal Bend (Table 1.1). Schools selected for GEAR UP were located in rural or semi-rural communities with a high percentage of students who were classified as economically disadvantaged.

Table 1.1. Texas Districts and Schools Participating in GEAR UP

School District	Region	Middle School(s)	High School
Cleveland ISD	Southeast	Cleveland Middle School	Cleveland High School
Culberson County-Allamore ISD	West	Van Horn School	
Education Service Center 19 with San Elizario ISD	West	Ann M. Garcia-Enriquez Middle School	San Elizario High School
Mathis ISD	Coastal Bend	Mathis Middle School	Mathis High School
Sheldon ISD	Southeast	C.E. King Middle School, Michael R. Null Middle School	C.E. King High School
Sinton ISD	Coastal Bend	E. Merle Smith Middle School	Sinton High School

Note. GEAR UP – Gaining Early Awareness and Readiness for Undergraduate Programs. ISD – independent school district.

GEAR UP provides targeted services to a grade-specific **primary cohort** of students who were in Grade 7 during the 2018–19 school year and expected to graduate at the end of Grade 12 in the 2023–24 school year (i.e., the **class of 2024**) through their first year of postsecondary education. Services aimed at both the middle and high school level included targeted academic tutoring, teacher professional development to increase academic rigor, individualized college and career counseling, and workshops/events aimed at students and parents. Middle school students had access to a college and career exploration course and additional support for Algebra I completion in Grade 8.

GEAR UP also provides basic services to a **priority cohort** of students consisting of all other students in Grades 9–12 attending participating high schools in the grantee districts during each year of the seven-year grant (i.e., from school years 2018–19 to 2024–25).

³ For information about TEA’s last GEAR UP state grant, awarded in 2012, please visit <https://tea.texas.gov/reports-and-data/program-evaluations/program-evaluations-middle-school-high-school-and-college-preparation/program-evaluation-middle-school-high-school-and-college-preparation-initiatives>

1.2. Evaluating GEAR UP and Purpose of this Report

In November 2019, TEA contracted with ICF and Agile Analytics to conduct an external, mixed-method evaluation of GEAR UP to measure program impact, implementation, and sustainability, with a focus on identifying best and promising practices and examining statewide reach. This report presents findings from the impact evaluation during the first two program years—school years 2018–19 (Year 1) and 2019–20 (Year 2) (see Appendix B for full methodological details).

It is important to note that the Coronavirus Disease 2019 (COVID-19) pandemic and subsequent March 2020 school closures across the U.S. disrupted all aspects of schooling in the spring semester of Year 2. Normal school operations ceased and academics and other activities, including GEAR UP, largely pivoted to online formats—to the extent possible—for the remainder of the academic year. In addition, spring 2020 assessments, such as the SAT, ACT, and STAAR (State of Texas Assessments of Academic Readiness), were cancelled. Ultimately, these changes had implications for the evaluation team’s planned impact analyses, which are discussed throughout this report.

1.2.1 Evaluation Questions

This report focuses on the following evaluation questions:

- What outcomes are associated with participation in GEAR UP? How do these differ by district?
- How do trends in outcomes for the class of 2024 GEAR UP cohort students differ in comparison to the state average?
- How do trends in outcomes for the class of 2024 GEAR UP cohort students differ in comparison to the students in a matched comparison group created through propensity score matching (PSM)?
- How do trends in outcomes for the class of 2024 students differ from students who attended the same schools one year prior to program implementation (i.e., the class of 2023)?
- How do trajectories of outcomes differ based on the length of time students attended GEAR UP schools? For example, do students who participate in GEAR UP in all grades differ compared to students who enter GEAR UP schools at a later grade level?

In future reports, we hope to answer one additional question:

- Were there lasting positive effects of GEAR UP on outcomes at middle schools one to two years after GEAR UP implementation was completed?⁴

⁴ Because of limited available data, this evaluation question will be explored in future reports.

1.2.2 Evaluation Design: Longitudinal and Quasi-Experimental

The external evaluation is a longitudinal design that spans seven years and follows a cohort model. There are five key cohort groups in the study:

- The **class of 2024 GEAR UP cohort** includes students at the six GEAR UP districts to whom services were provided.
- The **matched comparison cohort** consists of a statistically matched sample of students who are attending similar districts that did not participate in GEAR UP. These students are also from the class of 2024.
- The **retrospective cohort** includes students who attended GEAR UP districts one year prior to the start of the grant (i.e., the class of 2023).
- The two **follow-on cohorts** include students who attended the GEAR UP districts one and two years after implementation (although listed here for illustrative purposes, students in these follow-on cohorts are not included in the analyses in this report). These students are from the classes of 2025 and 2026.

Table 1.2 illustrates the timeline and grade levels associated with the class of 2024 GEAR UP cohort across the grant period compared to the other cohorts of interest. This report focuses on Year 2, when the class of 2024 was in Grade 8 (see orange-shaded boxes).

Table 1.2. GEAR UP Evaluation Timeline: Grade in School by Grant Year by Cohort Group

Cohort Group	Pre-Grant Award 2017–18	Year 1 2018–19	Year 2 2019–20	Year 3 2020–21	Year 4 2021–22	Year 5 2022–23	Year 6 2023–24	Year 7 2024–25
Class of 2024 GEAR UP Cohort	Grade 6	Grade 7	Grade 8	Grade 9	Grade 10	Grade 11	Grade 12	First Year of College
Matched Comparison Cohort	Grade 6	Grade 7	Grade 8	Grade 9	Grade 10	Grade 11	Grade 12	First Year of College
Retrospective Cohort (GEAR UP districts pre-award)	Grade 7	Grade 8	Grade 9	Grade 10	Grade 11	Grade 12	First Year of College	-
Follow-on Cohort 1 (GEAR UP districts)	Grade 5	Grade 6	Grade 7	Grade 8	Grade 9	Grade 10	Grade 11	Grade 12
Follow-on Cohort 2 (GEAR UP districts)	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8	Grade 9	Grade 10	Grade 11

Note. GEAR UP – Gaining Early Awareness and Readiness for Undergraduate Programs. The light orange-shaded boxes represent the grade levels and cohorts that are applicable to the impact analysis presented in this report. Specifically, this report compares the class of 2024 GEAR UP cohort in Grade 8 (in the 2019–20 school year) with two comparison groups: the matched comparison cohort in Grade 8 (in the 2019–20 school year) and the retrospective cohort in Grade 8 (in the 2018–19 school year). Grade 8 data for the two follow-on cohorts were not yet available at the time of report publication.

1.2.3 Cohort Groups

Each of the cohorts included in the impact analysis are described in additional detail in this section.

CLASS OF 2024 GEAR UP COHORT

There were 1,843 students who were included in the sample for the GEAR UP class of 2024 in this report. Table 1.3 provides demographic information about the students in the class of 2024 cohort.

Overall, the majority of students in the sample were Hispanic (80%) and were classified as economically disadvantaged (85%). More than half of the students (63%) were also classified as at risk. One-quarter of the students (25%) were English Learners (ELs). A relatively small number of students in the sample were African American (12%), White (7%) or received services from either Special Education (7%) or the Gifted and Talented Program (7%).

Table 1.3. Class of 2024 GEAR UP Cohort Sample Key Demographics By District

Student Characteristics	Sinton ISD (N=157)	Mathis ISD (N=112)	Cleveland ISD (N=512)	San Elizario ISD (N=262)	Culberson County- Allamore ISD (N=31)	Sheldon ISD (N=769)	All (N=1,843)
Gender							
Male	52%	54%	52%	47%	45%	50%	50%
Race/Ethnicity							
Hispanic	80%	96%	79%	100%	90%	70%	80%
African American	<5%	0%	5%	0%	0%	25%	12%
White	18%	<5%	13%	0%	<20%	4%	7%
Economic Status							
Economically Disadvantaged	66%	82%	90%	94%	77%	84%	85%
Instructional Program or Special Population							
At Risk	52%	65%	48%	69%	39%	73%	63%
English Learners	<5%	<5%	36%	44%	<10%	21%	25%
Special Education	12%	12%	4%	11%	<5%	7%	7%
Gifted and Talented	11%	8%	5%	10%	<5%	6%	7%

Source. Texas Education Agency, Public Education Information Management System (PEIMS), 2018–2020.

Note. Demographic variables are primarily from the fall of Grade 7 (fall 2018). In cases in which the student was missing Grade 7 demographic variables, values from fall of Grade 8 were used (fall 2019). To be included in the cohort, students must have been present on snapshot day in the fall of Grade 8 (fall 2019) and must have had information for all student characteristic variables and Grade 6 STAAR-Reading and STAAR-Mathematics. ISD – Independent School District. GEAR UP – Gaining Early Awareness and Readiness for Undergraduate Programs. Cell counts of $n < 5$ are masked.

MATCHED COMPARISON COHORT

To understand if participation in the GEAR UP intervention was associated with changes in outcomes, a group of similar students from similar districts as the GEAR UP campuses was created. Students were selected for the matched comparison group using PSM, which

constructs pairs of study subjects based on a series of observable variables. In this study, the variables matched were demographics (e.g., race/ethnicity, gender, economic status) and baseline academic achievement (i.e., STAAR-Reading and STAAR-Mathematics from the year prior to intervention). Almost all (93%) students in the class of 2024 GEAR UP cohort sample were matched for a final analytic sample size of 1,708 students. (See Appendix B for details on the PSM process and Table C.1, Appendix C, for matching rates by district.)

As demonstrated in Table 1.4, the matched cohorts were statistically identical after the PSM. Because the groups were identical on all available demographic and pre-intervention variables, differences in outcomes in Grade 8 could be reasonably attributed to participation in GEAR UP.

Table 1.4. Class of 2024 GEAR UP Cohort and Matched Comparison Cohort Key Demographics for Propensity Score Matched Students

Student Characteristic	Class of 2024 GEAR UP (n=1,708)	Matched Comparison (n=1,708)	sig	ES
Gender				
Male	51%	51%	ns	0.00
Race/Ethnicity				
Hispanic	82%	82%	ns	0.00
African American	12%	12%	ns	0.00
White	6%	6%	ns	0.00
Economic Status				
Economically Disadvantaged	87%	87%	ns	0.00
Instructional Program or Special Population				
At Risk	64%	64%	ns	0.00
English Learners	27%	27%	ns	0.00
Special Education	7%	7%	ns	0.00
Gifted and Talented	5%	5%	ns	0.00
STAAR Grade 6 Scale Score				
Mathematics	1595	1599	ns	0.04
Reading	1530	1529	ns	0.01

Source. Texas Education Agency, Public Education Information Management System (PEIMS), 2018–2020.

Note. Demographic variables are generally from the fall of Grade 7 (fall 2018). In cases where the student was missing demographic variables, they were added from the fall of Grade 8 (fall 2019). Asterisks indicate the level of statistical significance for χ^2 analyses (sig): * < 5%, ** < 1%, *** < 0.1%; ns indicates non-significant finding. ES indicates the effect size of the difference (using Hedge's g or Cox's index for dichotomous variables). GEAR UP – Gaining Early Awareness and Readiness for Undergraduate Programs. STAAR – State of Texas Assessment of Academic Readiness.

RETROSPECTIVE COHORT

The retrospective cohort includes students who attended GEAR UP districts one year prior to the district receiving the GEAR UP grant (i.e., the class of 2023). For example, the class of 2024 students were in Grade 7 in 2018–19 and retrospective cohort students were in Grade 8.

Analyses of differences between cohorts revealed that the demographic composition of districts had changed slightly over time (see Table 1.5). First, there were significantly more students who were classified as economically disadvantaged in the class of 2024 (85%) compared to the retrospective cohort (82%). Second, there were slightly more African American students and slightly fewer White students in the class of 2024 compared to the retrospective cohort and slightly fewer students who received special education services in the class of 2024 than the

retrospective cohort. The presence of these differences (all with effect sizes of greater than 0.05) means that statistical models that control for student characteristics will be more reliable in assessing the true impact of GEAR UP than statistical tests that merely compare means.

Table 1.5. Class of 2024 GEAR UP Cohort and Retrospective Cohort Key Demographics

Student Characteristic	Class of 2024 GEAR UP (n=1,843)	Retrospective (n=1,735)	sig	ES
Gender				
Male	50%	51%	ns	0.02
Race/Ethnicity				
Hispanic	80%	79%	ns	0.04
African American	12%	11%	ns	0.06
White	7%	8%	ns	0.09
Economic Status				
Economically Disadvantaged	85%	82%	*	0.13
Instructional Program or Special Population				
At Risk	62%	64%	ns	0.05
English Learners	26%	26%	ns	0.00
Special Education	8%	9%	ns	0.08
Gifted and Talented	7%	7%	ns	0.00
STAAR Grade 6 Scale Score				
Mathematics	1602	1597	ns	0.04
Reading	1537	1537	ns	0.02

Source. Texas Education Agency, Public Education Information Management System (PEIMS), 2017–2020.
Note. GEAR UP – Gaining Early Awareness and Readiness for Undergraduate Programs. STAAR – State of Texas Assessment of Academic Readiness. There were 5 students included in both the class of 2024 and the retrospective cohort groups. These students, originally in the retrospective cohort, were not promoted on time and thus became part of the class of 2024 cohort. Demographic variables are generally from the fall of Grade 7 (fall 2017 or 2018). In cases in which the student was missing demographic variables, they were added from the fall of Grade 8 (fall 2018 or 2019). Asterisks indicate the level of statistical significance for χ^2 analyses (sig): * < 5%, ** < 1%, *** < 0.1%; ns indicates non-significant finding. ES indicates the effect size of the difference (using Hedge's g or Cox's index for dichotomous variables). Characteristics with ES > 0.05 (i.e., Race/Ethnicity: African American, White; Economic Status; Instructional Program: Special Education) indicate baseline inequivalence between groups.

1.3. Report Overview

In the next chapter, analyses of student outcomes are reported. Descriptive statistics associated with each of the outcomes are first provided as a foundation for the analyses that follow. Next, findings regarding outcomes in the class of 2024 GEAR UP cohort are compared to those from the matched comparison and retrospective cohorts. Finally, the number of years in the class of 2024 GEAR UP cohort as a predictive factor for better outcomes is analyzed.

The outcomes examined in the next chapter are limited to Algebra I completion by the end of Grade 8 and promotion from Grade 8 to Grade 9. It was intended that this evaluation would also

examine results on the Grade 8 STAAR assessment in mathematics, reading, and science. However, due to the COVID-19 pandemic, STAAR was not administered in the spring of 2020, limiting the scope of this report.

Additional details about the methodology accompany each of the various models in the main text; Appendix B provides more details on analyses, including cohort construction and statistical methodology. Findings in this report may differ from the annual project outcomes reports due to differences in data availability and cohort processing rules. Appendix C provides tables with additional details on the findings reported as referenced throughout the chapter.

A summary of findings is presented in Chapter 3, along with conclusions, a discussion of limitations, and recommendations.

2. Student Outcomes

The overall goals of the federal GEAR UP program are improved college readiness and increased postsecondary education enrollment (see Appendix A.2 for a list of the Texas GEAR UP: Beyond Grad project goals and objectives). This chapter focuses on two Grade 8 outcomes: Algebra I completion by the end of Grade 8 and promotion from Grade 8 to Grade 9. First, overall means and variations by district for the class of 2024 are described. Then, differences between student outcomes and cohort are analyzed. Finally, the impact of the length of time students spent in the cohort is examined.

2.1. Analysis Overview

To assess the impact of GEAR UP on Grade 8 outcomes, a series of analyses were conducted in a stepwise fashion. Following is a high-level overview of the content of each of the following sections in this chapter.

- Section 2.2, Student Outcomes by District, describes each outcome and provides a rationale for why the outcome was examined and how data were selected for the outcome. It also presents the results for the outcome by district for students in the class of 2024 GEAR UP cohort.
- Section 2.3, Student Outcomes by Cohort, compares each outcome (i.e., Algebra I completion by the end of Grade 8, promotion from Grade 8 to Grade 9) for the class of 2024 GEAR UP cohort to the matched comparison and retrospective cohorts in turn. Each sub-section is arranged as follows:
 - General descriptive data (e.g., means) and basic statistical comparisons between groups (i.e., chi-square tests). These basic descriptive statistics provide a context for the subsequent analyses.
 - Statistical models. Each statistical model contains variables representing district, student characteristics, and prior academic performance (i.e., Grade 6 STAAR-Reading Scale Score) to help determine which outcomes were affected by program participation or are better explained by considering known aspects of the students.
- Section 2.4, Length of Time in Cohort, examines the effect of participation in GEAR UP for two years (i.e., in both Grades 7 and 8) to participation for only one year (i.e., Grade 8).

2.2. Student Outcomes by District

In this section, Grade 8 student outcomes by district are examined. Participating districts are identified by a number to mask the district and maintain confidentiality.

2.2.1 Algebra I Completion

Project Objective 1.1 states that, by the end of Grade 8, at least 30% of cohort students will have completed Algebra I. According to the Annual Implementation Report for Years 1 and 2 (Spinney et al., 2021), to accomplish this objective, districts made changes in the middle school

master schedule, encouraged students to take Algebra I in Grade 8, provided academic support for students in the course, and delivered targeted tutoring to students who received a failing grade on a progress report. As can be seen in Table 2.1, 22% of students in the class of 2024 GEAR UP cohort completed Algebra I by the end of Grade 8.

Results varied by district. Two of the districts—District 2 and District 5—met the 30% completion goal with completion rates of 31% and 67%, respectively. District 4’s completion rate was close to the goal (25%). Districts 3 and 6 had the lowest levels of completion, at 13% and 17%, respectively. Finally, District 1 did not submit course completion data to TEA for any of its middle school courses, so Algebra I completion for this district is unknown.

Table 2.1. Algebra I Completion by the End of Grade 8 for Class of 2024 GEAR UP Cohort by District

	District 1	District 2	District 3	District 4	District 5	District 6	All
Algebra I Completed by the End of Grade 8	NA	31%	13%	25%	67%	17%	22%

Source. Texas Education Agency, Public Education Information Management System (PEIMS), 2019–2020.

Note. GEAR UP – Gaining Early Awareness and Readiness for Undergraduate Programs. There is no outcome listed for Algebra I for District 1. This district did not provide course completion data to TEA for Algebra I for the 2019–20 school year. Algebra I completers were defined as students who received credit for Algebra I by Grade 8. The set of non-completers includes both students who did not take Algebra I and those who took Algebra I but did not receive credit. NA indicates not applicable.

2.2.2 On-Time Promotion

Project Objective 4.2 states that by the end of the project’s second year (i.e., between Grade 8 and Grade 9), the on-time promotion rate of class of 2024 cohort students will exceed the state average. Students who were enrolled in Grade 8 as of the fall snapshot (2019–20 for the class of 2024 GEAR UP cohort) and in Grade 9 or Grade 10 in the fall snapshot of the subsequent year were considered to have been promoted on time.⁵

On-time promotion from Grade 8 to Grade 9 was almost 100% for the class of 2024 GEAR UP cohort in all districts (See Table 2.2). This rate exceeded the state average of 99.5% (TEA, 2020).

Table 2.2. On-time Promotion from Grade 8 to Grade 9 for Class of 2024 GEAR UP Cohort by District

	District 1	District 2	District 3	District 4	District 5	District 6	All
Promotion from Grade 8 to Grade 9	>99%	100%	100%	100%	100%	100%	100%

Source. Texas Education Agency, Public Education Information Management System (PEIMS), 2019–2020.

Note. GEAR UP – Gaining Early Awareness and Readiness for Undergraduate Programs. Promotion was determined by examining the grade in which class of 2024 GEAR UP cohort students were enrolled in fall 2021. Students who were still enrolled in Grade 8 were classified as being retained, while students enrolled in Grade 9 or 10 were classified as being promoted on-time.

⁵ Fall snapshot is taken on the last Friday in October. On this day, data are collected for student enrollment across the state of Texas.

2.2.3 Section Summary

In this section, outcomes for Algebra I completion and on-time promotion were described. Key findings:

- The target of 30% Algebra I completion by the end of Grade 8 was not met. Twenty-two percent (22%) of class of 2024 GEAR UP cohort students completed Algebra I by Grade 8.
- Algebra I completion by the end of Grade 8 varied greatly by district, ranging from 13% to 67% for the five districts that reported completion data.
- Almost 100% of students were promoted on time from Grade 8 to Grade 9. There was no variation among districts.

2.3. Student Outcomes by Cohort

In this section, outcomes by cohort are examined.

2.3.1 Algebra I Completion by the End of Grade 8

This section provides analyses for Algebra I completion by the end of Grade 8. As noted in the previous section, there was one district that was missing data for this outcome; removing this district caused some changes to the analytic samples that are discussed below.

MATCHED COMPARISON COHORT

Initial analyses revealed that there were no significant differences in Algebra I completion by the end of Grade 8 for the PSM-matched class of 2024 GEAR UP and comparison groups. Completion rates were 21% and 22%, respectively. However, to account for the missing data from District 1, all District 1 matches were removed from the matched comparison cohort. See Table C.2, Appendix C, for information on the new analytic sample for the PSM-matched cohort.

In the new matched group, one prior achievement variable, Grade 6 STAAR-Mathematics, showed imbalance with an effect size of more than 0.05. Students in the matched comparison cohort had slightly higher scale scores on Grade 6 STAAR-Mathematics than students in the PSM-matched class of 2024 GEAR UP cohort ($g = 0.07$). The presence of this difference meant that understanding the true difference between the groups could only be accomplished via a statistical model controlling for this variable.

Because of the sufficient number of and variation between matched comparison districts, covariate multilevel models (MLMs) were conducted to control for district, prior performance on STAAR, and student characteristics (see Appendix B for details). In these models, there was no effect of cohort group on Algebra I completion; that is, Algebra I completion was the same for both the class of 2024 GEAR UP cohort and the matched comparison cohort. (See Table C.3, Appendix C.)

Students' prior performance on STAAR was a strong predictor of Algebra I completion in Grade 8. Those who had higher scale scores on STAAR-Reading and STAAR-Mathematics in Grade 6 were more likely to complete the course than students with lower scale scores. Additionally, male students, African American students, students in Special Education, ELs, and students not

identified as Gifted and Talented were less likely than their counterparts to complete Algebra I by Grade 8.

RETROSPECTIVE COHORT

Fifteen percent of retrospective cohort students completed Algebra I by Grade 8, compared to 22% of class of 2024 GEAR UP cohort students. While District 1 did report course completion data to TEA for the retrospective cohort, because District 1 students for the class of 2024 cohort were removed from the sample due to missing data, completion data for the retrospective cohort's District 1 students were also removed. See Table C.4 for information on the new analytic sample. Similar to the prior analytic sample for the retrospective cohort analyses (Table 1.5), there were several student characteristic differences with effect sizes of greater than 0.05. There were fewer White students, students classified as at risk, students receiving Special Education services, students identified as Gifted and Talented, and more students who were classified as economically disadvantaged in the class of 2024 GEAR UP cohort than the retrospective cohort. Because of these extant differences in groups in the analytic sample, results from statistical models controlling for these unbalanced covariates are more reliable than those from tests that compare means.

As with the class of 2024 GEAR UP cohort, completion of Algebra I for the retrospective cohort varied greatly by district (see Table 2.3). An examination of the completion percentages for each district indicates that three of the six districts (Districts 2, 5, and 6) significantly increased their Algebra I completion rates, two districts had no or little change (Districts 3 and 4), and one district's changes are unknown due to missing data (District 1).

Table 2.3. Algebra I Completion by the End of Grade 8: Comparison by District for Class of 2024 GEAR UP and Retrospective Cohorts

Cohort	District 1	District 2	District 3	District 4	District 5	District 6	All
Class of 2024 GEAR UP	NA	31%	13%	25%	66%	17%	22%
Retrospective	0%	18%	14%	24%	0%	1%	18%
Sig	NA	*	ns	ns	***	***	**

Source. Texas Education Agency, Public Education Information Management System (PEIMS), 2018–2020.

Note. GEAR UP – Gaining Early Awareness and Readiness for Undergraduate Programs. District 1 was missing data for the class of 2024 GEAR UP cohort. The retrospective cohort's data are shown here for reference; however, this district was removed from all subsequent analyses. The percentage in "All" reflects the removal of the district.

Asterisks indicate the level of statistical significance ("sig"): * < 5%, ** < 1%, *** < 0.1%; ns indicates non-significant finding. NA indicates not applicable.

Next, a logistic regression analysis was conducted to control for district, prior performance on STAAR, and student characteristics (see Appendix B for details). The model used for the retrospective cohort was simpler than the model used to examine the outcome for the matched comparison cohort because there were a small number of districts and because the districts for the two cohort groups were the same. In the model, cohort group was a strong predictor of Algebra I completion. Students in the class of 2024 GEAR UP cohort were more likely to complete Algebra I by Grade 8 than students in the retrospective cohort, even after prior STAAR performance and demographic characteristics were accounted for (see Table 2.4). In fact, class of 2024 GEAR UP cohort students were about twice as likely to complete Algebra I than

students in the retrospective cohort, once district, prior performance, and demographic characteristics were controlled ($OR = 1.92, p < .001$).

Table 2.4. Algebra I Completion by the End of Grade 8: Class of 2024 GEAR UP Cohort versus Retrospective Cohort

Initial Group Differences in Algebra I Completion by the End of Grade 8						
Cohort Percentages		Number in Sample		Test Results		
Class of 2024	Retrospective	Class of 2024	Retrospective	χ^2	sig	ES
22%	18%	1,581	1,484	9.0	**	0.15
Logistic Regression Model						
Variable	B	SE	Z	Sig	OR ^a	
Intercept	0.48	0.68	0.70	ns		
Group						
Group (class of 2024 vs. retrospective cohort)	0.65	0.13	5.19	***	1.92	
Grade 6 STAAR						
Mathematics Scale Score (z-score)	1.65	0.10	16.32	***		
Reading Scale Score (z-score)	0.38	0.09	4.21	***		
Gender						
Male	-0.46	0.13	-3.64	***	0.63 (1.58)	
Race/Ethnicity						
Hispanic	0.32	0.56	0.58	ns		
African American	0.09	0.58	0.16	ns		
White	0.58	0.59	0.98	ns		
Economic Status						
Economically Disadvantaged	-0.16	0.15	-1.06	ns		
Instructional Program or Special Population						
At Risk	-0.22	0.15	-1.45	ns		
English Learner	-0.28	0.22	-1.24	ns		
Special Education	-0.89	0.47	-1.88	ns		
Gifted and Talented	1.17	0.22	5.21	***	3.22	
Residual Deviance	Null Deviance	R squared	Number of students	Number of districts		
1,752	3,010	0.58	2,978	5		

Source. Texas Education Agency, Public Education Information Management System (PEIMS), 2017–2020; Texas Education Agency, State of Texas Assessments of Academic Readiness (STAAR), 2016–2018.

Note. GEAR UP – Gaining Early Awareness and Readiness for Undergraduate Programs. STAAR – State of Texas Assessment of Academic Readiness. The reference categories in the model are retrospective cohort, female, other race/ethnicity, not Economically Disadvantaged, not at risk, non-EL, non-Special Education, non-Gifted And Talented. Asterisks indicate the level of statistical significance (“sig”): * < 5%, ** < 1%, *** < 0.1%; ns indicates non-significant finding. NA indicates not applicable. ES indicates the effect size of the difference (using Cox’s index for dichotomous variables). Students from District 1 were excluded from the analysis. District attended was also included in the model; to save space, the model coefficients from the individual districts are not included in the table above.

^a For ease of interpretation, odds ratios (OR) of less than one have been transformed to reflect the odds of the non-reference group, calculated as 1/odds ratio of the reference group. This reversed odds ratio is presented in parentheses. Odds ratios are only presented for significant categorical variables.

Students’ prior performance on STAAR was a strong predictor of Algebra I completion in Grade 8. Students who had higher scale scores on STAAR-Reading and STAAR-Mathematics in Grade 6 were more likely to complete the course than students with lower scale scores.

Additionally, female students and students identified as Gifted and Talented were more likely than their counterparts to complete Algebra I by Grade 8.

2.3.2 Promotion from Grade 8 to Grade 9

As noted in the previous section, almost 100% of students in the class of 2024 GEAR UP cohort were promoted on time. Because of the lack of variance in the data, we were unable to create valid covariate logistic regression models for this outcome, so results are only reported for comparisons of means.

Matched Comparison Cohort. In the matched comparison cohort, almost 100% of students were promoted on-time from Grade 8 to Grade 9. There were no statistical differences between groups.

Retrospective Cohort. In the retrospective cohort, similar to the class of 2024 GEAR UP cohort, almost 100% of students were promoted on-time from Grade 8 to Grade 9. There were no statistical differences between groups.

2.3.3 Section Summary

In this section, comparisons of outcomes for Algebra I completion and on-time promotion between cohorts were discussed.

Key findings:

- There were key characteristic differences between groups in the final analytic samples that required the use of statistical models to account for these differences while estimating the relationship of group membership with the outcome of interest.
- In the models, group was not a significant predictor of Algebra I completion for the class of 2024 GEAR UP and matched comparison group comparison. However, it was a strong predictor of Algebra I completion for the class of 2024 GEAR UP and retrospective cohort comparison. In fact, class of 2024 GEAR UP cohort students were about twice as likely to complete Algebra I by Grade 8 than students in the retrospective cohort once district, prior performance on STAAR, and demographics were taken into account.
- Almost all students (~100%) were promoted from Grade 8 to Grade 9 on time across all three cohorts. There were no differences between groups.

2.4. Length of Time in Cohort

Next, the impact of participation in GEAR UP was estimated by looking at the number of years students had been enrolled in a GEAR UP campus. In general, it was anticipated that students who participated in GEAR UP in both Grades 7 and 8 would have better student outcomes than students who participated only in Grade 8. That is, more exposure to GEAR UP programming should be associated with better outcomes.

2.4.1 Algebra I Completion

The vast majority of students in the sample (90%) had attended a GEAR UP campus in both Grade 7 and 8. Attending in both grade levels appears to have been advantageous: Students

who attended in both Grade 7 and 8 were more than twice as likely (22%) to complete Algebra I than students who had only attended for one year (9%). These differences persisted in the logistic regression model ($OR = 3.86, p < .001$). Additional predictors of Algebra I completion included Grade 6 STAAR-Mathematics and Reading scale scores, at-risk status, and Special Education status. See Table 2.5 for details. Students who had higher STAAR-Mathematics and Reading scale scores were more likely to finish Algebra I by Grade 8. Students who were classified as at risk or who were eligible to receive Special Education services were less likely to complete the course.

Table 2.5. Algebra I Completion by the End of Grade 8 by Length of Time in Cohort

Initial Group Differences in Algebra I Completion by the End of Grade 8						
Length of Time in Cohort		Number in Sample		Test Results		
1 year	2 years	1 year	2 years	χ^2	sig	ES
9%	22%	158	1,504	15.5	***	0.32
Logistic Regression Model						
Variable	B	SE	Z	Sig	OR ^a	
Intercept	-4.87	0.97	-5.03	***		
Length of Time in Cohort						
Both Grade 7 & 8 (vs. Grade 8 only)	1.35	0.35	3.87	***	3.86	
Grade 6 STAAR						
Mathematics Scale Score (z-score)	1.58	0.13	12.22	***		
Reading Scale Score (z-score)	0.37	0.11	3.21	***		
Gender						
Male	-0.26	0.16	-1.60	ns		
Race/Ethnicity						
Hispanic	0.48	0.64	0.75	ns		
African American	0.01	0.67	0.02	ns		
White	0.69	0.69	1.00	ns		
Economic Status						
Economically Disadvantaged	-0.23	0.22	-1.03	ns		
Instructional Program or Special Population						
At Risk	-0.43	0.20	-2.16	*	0.65 (1.53)	
English Learner	0.01	0.28	0.03	ns		
Special Education	-1.21	0.57	-2.14	*	0.30 (3.35)	
Gifted and Talented	0.55	0.30	1.84	ns		
Residual Deviance	Null Deviance	R squared	Number of students	Number of districts		
1,024	1708	0.40	1,662	5		

Source. Texas Education Agency, Public Education Information Management System (PEIMS), 2018–2020; Texas Education Agency, State of Texas Assessments of Academic Readiness (STAAR), 2017–2018.

Note. STAAR – State of Texas Assessment of Academic Readiness; The reference categories in the model are retrospective cohort, female, other race/ethnicity, not Economically Disadvantaged, not at risk, non-EL, non-Special Education, non-Gifted And Talented. Asterisks indicate the level of statistical significance (“sig”): * < 5%, ** < 1%, *** < 0.1%; ns indicates non-significant finding. ES indicates the effect size of the difference (using Cox’s index for dichotomous variables). Students from District 1 were excluded from the analysis. District attended was also included in the model (there were 6 districts in total). To save space, the model coefficients from the individual districts are not included in the table above.

^a For ease of interpretation, odds ratios (OR) of less than one have been transformed to reflect the odds of the non-reference group, calculated as 1/odds ratio of the reference group. This reversed odds ratio is presented in parentheses. Odds ratios are only presented for significant categorical variables.

2.4.2 Promotion from Grade 8 to Grade 9

Because there was little variation in this outcome (almost 100% of students were promoted on time), analysis of promotion levels by length of time in cohort was not possible.

2.4.3 Section Summary

Length of time in cohort was a strong predictor of Algebra I completion by the end of Grade 8.

Key findings:

- More than twice as many students who had participated in GEAR UP for two years completed Algebra I in Grade 8 than those who had only participated in their Grade 8 year.
- In the covariate logistic regression, once prior performance, district, and student characteristics were taken into account, students who had participated in GEAR UP in both Grade 7 and 8 were predicted to complete the course at almost four times the rate of students who joined the cohort in Grade 8.

3. Summary and Conclusion

In this section, we report the key findings from the impact evaluation, discuss limitations, and make recommendations for future work.

3.1. Key Findings

3.1.1 Algebra I Completion

A primary objective for the GEAR UP program in the middle school years was to increase Algebra I completion by the end of Grade 8. Project Objective 1.1 sets the target for Algebra I completion by the end of Grade 8 at 30%. GEAR UP districts made progress toward this goal, increasing the percentage of students completing Algebra I from 18% (class of 2023) to 22% (class of 2024). Statistical models indicated that students who participated in GEAR UP were almost twice as likely as students in the retrospective cohort to complete Algebra I, once covariates like district, prior achievement on STAAR, and student characteristics were included in the models. Additionally, students who participated in the program for two years completed Algebra I at twice the rate as students who participated only one year. However, when examining the results comparing a sample of the class of 2024 GEAR UP cohort students to a PSM-matched comparison sample, there were no differences between groups in the MLMs.

3.1.2 On-Time Promotion

On-time promotion rates from Grade 8 to Grade 9 were almost 100% for the class of 2024 GEAR UP cohort, exceeding the state average of 99.5%. These rates were similar for students in the matched comparison and retrospective cohorts. With rates near 100% for all groups, statistical analyses could not be conducted.

3.2. Limitations

There were several important limitations in the study. The first and largest limitation was in the availability and reliability of outcome data due to the COVID-19 pandemic. Because the COVID-19 pandemic forced districts to close for a time, and then resume services virtually, the annual STAAR assessments were cancelled for 2020. The STAAR assessment provides reliable statewide information on student academic achievement, and without it, the number of outcomes that could be explored was limited. Additionally, there may be missing data among the outcomes that were able to be collected. For example, one district in the class of 2024 GEAR UP cohort did not submit middle school course completion data in spring 2020, and thus Algebra I completion data were not available.

Second, the design of the study is a quasi-experimental design, which cannot prove causality. That is, even when analyses are carefully controlled, it is not possible to state with certainty that participation in GEAR UP actually caused any observed differences between cohorts. That is, it can only be said that GEAR UP implementation was *associated* (or not) with differences in outcomes, and not that the program *caused* the changes.

Third, the districts for the matched comparison cohort were carefully selected to be as similar as possible to the GEAR UP districts. However, they were not selected based on prior Algebra I

completion levels for Grade 8 students. It is possible that the comparison districts had higher levels of Grade 8 Algebra I completion in the years prior to the analysis due to other districtwide programs, policies, and initiatives. There was a large level of variation by district for this outcome.

Fourth, some of the observed differences in Algebra I completion may have been due to differences in course offerings and not differences in student interest and capacity to succeed in the course. In the retrospective cohort, for example, several of the districts had near 0% completion of Algebra I in prior years, which may indicate that the course was not available for students to take. The increase in Algebra I completion by the end of Grade 8 may be solely due to increased opportunities to take the course rather than improved supports and motivation for GEAR UP students in the class of 2024.

Fifth, for purposes of this study, students were considered to be a part of the class of 2024 GEAR UP cohort if they were enrolled in a GEAR UP district during fall snapshot in Grade 8. They were not required to have received services to be a part of the cohort. Additionally, all students from the retrospective cohort who were retained in grade became part of the class of 2024 GEAR UP cohort. Therefore, this study may underestimate the magnitude of effects favoring the class of 2024 GEAR UP cohort.

Sixth, length of time in cohort was found to be significantly positively related to Algebra I completion in Grade 8. However, students who participated only in Grade 8 may have differed from their counterparts in important ways. For example, students who moved between Grade 7 and 8 may have had family members with job changes or other disruptions that may have affected their ability to succeed in school. In addition, enrolling in Algebra I often occurs at the end of Grade 7. If students were not in a GEAR UP campus in Grade 7, they may not have received encouragement to enroll in the course.

Finally, this report focuses on short-term outcomes that are very specific and measurable. Predictors used in the analyses were also measurable (e.g., gender, economic status). Other variables that may also have an impact on outcomes may not be measurable, such as student motivation and family structure. Some of the GEAR UP activities that occurred in Grade 7 and 8 may not be associated with outcomes to date but may eventually be associated with the longer-term goals of the program including enrolling in and attending a postsecondary educational institution.

3.3. Recommendations

Improving Algebra I completion is a goal for GEAR UP through Grade 9. Project Objective 1.1 sets a target of 85% Algebra I completion by the end of Grade 9. Because the majority of districts did not meet the Grade 8 target of 30%, many districts will have some extra catching up to do to meet the goal. Districts should consider ensuring that an adequate number of students are enrolled in the course and should consider providing academic supports, such as tutoring and offering extra resources, to ensure that, once enrolled, students successfully complete Algebra I by Grade 9.

Despite missing the target of 30% Algebra I completion by the end of Grade 8, there was a significant increase in completion of Algebra I in GEAR UP districts once the program began.

Sustaining the practices that caused this increase could lead to lasting improvements in Algebra I completion that can be observed in future reports by analyzing the results of the follow-on cohorts.

There was a large amount of variation in Algebra I completion by district for students at both the GEAR UP campuses and in the matched comparison group. Some of these differences in Algebra I completion may have been due to differences in course offerings and not differences in student interest and capacity to succeed in the course. In future studies, researchers may consider choosing comparison districts that have similar levels of Algebra I completion to intervention districts in the year prior to intervention.

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APPENDIX A: GEAR UP: Beyond Grad Strategies and Project Goals and Objectives

A.1. GEAR UP: Beyond Grad Strategies

The core strategies conceptualized in the Gaining Early Awareness and Readiness for Undergraduate Programs (GEAR UP): Beyond Grad program to close the college achievement gap are as follows:

- 1) Increasing academic rigor by facilitating an increase in access to, perceived value of, and student success in academically rigorous courses through extensive professional development for teachers, counselors, and administrators and targeted tutoring for students;
- 2) Preparing middle school students by empowering them with pathway information early on, through individualized college and career advising in middle school and adoption of a high-quality, Texas Essential Knowledge and Skills (TEKS)-aligned career exploration course;
- 3) Expanding college and career advising and resources for high school students by mitigating the effects of high student-to-counselor ratios and providing robust, individualized college and career advising through the adoption of a college and career readiness advising model in GEAR UP: Beyond Grad;
- 4) Leveraging technology by expanding advisor capacity and amplifying high-quality resources through the adoption of targeted, user-centered technology tools for advisors, counselors, administrators, students, and parents; and
- 5) Developing local alliances by establishing or expanding existing alliances with business, higher education, and community partners that support student achievement and offer opportunities for career exploration.

A.2. Project Goals and Objectives

The Texas Education Agency (TEA) established the following goals and objectives for GEAR UP:

Project Goal 1: Increase access to rigorous courses in order to reduce the need for remediation

- ▶ Objective 1.1: By the end of the class of 2024's second year (Grade 8), 30% of class of 2024 students will complete Algebra I. By the end of the class of 2024's third year (Grade 9), 85% of class of 2024 students will complete Algebra I.⁶

⁶ The goals and objectives originally referred to the class of 2024 as the "primary cohort." These have been edited here to use "class of 2024" for consistency with the rest of the report and to clearly distinguish this cohort from the priority cohort.

- ▶ Objective 1.2: By the end of the class of 2024's fifth year (Grade 11), 60% of class of 2024 students will complete a Pre-Advanced Placement (AP), Pre-International Baccalaureate (IB), AP, or IB course.
- ▶ Objective 1.3: Each year, 90% of class of 2024 students who receive a failing grade on a progress report will receive targeted academic tutoring.

Project Goal 2: Graduating prepared for college and career

- ▶ Objective 2.1: By the end of the project's sixth year, 60% of class of 2024 students will be eligible to earn college credit through achievement of a passing score on the AP exam, IB exam, or completion of a rigorous dual credit course.
- ▶ Objective 2.2: By the end of the project's sixth year, the percentage of class of 2024 students graduating on the Foundation High School Program with an endorsement and/or receiving the Distinguished Level of Achievement will meet or exceed the baseline state average.

Project Goal 3: Provide educator training and professional development for rigorous academic programs

- ▶ Objective 3.1: Each year, 50% of high school core content teachers will participate in professional development that supports a rigorous curriculum (e.g., project-based learning, advanced instructional strategies, teacher externships, student engagement, etc.).
- ▶ Objective 3.2: Each year, teams of educators and administrators (middle school, high school, and institutions of higher education) will complete at least five days of vertical teaming in order to align curriculum and reduce the need for remediation at the postsecondary level.
- ▶ Objective 3.3: Each year, 20% of high school class of 2024 core content teachers will participate in at least three individualized educator coaching and/or mentoring sessions.
- ▶ Objective 3.4: By the end of the project's second year, all high school counselors will complete training in college and career advising.

Project Goal 4: Increase high school graduation

- ▶ Objective 4.1: The class of 2024 completion rate will meet or exceed the baseline state average completion rate.
- ▶ Objective 4.2: At the end of the class of 2024's second year (Grade 8), the on-time promotion rate will exceed the baseline state average promotion rate.

Project Goal 5: Support participation in postsecondary education and career preparation

- ▶ Objective 5.1: Each year, 85% of tenth graders will take the Preliminary SAT (PSAT) or ACT Aspire exam. Each year, 85% of eleventh graders will take the SAT or ACT exam.
- ▶ Objective 5.2: By the end of the class of 2024's sixth year (Grade 12), 50% of class of 2024 students will meet the college readiness criterion on the SAT, ACT, or the Texas Success Initiative Assessment.

- ▶ Objective 5.3: At least 60% of class of 2024 students will enroll in postsecondary education in the fall after high school graduation.
- ▶ Objective 5.4: At least 60% of class of 2024 students who enroll in postsecondary education will place into college-level courses without the need for remediation.
- ▶ Objective 5.5: The number of class of 2024 students who complete the first year of college will meet or exceed the baseline district average.

Project Goal 6: Provide postsecondary and career preparation information to students and families

- ▶ Objective 6.1: Each year in ninth grade, students will receive information about the school's high-quality pathways and programs of study that align to postsecondary programs and high-demand careers available to them.
- ▶ Objective 6.2: Each year, students and parents will receive information about postsecondary and career options, preparation, and financing.
- ▶ Objective 6.3: Each year, 90% of class of 2024 students will receive at least one comprehensive, individualized college and career counseling session.
- ▶ Objective 6.4: By the end of the third year, 50% of class of 2024 parents will receive at least one individualized college and career counseling session.
- ▶ Objective 6.5: Each year, class of 2024 parent attendance at Texas GEAR UP events and services will increase.

Project Goal 7: Increase educational expectations for and awareness about postsecondary and career options

- ▶ Objective 7.1: Each year, 75% of class of 2024 students will attend at least one college visit.
- ▶ Objective 7.2: By the end of the class of 2024's sixth year (Grade 12), 85% of class of 2024 students will complete the Free Application for Federal Student Aid (FAFSA).
- ▶ Objective 7.3: By the end of the class of 2024's sixth year (Grade 12), 85% of class of 2024 students will complete at least two college applications.
- ▶ Objective 7.4: Each year, 30% of class of 2024 students will attend a summer program (academic acceleration, enrichment, college exploration, etc.).
- ▶ Objective 7.5: Each year, 30% of class of 2024 and priority cohort students will participate in a work-based learning opportunity.

Project Goal 8: Build and expand community partnerships

- ▶ Objective 8.1: All participating districts will form business alliances that support higher student achievement and offer opportunities for career exploration.
- ▶ Objective 8.2: All participating districts will form alliances with governmental entities and community groups to enhance the information available to students regarding high school pathways, scholarships, financial aid, and college awareness.

Project Goal 9: Enhance statewide college and career readiness

- ▶ Objective 9.1: Each year, tri-agency partners (TEA, Texas Higher Education Coordinating Board, and Texas Workforce Commission) will convene quarterly to ensure alignment of statewide initiatives around college and career readiness.
- ▶ Objective 9.2: By the end of the project's fourth year, class of 2024 and priority cohort students will have access to a student-focused online resource to assist them in making informed decisions about their education and career pathway options.
- ▶ Objective 9.3: Annually increase the number of educators, counselors, and community members that complete specialized college and career readiness training.

APPENDIX B: Evaluation Design, Methods, and Analytics

The Gaining Early Awareness and Readiness for Undergraduate Programs (GEAR UP) evaluation is designed to produce credible, timely, and actionable information to support successful implementation, inform project personnel and stakeholders of the program’s outcomes and impact, identify potential best/promising practices, and support program sustainability. Evaluation findings will support program improvement in the six districts participating in GEAR UP and also help the Texas Education Agency (TEA) scale initiatives across the state.

This appendix describes the evaluation design, methodology, and analytic approach used for the impact study component of the evaluation—the findings of which are shared in this report.

B.1. GEAR UP Logic Model

The evaluation design was developed based on a logic model that describes how GEAR UP might bring about change in student outcomes (see Figure B.1). The logic model maps out the inputs, program activities (outputs), and intended outcomes of the program.

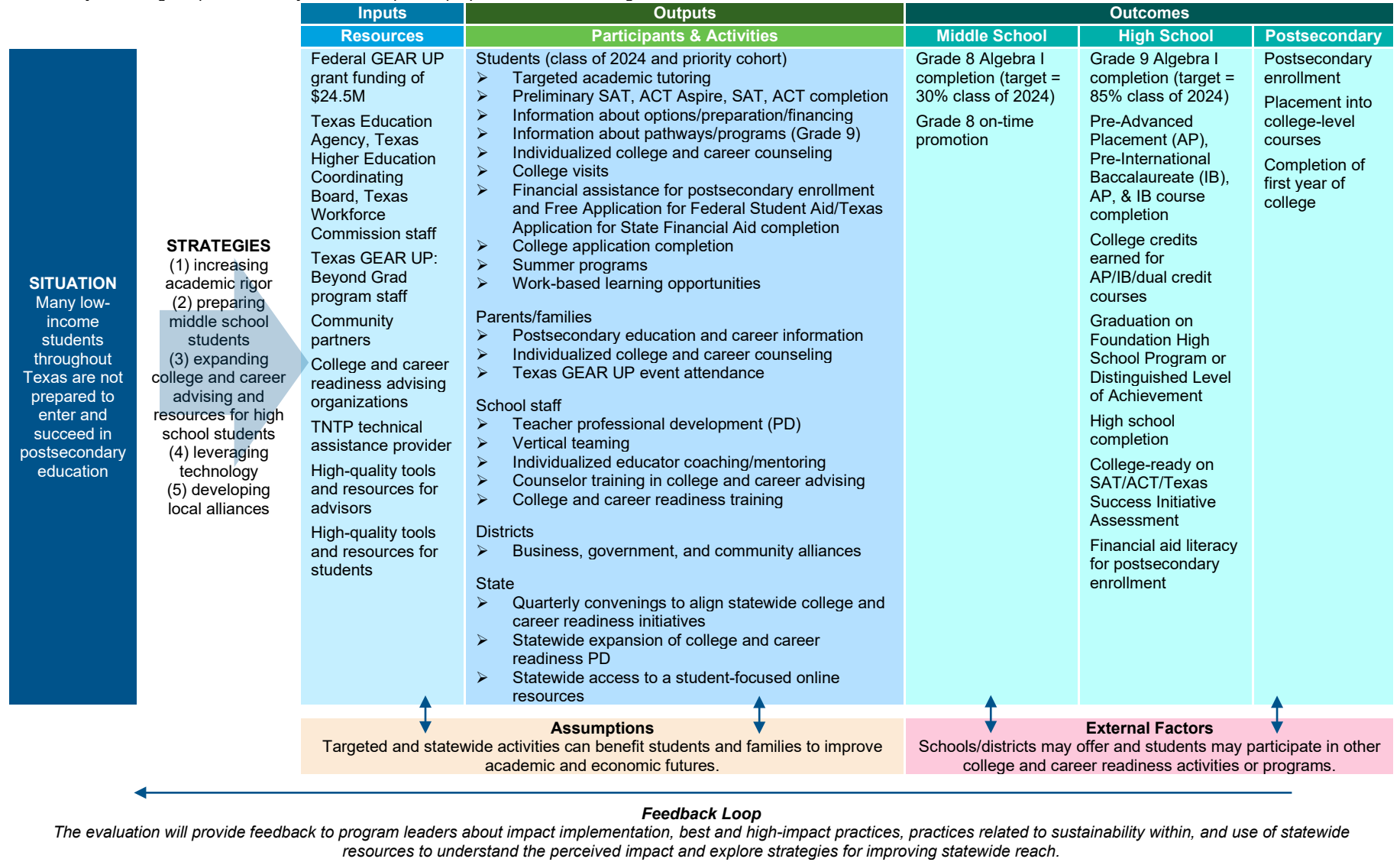
In the model, the leftmost column indicates the situation: that many low-income students in Texas are not prepared to enter and succeed in postsecondary education. The second column indicates strategies for improving the situation (e.g., “preparing middle school students”). The next column identifies the inputs into the program (e.g., funding, technical assistance).

The “Outputs” column details the activities in which individual students, parents/families, school staff, districts, and the state participate during the course of the grant. A few examples of program outputs are academic tutoring for students, professional development for teachers, and postsecondary education and career information for families.

Finally, outcomes indicate the program’s effects on students. Outcomes are broken down into middle school, high school, and postsecondary. In middle school, the program focuses on increasing Algebra I completion and on-time promotion. In high school, outcomes include preparation for college-level academic work, earning of college credits, and on-time completion of high school, among others. Postsecondary outcomes include enrollment in college, placing into college-level (vs. remedial level) courses, and successful completion of the first year of college.

Figure B.1. Texas Gaining Early Access to Undergraduate Programs (GEAR UP): Beyond Grad Logic Model

Mission: Texas GEAR UP: Beyond Grad seeks to accomplish the three main goals of the Federal GEAR UP program: (1) increase the academic performance and preparation for postsecondary education of participating students; (2) increase the rate of high school graduation and participation in postsecondary education; and (3) increase the educational expectations and family knowledge of postsecondary education options, preparation, and financing.



B.2. Evaluation Questions

The evaluation questions addressed in this report are listed in Table B.1.⁷

Table B.1. GEAR UP Impact Study Evaluation Questions

Evaluation Questions
<ul style="list-style-type: none"> • What outcomes are associated with participation in GEAR UP? How do these differ by district? • How do trends in outcomes for the class of 2024 GEAR UP cohort students differ in comparison to the state average? • How do trends in outcomes for the class of 2024 GEAR UP cohort students differ in comparison to the students in a matched comparison group created through propensity score matching (PSM)? • How do trends in outcomes for the class of 2024 students differ from students who attended the same schools one year prior to program implementation (i.e., the class of 2023)? • How do trajectories of outcomes differ based on the length of time students attended GEAR UP schools? For example, do students who participate in GEAR UP in all grades differ compared to students who enter GEAR UP schools at a later grade level? • Were there lasting positive effects of GEAR UP on outcomes at middle schools one to two years after GEAR UP implementation was completed?⁸

Note. GEAR UP - Gaining Early Awareness and Readiness for Undergraduate Programs

B.3. Analysis Procedures

This report focuses on two major outcomes for the middle school years that are tied to specific project objectives:

- Objective 1.1: By the end of the class of 2024's second year (Grade 8), 30% of class of 2024 students will complete Algebra I. By the end of the class of 2024's third year (Grade 9), 85% of class of 2024 students will complete Algebra I.
- Objective 4.2: At the end of the class of 2024's second year (Grade 8), the on-time promotion rate will exceed the baseline state average promotion rate.

Each of these objectives is related to one evaluation question: How does the academic performance of class of 2024 GEAR UP cohort students compare to retrospective cohort (class of 2023) students and non-participants (class of 2024 students from non-participating schools)? Examining differences in performance on the State of Texas Assessment of Academic Readiness (STAAR) in 2020 was a planned part of this report. However, the Coronavirus Disease 2019 (COVID-19) pandemic shuttered schools statewide in March 2020, just before testing was about to begin, and schools moved to virtual instruction for the rest of the 2019–20 school year; the STAAR exams were not administered.

⁷ Note that there are additional evaluation questions guiding other aspects of the evaluation. Additional evaluation questions will be presented in other reports, as applicable.

⁸ Because of limited available data, this evaluation question will be explored in future reports.

Table B.2. Outcomes

Objective	Key Question	Variable analyzed
Algebra I		
1.1	How many students (%) successfully completed Algebra I in Grade 8?	Variable name in PEIMS: COURSE_RESULT
On-time Promotion		
4.2	How many students (%) are promoted on time?	On time promotion from Grade 8 to Grade 9 in 2020 (class of 2024 GEAR UP and comparison cohorts) or 2019 (retrospective cohort)

Note. Algebra I completion is defined as the variable “COURSE_RESULT” being coded as “Pass” (vs “Fail” or “Incomplete”). Promotion is defined as in one grade level in the Public Education Information Management System (PEIMS) in the fall snapshot of one year and in the next grade or higher in the fall snapshot of the following year; for example, in Grade 8 in PEIMS fall snapshot 2019–20 and in Grade 9 PEIMS fall snapshot 2020–21. Students were included in this analysis regardless of the campus attended in Grade 9, as long as data were available (i.e., attended a public school in Texas).

Use of Extant Data. To measure the program’s impact on student academic outcomes, the ICF team used extant data provided by TEA. Specifically, Public Education Information Management System (PEIMS), State of Texas Assessments of Academic Readiness (STAAR), and Texas Academic Performance Reports (TAPR) served as primary data sources.

B.3.1. Creation of Matched Comparison Cohort

The ICF team selected nonparticipating districts and students for the matched comparison group using PSM, which constructs comparison groups by pairing study subjects based on a series of observable variables including student demographics (e.g., race/ethnicity, free/reduced lunch status, special education status, English learner (EL) status) and baseline academic achievement (e.g., STAAR-Reading and STAAR-Mathematics from the year prior to the GEAR UP intervention, i.e., Grade 6).

The PSM was constructed via a two-step process. First, GEAR UP districts were matched to similar nonparticipating districts based on the demographic makeup and academic performance of the districts (e.g., percent Hispanic students, percent students receiving free or reduced lunch; see Table B.3). Because of the small size of some of the GEAR UP districts, each GEAR UP district was matched to four potential comparison districts.

Table B.3. Variables Used for Matching at the School Level

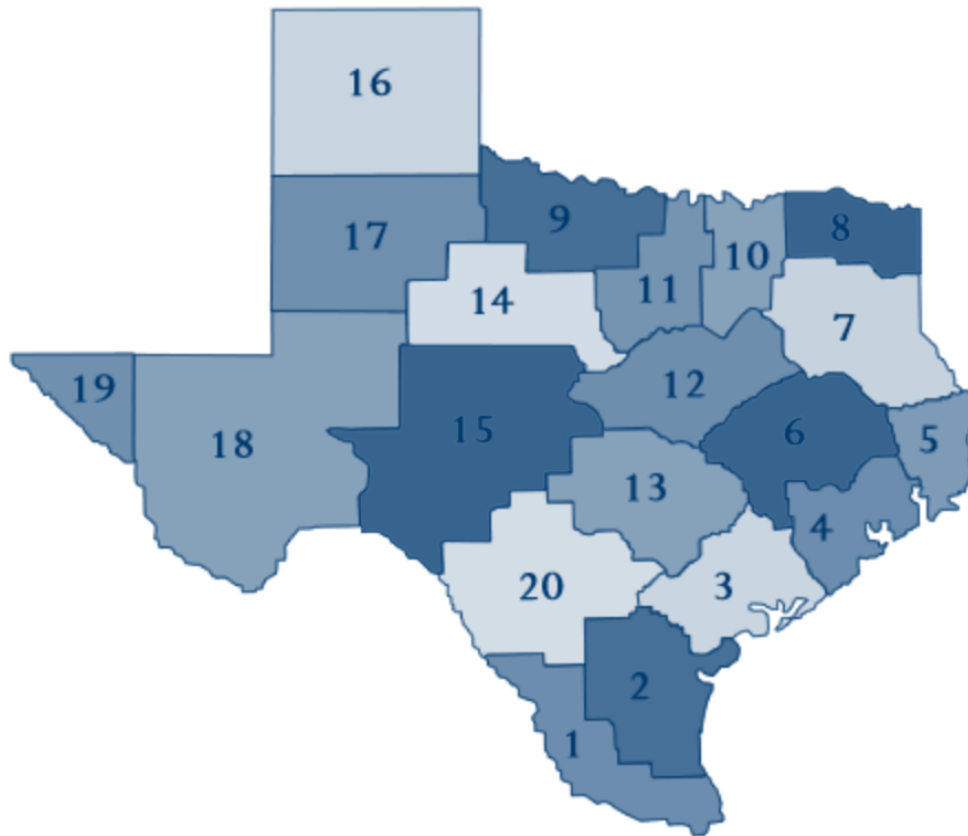
Item	Variable Name in TAPR 2017–18
Region	REGION
School Type	GRDTYPE
Grades	GRDSPAN
School Size/Total Students	CPETALLC
Race/Ethnicity % (Black, Hispanic, White)	CPETBLAP, CPETHISP, CPETWHIP
Economically Disadvantage %	CPETECOP
English Learner (EL) %	CPETLEPP
At Risk %	CPETRSKP
Accountability Rating	C_RATING
Attendance Rate	CA0AT18R (from TAPR 2018–19 file)
Annual Dropout Rate (Grade 7–8)	CA0708DR18R (from TAPR 2018–19 file)
All Grade STAAR-Reading Level (Approaches, Meets, Masters)	CDA00AR01S18R CDA00AR01218R CDA00AR01318R
All Grade STAAR-Mathematics Level (Approaches, Meets, Masters)	CDA00AM01S18R CDA00AM01218R CDA00AM01318R

Note. TAPR - Texas Academic Performance Reports. STAAR - State of Texas Assessment of Academic Readiness. All data came from the TAPR 2017–18 file unless otherwise noted.

The variables in Table B.3 are listed in relative order of importance for the match. Regional Education Service Center (ESC) area was prioritized (see Figure B.2 for a map of all ESCs); when a matching district could not be located within an ESC region, the search was expanded to nearby similar regions:

- Region 2 was matched with Region 3,
- Region 4 was matched with Region 6,
- Region 18 was matched with districts near the Mexico border in Region 15, and
- Region 19 was matched with Region 1.

This process produced a list of four to five matching districts for each GEAR UP district. The list was further pared down through discussions about the unique characteristics of the various school districts (for example, Marfa Independent School District was excluded as a match because of the area's unique situation as a center for artists with a large transient/tourist population).

Figure B.2. Regional Education Service Centers

Source: <https://tea.texas.gov/about-tea/other-services/education-service-centers/education-service-centers-map>

In the second step of the PSM, individual students within the matched districts were matched with students from nonparticipating districts based on their demographics and prior academic achievement on the STAAR assessment. Students were eligible for consideration for the match if they were enrolled at either a GEAR UP campus or a matched campus during the PEIMS snapshot in the fall of their Grade 8 year (i.e., 2019–20). The reason the fall snapshot (which is taken around the midpoint of the fall semester) is used, rather than enrollment at any time, is for two reasons:

- To ensure that students who were considered GEAR UP participants had a long enough window of time to have received some services by the time that outcomes were assessed, and
- To control for the fact that attendance data was not consistently collected in the spring of 2020 due to the COVID-19 pandemic forcing all Texas public schools to close for a time and then be reopened virtually.

See Table B.4 for a list of matching criteria.

Table B.4. Variables Used for Matching at the Student Level

Item	Variable Name in PEIMS
Gender	SEX
Race/Ethnicity (Black, Hispanic, White, Asian)	ETHNIC
Economically Disadvantaged	ECONOMIC
Gifted and Talented Program	GIFTED
Special Education	SPECED
English Learner (EL)	LEP
At Risk	AT_RISK
Attendance %	TOT_DAYS_MEMBER/ TOT_DAYS_PRESENT
Grade 6 STAAR-Reading Scale Score	R_SSC
Grade 6 STAAR-Mathematics Scale Score	M_SSC

Note. STAAR - State of Texas Assessment of Academic Readiness. PEIMS - Public Education Information Management System. Demographic variables used for PSM were collected from the fall snapshot in 2018–19 when possible. When data were not available, these demographic variables were added based on end-of-year data. Grade 6 STAAR data were from 2017–18.

To be a part of the PSM process, students had to have met the following criteria:

- Have demographic and pre-intervention performance data available (i.e., have data for all of the items in Table B.4),
- Be recorded as attending the target campus in the PEIMS fall snapshot in 2019–20, and
- Have data for at least one of the two outcomes in our study (i.e., completion of Algebra I by the end of Grade 8 and/or promotion from Grade 8 to Grade 9).

The PSM model was based on the logistic regression model where the outcome was the probability of participation in GEAR UP (i.e., GEAR UP student vs. non-GEAR UP student) and predictors were a set of covariates that described the students (see Table B.4 for all covariates used in the analysis). The following equation expresses the basic logistic regression modeling framework:

$$\text{Log}(p_k / 1 - p_k) = \beta_{00} + \beta_{10} * \text{predictor}_k + \dots$$

where:

- Postscripts k stand for student,
- P is a probability that a student “k” is a GEAR UP participant,
- β 's are parameters to be estimated, and
- “...” indicates that the model will include multiple predictors and corresponding parameters (see Table B.4).

Based on derived coefficients (β s) and the values of predictors, the logistic regression model produces a statistic called predicted probability or propensity score. The propensity score is a balancing score, meaning that it balances all pretreatment group differences in observed covariates. For each GEAR UP student, a comparison student in the same grade with the closest propensity score was selected using nearest neighbor matching. As a result, the GEAR

UP cohort and the matched comparison cohort were similar in observed characteristics that are important in predicting the outcome distinction between treatment and non-treatment groups. In deriving propensity scores, the logistic regression algorithm took into account the relative weight of predictors in their covariate correlation with the outcome.

After the comparison students were selected, data were checked for baseline equivalency for all demographic and prior achievement data (see Table B.4). Hedges' g (for continuous variables) and Cox (for dichotomous variables) effect size estimates were used to compare treatment groups and assess baseline equivalence, with the goal being that all variables had differences of no larger than an effect size (ES) of .05. This target is generally considered to indicate equivalence per What Works Clearinghouse (WWC) guidance (i.e., What Works Clearinghouse, 2017). If there was inequivalence ES over .25 for any variable, the PSM was repeated. Inequivalence ES values between .05 and .25 are considered acceptable by WWC standards as long as these inequivalencies are adjusted for in the statistical model. Further, any identified inequivalencies were pointed out in the narrative. All variables in Table B.4 were added to covariate logistic regression models to adjust for the differences statistically.

B.3.2. Analytic Samples

Before analyses were begun, the analytic samples for each of the three cohort groups were defined: class of 2024 GEAR UP, matched comparison (class of 2024), and retrospective (class of 2023). Because there was not variation in on-time promotion data, analyses were conducted only for one outcome: Algebra I completion by the end of Grade 8.

DEFINITION OF ANALYTIC SAMPLES

There were four analytic samples:

- Class of 2024 by district
- Class of 2024 GEAR UP vs. matched comparison
- Class of 2024 GEAR UP vs. retrospective
- Length of time in cohort analysis—attended in Grade 7 and 8 vs. Grade 8 only

To be included in the analytic sample for class of 2024 GEAR UP by district students must:

- Be counted at a GEAR UP campus in Grade 8 in the PEIMS Fall snapshot of 2019–20, and
- Have data for all demographic and prior STAAR performance as listed in Table B.4.
 - There were initially 1,965 students who were in the GEAR UP cohort. However, 122 students did not have demographic and/or prior STAAR performance data; these students were removed from the analytic sample.

To be included in the analytic sample for class of 2024 GEAR UP vs. matched comparison cohort, students must:

- Have been matched via the PSM process,
- Be counted at their current campus in the PEIMS Fall snapshot of 2019–20, and
- Have available data for the outcome of interest.

- Because District 1 did not provide end-of-year course completion data for its middle school students, this district was excluded from the analytic sample.
- Additionally, students matched to District 1 students in the matched comparison cohort were removed from the sample.

To be included in the analytic sample for class of 2024 GEAR UP vs. retrospective cohort, students must:

- Have data for all demographic and prior performance as listed in Table B.4 (but substitute 2016–17 for the year of the data pull for the retrospective cohort’s Grade 6 STAAR data),
- Be counted at their current campus in the PEIMS Fall snapshot of their Grade 8 year (either 2018–19 for the retrospective cohort or 2019–20 for the class of 2024 GEAR UP cohort),
 - Five students who were retained in Grade 8 were in both the class of 2024 and retrospective cohorts initially. Because these students were served by GEAR UP, they were removed from the retrospective cohort in all analyses but the on-time promotion analysis.
- And, have data for the outcome of interest.
 - Because District 1 did not provide end-of-year course completion data for its middle school students, this district was excluded from the analytic sample for both the class of 2024 and retrospective cohort.

To be included in the analytic sample for length of time in cohort, students must:

- Have data for all demographic and prior performance as listed in Table B.4,
- Be counted at their current campus in the PEIMS Fall snapshot of 2019–20, and
- Have data for the outcome of interest.
 - Because District 1 did not provide end-of-year course completion data for its middle school students, this district was excluded from the analytic sample.
 - Additionally, students in the retrospective cohort from District 1 were excluded from the analytic sample.

BASELINE EQUIVALENCE

Next, we established if there were differences between groups for each analytic sample in terms of demographics or prior achievement data for each analytic sample.

- If the $ES \leq 0.05$ for all demographic and prior achievement variables, the samples are deemed equivalent. All variables in the sample for the class of 2024 GEAR UP vs. matched comparison cohort were in this category.
- If the ES is $0.05 < ES < 0.25$, the samples are considered partially equivalent; any differences noted in outcomes may be due to pre-existing differences between cohorts. WWC recommends adding any variables that fit into this category into a statistical model to adjust for these pre-existing differences (What Works Clearinghouse, 2017). All of the models for this report will include the demographic and prior-year achievement data, regardless of equivalence. Several variables for the analytic sample for the class of 2024 GEAR UP vs. retrospective cohort were in this category.

- If the ES is > 0.25 , the samples are not equivalent, and it is inappropriate to compare differences in outcomes. None of the samples in the current study were in this category.

B.3.3. Analytical Strategies

To compare differences between cohorts, there were two distinct types of analyses:

- **Comparison of means.** These analyses compared means utilizing a chi-square analysis and Cox's index for dichotomous variables. Outcomes with p values of < 0.05 are considered statistically significant.
- **Statistical model.** Depending on the analysis, either a multilevel model (MLM) or a covariate logistic regression was used. These models took into account district, prior performance on STAAR, and student characteristics and are considered more robust than simple comparisons of means.

B.3.4. Statistical Models

CLASS OF 2024 GEAR UP VS. MATCHED COMPARISON COHORT: MULTILEVEL MODEL

The analytical model used for the class of 2024 GEAR UP vs. matched comparison cohort analyses was an MLM; specifically, multilevel logistic regression modeling was used due to the binary nature of the outcome data. An MLM was used to control for the fact that students in this study were clustered within a relatively large number of districts (25) and that students in the same district share key characteristics (e.g., teachers, principal, location of district) with their schoolmates and thus are not independent from each other.

The classical statistical tests most likely underestimate the amount of imprecision in the data which leads to overly optimistic and misleading statistical test results. By explicitly incorporating the imprecision of between-school variance into the estimation process, the MLM adjusts for the clustering problem and derives more realistic estimates of standard errors, providing conservative statistical test results (Schoeneberger, 2015).

As summarized in Table B.5, the MLM examined the impact of the GEAR UP intervention on student outcomes. To elaborate how these analytical questions are examined with data, the next sections provide additional detailed specifications of MLMs.

Table B.5. Analytic Sample Descriptives

Demographic Data		Prior Achievement Data
N	% Gifted and Talented	Grade 6 STAAR-Reading Scale Score (Mean, Standard Deviation)
% Black/African American	% Special Education	
% White	% English Learner (EL)	Grade 6 STAAR-Mathematics Scale Score (Mean, Standard Deviation)
% Hispanic	% At Risk	
% Economically Disadvantaged	% Male	

Note. STAAR - State of Texas Assessment of Academic Readiness.

The MLM was run in three stages.

- The **intercept model** documents the amount of variance in the outcome by district:

$$\text{Level 1 (Student Level): } \log(P / 1-P) = \beta_{0j}$$

$$\text{Level 2 (District Level): } \beta_{0j} = \gamma_{00} + \mu_{0j}$$

- The **main effects MLM** adds cohort group to the analysis (i.e., class of 2024 GEAR UP or matched comparison cohort):

$$\text{Level 1 (Student Level): } \log(P / 1-P) = \beta_{0j}$$

$$\text{Level 2 (District Level): } \beta_{0j} = \gamma_{00} + \gamma_{01} [\text{Cohort}] + \mu_{0j}$$

- The **covariate MLM** adds covariates to the main MLM:

$$\text{Level 1 (Student Level): } \log(P / 1-P) = \beta_{0j} + \beta_1^* [\text{Gender}]_i + \beta_2^* [\text{Ethnicity/Race: Hispanic}]_i + \dots$$

$$\text{Level 2 (District Level): } \beta_{0j} = \gamma_{00} + \gamma_{01} [\text{Cohort}] + \mu_{0j}$$

Where:

- P stands for the probability that a student successfully completes a course,
- postscripts *i* and *j* index, respectively, student and district,
- β 's and γ 's are parameters to be estimated,
- μ 's are district-specific residuals (estimated as random effects),
- Cohort is a binary indicator (1 if GEAR UP district, else 0), and
- "..." indicates that the model will include multiple predictors and corresponding parameters.

The model uses a logistic function suitable for analyzing the binary outcome (i.e., logistic regression). The outcome examined was the probability of students successfully completing an Algebra I course (represented as P in the model). The model explicitly drives district differences as level-2 intercepts or random effects (expressed as β_{0j} in the equation) and uses the level-2 intervention variable to analyze the outcome variation between GEAR UP and matched comparison districts. Because the model includes both level-1 and level-2 covariates, the impact coefficient (γ_{01}) will measure the net magnitude of the GEAR UP program effectiveness on completion of Algebra I in Grade 8.

District-level covariates entered into the model included:

- Cohort (1 if in GEAR UP, 0 if not in GEAR UP)
- District ($n=25$)

Student-level covariates entered into the model included:

- Gender
- Race and Ethnicity (African American, Hispanic vs. White/Other)
- Economic Status: Economically Disadvantaged
- Special Populations and Programs: EL, At Risk, Special Education, Gifted and Talented
- Prior scale score on Grade 6 STAAR-Reading and STAAR-Mathematics. STAAR Scale Scores were first transformed into z-scores before being used in the model.

CLASS OF 2024 GEAR UP VS. RETROSPECTIVE COHORT: BINARY LOGISTIC REGRESSION

Because the outcomes of interest are both percentages (i.e., the percentage of students completing Algebra I by the end of Grade 8 and the percentage of students promoted from Grade 8 to Grade 9), and because of the small number of districts in the analysis (5), a binary logistic regression was utilized to analyze the class of 2024 GEAR UP vs. retrospective cohort data. The logistic regression model examined the probability that students will achieve a particular outcome, for example, of successfully completing Algebra I in Grade 8 (represented as P in the model).

The model is expressed as follows:

$$\log (P / 1-P) = \beta_0 + \beta_1 * [GEAR UP]_i + \beta_2 * [District_A]_j + \beta_3 * [Gender_Male]_j \dots$$

Where:

- P represents probability of the outcome occurring,
- postscript *i* indicates student *i*,
- β s are parameters to be estimated, β_0 is the intercept and all other parameters are tied to a predictor variable,
- *GEAR UP* is a binary variable (1= class of 2024 GEAR UP cohort; 0=comparison or retrospective cohort),
- *District_A* is an example of a district membership variable (1 if District A, 0 if other districts),
- *Gender_Male* is an example of a student level covariate (1 if male, 0 if female), and
- “...” indicates that the model will include multiple predictors and corresponding parameters.

Being part of the intervention (expressed as “*GEAR UP*” in the model) served as a predictor variable for the model, along with district attended and other covariates (such as demographics and prior academic performance). If the GEAR UP intervention was successful, the program impact is reflected in the size of parameter β_1 , as it captures the average performance difference of class of 2024 GEAR UP cohort students and comparison students. District differences were adjusted for by a series of dummy variables representing district, though for simplicity only one district is shown in the model above.

As mentioned, several covariate variables entered the model. The same set of covariates is used for all models discussed and consists of the following:

- District
- Race and Ethnicity (African American, Hispanic, White vs. Other)
- Economic Status: Economically Disadvantaged
- Special Populations and Programs: EL, At Risk, Special Education, Gifted and Talented
- Prior scale score on Grade 6 STAAR-Reading and STAAR-Mathematics. STAAR Scale Scores were first transformed into z-scores before being used in the model.

LENGTH OF TIME IN COHORT: BINARY LOGISTIC REGRESSION

In this section, length of time in cohort was examined to see if more exposure to GEAR UP programming predicted better outcomes for students in the class of 2024 GEAR UP cohort (i.e., comparing the difference between receiving two years of services vs. one year). As with the analyses comparing the class of 2024 GEAR UP and retrospective cohorts, a binary logistic regression was used.

The model is expressed as follows:

$$\log (P / 1-P) = \beta_0 + \beta_1 * [Length_In_Cohort]_i + \beta_2 * [District_2]_j + \beta_3 * [Gender_Male]_j \dots$$

Where:

- P represents probability of the outcome occurring,
- postscript *i* indicates student *i*,
- β s are parameters to be estimated, β_0 is the intercept and all other parameters are tied to a predictor variable,
- *Length_In_Cohort* is a binary variable (1=1 year in cohort; 2=2 years in cohort),
- *District_2* is an example of a district membership variable (1 if District 2, 0 if other district),
- *Gender_Male* is an example of a student level covariate (1 if male, 0 if female). The same set of covariates as listed above for the class of 2024 GEAR UP vs. retrospective analysis was used, and
- “...” indicates that the model will include multiple predictors and corresponding parameters.

References

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APPENDIX C: Additional Technical Detail

Table C.1. Class of 2024 GEAR UP Cohort Propensity Score Matched Students, 2018–19 to 2019–20

	District 1	District 2	District 3	District 4	District 5	District 6	All
Matched	233	147	492	708	31	97	1,708
Unmatched	29	10	20	61	0	15	135
Matching Rate	90%	94%	96%	92%	100%	87%	93%

Source. Texas Education Agency, Public Education Information Management System (PEIMS), 2018–2020.

Note. GEAR UP - Gaining Early Awareness and Readiness for Undergraduate Programs.

Table C.2. Characteristics of Class of 2024 GEAR UP Cohort and Propensity Score Matched Comparison Cohort Students in the Analytic Sample for the Algebra I Outcome Analysis

Student Characteristic	Class of 2024 GEAR UP (n=1,475)	Comparison (n=1,475)	sig	ES
Gender				
Male	51%	51%	ns	0.00
Race/Ethnicity				
Hispanic	79%	79%	ns	0.00
African American	14%	14%	ns	0.00
White	7%	7%	ns	0.00
Economic Status				
Economically Disadvantaged	86%	86%	ns	0.00
Instructional Program or Special Population				
At Risk	63%	63%	ns	0.00
English Learners	24%	24%	ns	0.00
Special Education	6%	6%	ns	0.00
Gifted and Talented	4%	4%	ns	0.00
STAAR Grade 6 Scale Score				
Mathematics	1600	1593	ns	0.07
Reading	1529	1532	ns	0.02

Source. Texas Education Agency, Public Education Information Management System (PEIMS), 2018–2020.

Note. GEAR UP - Gaining Early Awareness and Readiness for Undergraduate Programs. STAAR - State of Texas Assessment of Academic Readiness. This sample excludes students from District 1. Demographic variables are generally from the fall of Grade 7 (fall 2017 or 2018). In cases where the student was missing demographic variables, they were added from the fall of Grade 8 (fall 2018 or 2019). Asterisks indicate the level of statistical significance for χ^2 analyses (sig): * < 5%, ** < 1%, *** < 0.1%; ns indicates non-significant finding. ES indicates the effect size of the difference (using Hedge's g or Cox's index for dichotomous variables).

Table C.3. Algebra I Completion by the End of Grade 8: Propensity Score Matched Class of 2024 GEAR UP Cohort versus Comparison Cohort

Initial Group Differences in Algebra I Completion by the End of Grade 8									
	Cohort Percentages				Number in Cohort		Test Results		
	Class of 2024		Comparison		Class of 2024		χ^2	sig	ES
	GEAR UP				GEAR UP	Comparison			
	21%		24%		1,475	1,475	4.5	*	0.10
Multilevel Regression Models									
Variable	Main Model				Covariate Model				
	B	SE	sig	OR	B	SE	sig	OR ^a	
Intercept	-1.54	0.24	***	NA	-2.05	0.51	***	NA	
Group									
Class of 2024 GEAR UP cohort (vs. matched comparison)	0.45	0.48	ns	NA	1.21	0.92	ns	NA	
Grade 6 STAAR Scale Score (z-score)									
Mathematics					2.02	0.11	***	NA	
Reading					0.43	0.10	***	NA	
Gender									
Male					-0.29	0.13	*	0.75 (1.34)	
Race/Ethnicity									
Hispanic					-0.42	0.24	ns	NA	
African American					-0.87	0.29	**	0.41 (2.37)	
Economic Status									
Economically Disadvantaged					-0.17	0.17	ns	NA	
Instructional Program or Special Population									
At Risk					-0.08	0.16	ns	NA	
English Learner					-0.44	0.22	*	0.64 (1.55)	
Special Education					-2.05	0.76	**	0.14 (7.31)	
Gifted and Talented					0.70	0.24	**	1.97	
Number of students/districts	2,950 / 25						2,950 / 25		
District level variance	Intercept only				Main model		Covariate model		
	0.83				0.81		3.20		
AIC	2,955				2,954		1,830		

Source. Texas Education Agency, Public Education Information Management System (PEIMS), 2018–2020; Texas Education Agency, State of Texas Assessments of Academic Readiness (STAAR), 2017–2018.

Note. GEAR UP - Gaining Early Awareness and Readiness for Undergraduate Programs. STAAR - State of Texas Assessment of Academic Readiness. The reference categories in the model are comparison cohort, female, White/other race/ethnicity, not Economically Disadvantaged, not at risk, non-English Learner, non-Special Education, non-Gifted and Talented. Asterisks indicate the level of statistical significance (“sig”): * < 5%, ** < 1%, *** < 0.1%; ns indicates non-significant finding. NA indicates not applicable. ES indicates the effect size of the difference (using Cox’s index for dichotomous variables). Students must have been a part of the PSM-matched analytic sample to be included in these analyses. Class of 2024 GEAR UP cohort students from District 1 and their matches in the comparison group were excluded from the analysis.

^a For ease of interpretation, odds ratios (OR) of less than one have been transformed to reflect the odds of the non-reference group, calculated as 1/odds ratio of the reference group. This reversed odds ratio is presented in parentheses. Odds ratios are only presented for significant categorical variables.

Table C.4. Characteristics of Class of 2024 GEAR UP Cohort and Retrospective Cohort Students in the Analytic Sample for the Algebra I Outcome Analysis

Student Characteristic	Class of 2024 GEAR UP (n=1,581)	Retrospective (n=1,484)	sig	ES
Gender				
Male	51%	51%	ns	0.00
Race/Ethnicity				
Hispanic	76%	76%	ns	0.00
African American	14%	13%	ns	0.05
White	8%	10%	ns	0.15
Economic Status				
Economically Disadvantaged	84%	80%	**	0.16
Instructional Program or Special Population				
At Risk	61%	64%	ns	0.08
English Learners	22%	23%	ns	0.03
Special Education	7%	9%	ns	0.17
Gifted and Talented	6%	7%	ns	0.10
STAAR Grade 6 Scale Score				
Mathematics	1598	1598	ns	0.01
Reading	1537	1542	ns	0.04

Source. Texas Education Agency, Public Education Information Management System (PEIMS), 2018–2020.

Note. GEAR UP - Gaining Early Awareness and Readiness for Undergraduate Programs. STAAR - State of Texas Assessment of Academic Readiness. Demographic variables are generally from the fall of Grade 7 (Fall 2017 or 2018). In cases where the student was missing demographic variables, they were added from the fall of Grade 8 (Fall 2018 or 2019). Asterisks indicate the level of statistical significance for χ^2 analyses (sig): * < 5%, ** < 1%, *** < 0.1%; ns indicates non-significant finding. ES indicates the effect size of the difference (using Hedge's g or Cox's index for dichotomous variables).