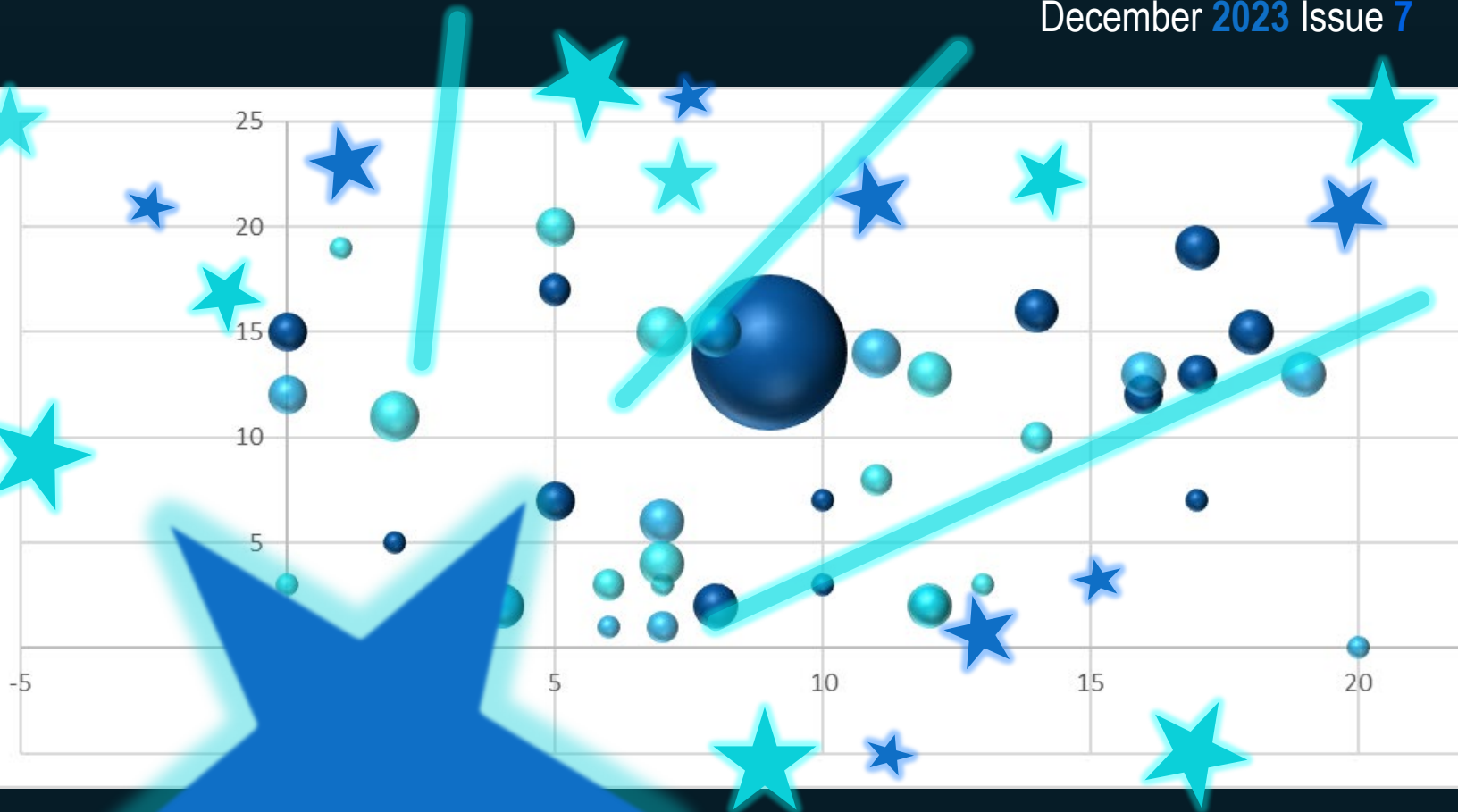# IR CORNER

Be inspired by the

Magic of Data

TCC is Focused on Student Success
Recruitment, Retention, & Completion

STEM
The Future is Now

TARRANT COUNTY COLLEGE
OFFICE OF INSTITUTIONAL RESEARCH

IR OFFICE:

Holly Stovall
Executive Director of IR

Abbie Arellano
Research Analyst

Kira Barrington
Asst. to Executive Director

Mark Holcomb
Data Programmer Analyst

Bonnie Hurford
Director of Analytics

William Luong
Asst. Director of Institutional
Effectiveness

Christina Kraines
Data Programmer Analyst

Elizabeth Northern
Director of Research

Joshua Rule
Research Analyst

Stephanie Suarez
Coordinator of Assessment
Technology

Matthew Wolfe
Research Analyst

Be inspired by the Magic of Data

Holly Stovall

Data hold a certain mystique by serving as a gateway to uncovering patterns and potentially an impetus for consideration of important changes in policy and practice. While a vast array of initially meaningless numbers can be daunting at first, through analysis important information is found and can be conveyed so that it becomes useable. Some might even say that there seems to be some magic in this process from moving from the unknown to the known – or at least moving one step closer towards full understanding.

It is inspiring to see the impact of "data in action". Whether TCC is investigating the student experience through surveys, adjusting the schedule by analyzing trends, or altering the TSI benchmarks for appropriate course placement, all have the potential to better support our students.
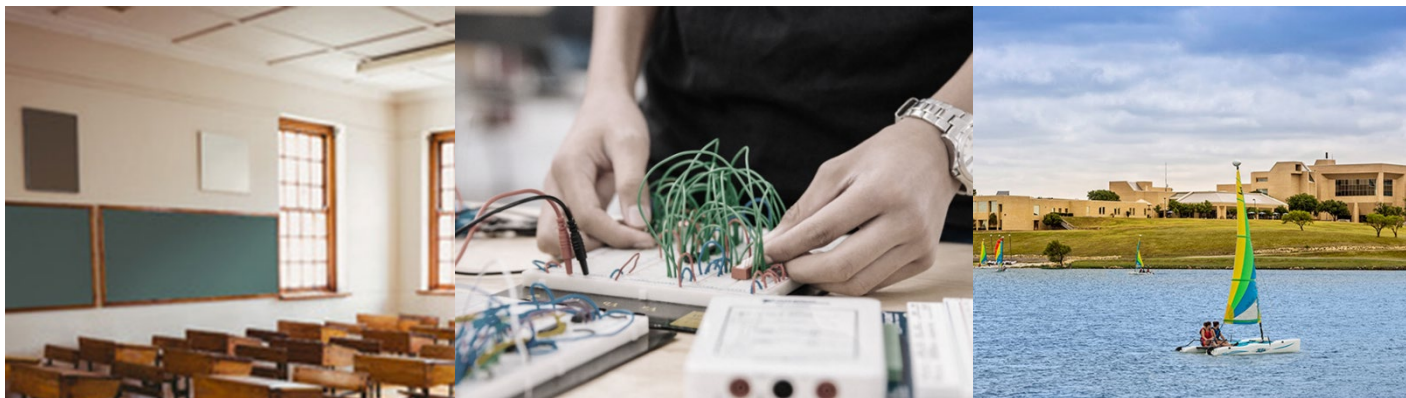
In this issue, we share data that captivated us such as trends in online enrollment, gaps in the progression of STEM students, and perspectives from students' course evaluations. In addition, we present an overview of the Senior Education program, examine whether students in cancelled courses re-enroll in other courses, and provide an update on the College's three goals of recruitment, retention, and completion.

We hope these articles awaken your interest in a bit of "data magic" and inspire further exploration into how data can be leveraged to transform and shape future efforts.

insplRe

"The world is full of magic things, patiently waiting for our senses to grow sharper.

* Attributed to W.B. Yeats

CONTENTS

Online Coursework at TCC: Then and Now

HISTORY

IT'S TRUE: TCC has been offering online courses well before the transition to online during the COVID-19 Pandemic. Known colloquially as distance learning, remote learning, eLearning, and online learning, the ability to take a course via computer or other technologies in the comfort of your home has been an option at TCC since 1973. "Our [TCC's] eLearning program began in the fall of 1973 with two courses delivered via instructional television. Almost 800 students enrolled in the two courses, which immediately demonstrated interest in a flexible and convenient way to take courses. In the spring of 1989, TCC began offering computer-delivered instruction (CDI) courses, now known as online courses."[1] Today, a majority of online coursework is facilitated through Connect Campus.

This analysis sheds light on online coursework at TCC through the lens of enrollments and headcounts, student success, and any change in preference throughout time. Academic years 2013-14 through 2022-23 and 2023FL were included in the analysis. Pandemic terms were split out due to adaptations towards majority remote learning schedules during that time.

ENROLLMENTS & HEADCOUNTS

When looking at the long semesters of fall and spring, enrollments and headcounts were divided into three time periods: pre-pandemic, pandemic, and post-pandemic.

Average Rates by Time Period

	% Online	% At Least One Online	% All Online
Pre-Pandemic	16.2%	23.9%	10.8%
Pandemic	95.2%	97.7%	92.7%
Post-Pandemic	25.5%	34.2%	19.0%

Not surprisingly, the online course enrollment and headcount rates were over 90% during the pandemic, when a majority of course offerings were online. The pre- and post-pandemic rates, on average, increased by roughly ten percentage points in all three metrics.

Before the pandemic, about 13-19% of course enrollments each long term were online, compared to about 1 in 4 after the pandemic. About a quarter of students took at least one online course pre-pandemic compared to, on average, about 1 in 3 students post-pandemic. About 1 in 10 students prior to the pandemic enrolled solely online compared to about 1 in 5 students post-pandemic.

Rates of Online Course Enrollments & Online Headcounts

(All rates over 90%)

Legend: —— % Online   —— At Least 1 Online   —— All Online

Pre-pandemic   Pandemic   Post-pandemic
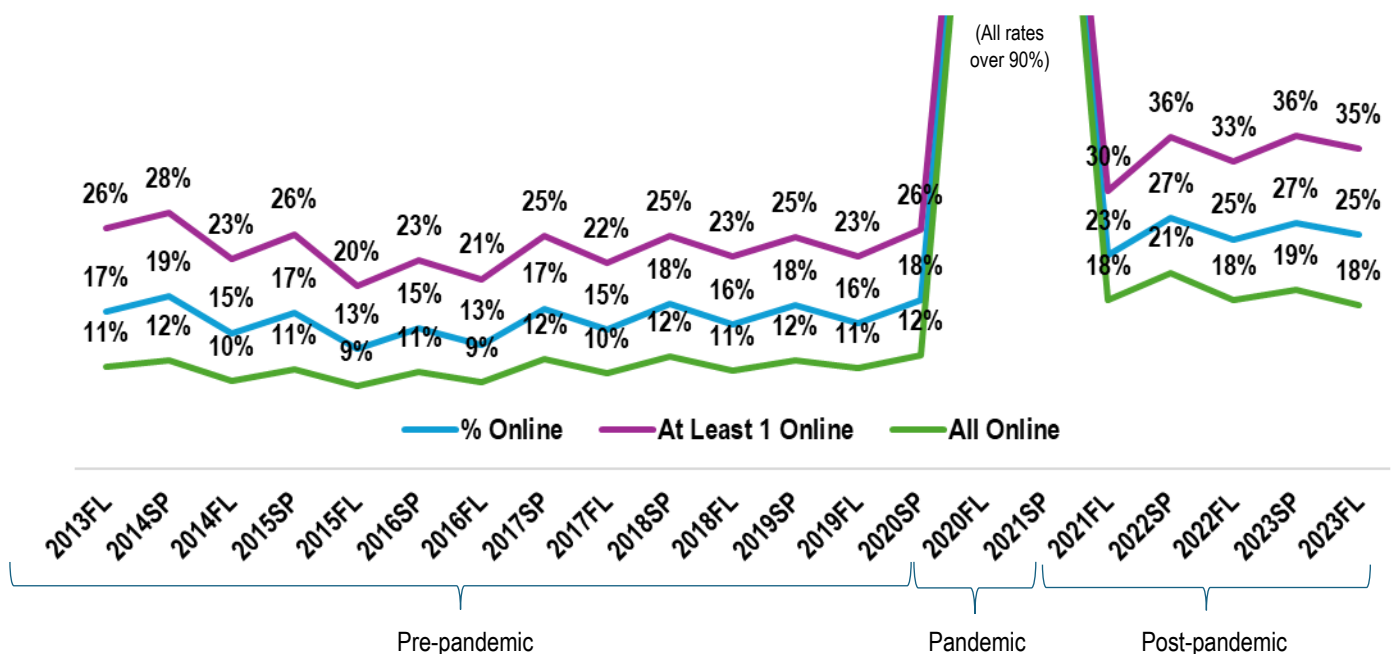
SUCCESS & WITHDRAW RATES

Pre-pandemic, online coursework success rates (A, B, C, CR grades) were about 3-4 percentage points lower than non-online courses. Additionally, withdraw rates for online course work were 2-3 percentage points higher than non-online coursework.
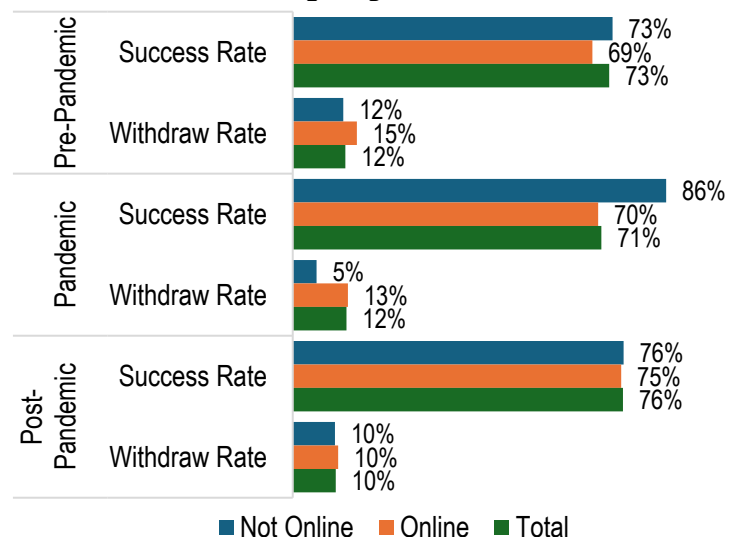
Post-pandemic, online-coursework success rates have been, on average, about one percentage point lower than non-online courses. Withdraw rates for both course groupings were comparable post-pandemic.

It is of note, however, that success rates overall have increased post-pandemic, with the average success rate post-pandemic being about 76% compared to about 73% pre-pandemic.
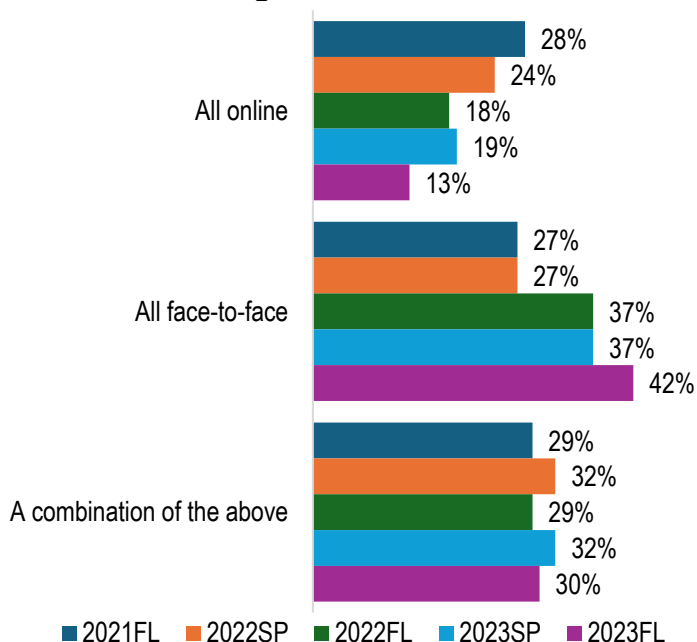
Success & Withdraw Rates by Course Grouping & Time Period

Pre-Pandemic
- Success Rate: 73% (Not Online), 69% (Online), 73% (Total)
- Withdraw Rate: 12% (Not Online), 15% (Online), 12% (Total)

Pandemic
- Success Rate: 86% (Not Online), 70% (Online), 71% (Total)
- Withdraw Rate: 5% (Not Online), 13% (Online), 12% (Total)

Post-Pandemic
- Success Rate: 76% (Not Online), 75% (Online), 76% (Total)
- Withdraw Rate: 10% (Not Online), 10% (Online), 10% (Total)

Legend: ■ Not Online ■ Online ■ Total

SCHEDULING PREFERENCES SURVEY RESULTS

In 2023FL, the Student Ready Survey was administered to all TCC students. Almost half of the respondents (about 42%) indicated preferring all face-to-face classes. While about 13% of respondents reported wanting a completely online schedule, about 17% of 2023FL students took a completely online schedule. Immediately post-pandemic (in 2021FL), the reported preference for a completely online schedule was near 30%. Since then, the reported preference for online steadily decreased to 13% in 2023FL.

Modality Preference (N = 792)

All online
- 28% (2021FL)
- 24% (2022SP)
- 18% (2022FL)
- 19% (2023SP)
- 13% (2023FL)

All face-to-face
- 27% (2021FL)
- 27% (2022SP)
- 37% (2022FL)
- 37% (2023SP)
- 42% (2023FL)

A combination of the above
- 29% (2021FL)
- 32% (2022SP)
- 29% (2022FL)
- 32% (2023SP)
- 30% (2023FL)

Legend: ■ 2021FL ■ 2022SP ■ 2022FL ■ 2023SP ■ 2023FL

Subgroups – Preferences of Part-Time & TCC Connect Campus Student Respondents

The percentage of part-time respondents decreased from near 60% in 2021FL to about 50% in 2023FL, and the percentage of TCC Connect Campus respondents decreased from about 20% in 2021FL to 15% in 2023FL. Since these subgroups have historically been more likely to prefer an all-online schedule compared to their comparison groups, decreases in these groups could impact the overall percentage who preferred all-online. Interestingly, however, the percentage within these subgroups who preferred all-online decreased.

Alignment between Preferred Method and Enrolled Method

About 98% of respondents who preferred all face-to-face reported that they were primarily enrolled in face-to-face, while only 87% of respondents who preferred all online reported that they were enrolled primarily online.

Preferred Method	Reported Primarily Enrolled In:	
	Face-to-face	Online
All online	13%	**87%**
All hybrid	87%	13%
All face-to-face	**98%**	2%
A combination of the above	78%	22%

1 https://www.tccd.edu/academics/courses-and-programs/elearning/about-us/
Source: Enrollment Data by Term (credit types N & L excluded), Course Section Data WHDB; 2023FL Student Ready Survey
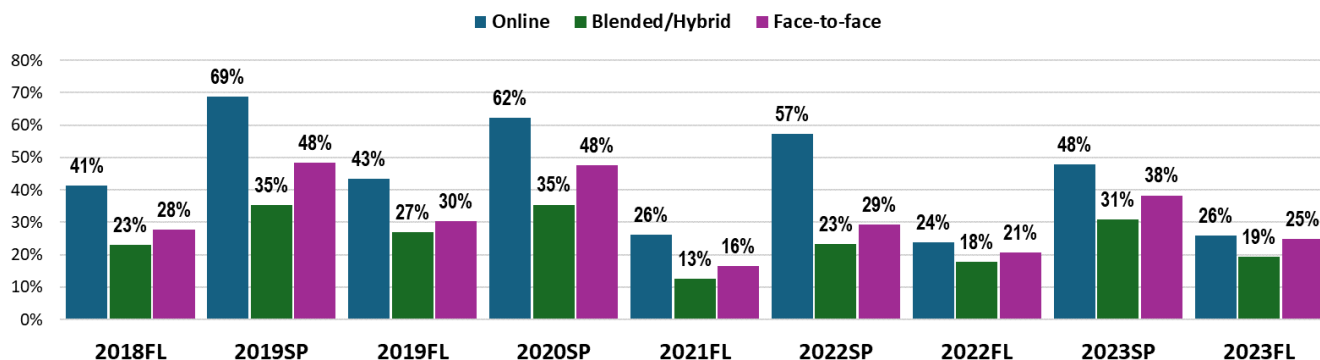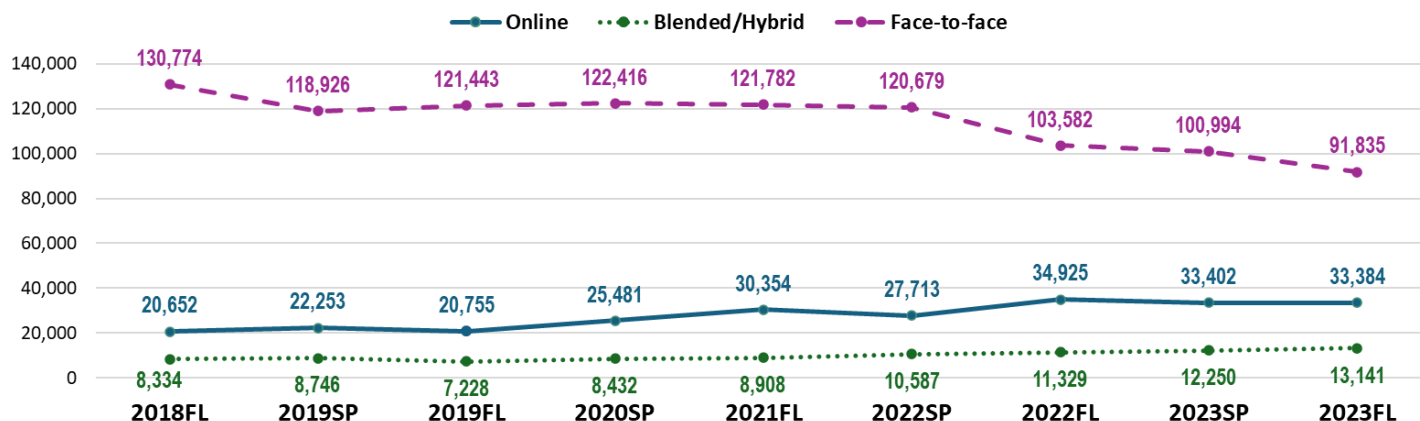
ONLINE FILL RATES

The graphs below show adjustments to the number of seats available by modality when the schedule went live, initial capacity, over time. Based on the sections available to students when the schedule went live, online sections historically filled faster. For example, in 2018FL, about 41% of the initial capacity was filled

in the first three weeks in online sections compared to about 28% in face-to-face sections. Likely as a response to online sections filling, the initial capacity in online sections has increased substantially since 2018FL. In other words, efforts were made to better align capacity with demand.

Percent of Initial Capacity Filled in First Three Weeks After Open Registration
(Intial Capacity is When Schedule went Live)

Legend: ■ Online ■ Blended/Hybrid ■ Face-to-face

Term	Online	Blended/Hybrid	Face-to-face
2018FL	41%	23%	28%
2019SP	69%	35%	48%
2019FL	43%	27%	30%
2020SP	62%	35%	48%
2021FL	26%	13%	16%
2022SP	57%	23%	29%
2022FL	24%	18%	21%
2023SP	48%	31%	38%
2023FL	26%	19%	25%

Intial Capacity When Schedule went Live

Legend: ● Online ●●● Blended/Hybrid ●— Face-to-face

Term	Face-to-face	Online	Blended/Hybrid
2018FL	130,774	20,652	8,334
2019SP	118,926	22,253	8,746
2019FL	121,443	20,755	7,228
2020SP	122,416	25,481	8,432
2021FL	121,782	30,354	8,908
2022SP	120,679	27,713	10,587
2022FL	103,582	34,925	11,329
2023SP	100,994	33,402	12,250
2023FL	91,835	33,384	13,141

CONCLUSIONS – A PERMANENT SHIFT IN MODALITY?

Returning from the pandemic, some speculated that there would be a permanent shift towards online courses. In terms of modality preference, the reported percentage of respondents who preferred all online courses decreased by about half from about 28% in 2021FL to about 13% in 2023FL. While the demographics such as the percentage of part-time and percentage of TCC Connect Campus respondents changed, the decreases in these subgroups of respondents who have historically preferred all online at higher rates may not explain the overall decrease in preference for all online since within these subgroups there was a decrease in the preference for all online.

However, there was a bigger gap between the preferred method and reported enrollment method for 2023 fall survey respondents reporting enrollment primarily online (87% match) compared to respondents reporting enrollment primarily face-to-face (98% match). In addition, historical data showed that online sections available to students when the schedule went live filled faster.

Moreover, the pre-pandemic percent of students in all online and at least one online was somewhat consistent – roughly one in ten and one-quarter respectively. Post-pandemic these percentages were closer to roughly one in five and above one-third respectively. Thus, even though reported preference for all online did not increase over the past few terms, enrollment patterns suggest a potentially permanent shift in the percentage of students enrolled online.

TCC IS FOCUSED ON STUDENT SUCCESS

RECRUITMENT, RETENTION, & COMPLETION

Goal 1: Increase Fall Headcount to 50,000 in Fall 2025

Baseline: Fall 2022 ~43,500
Headcount: the number of credit students enrolled on the fall term's census date.

For a decade (Fall 2010 to Fall 2019), TCC's fall headcount was about 50,000. Headcount declined during the pandemic and decreased to a low of about 40,500 by Fall 2021. Fall 2022 brought signs of recovery with about a 7% increase in headcount from Fall 2021. This growth was mainly driven by new students, which increased by about 24%. The headcount for both new non-dual enrolled students and new dual enrolled students increased substantially; however, the percentage increase was higher for new dual enrolled students.

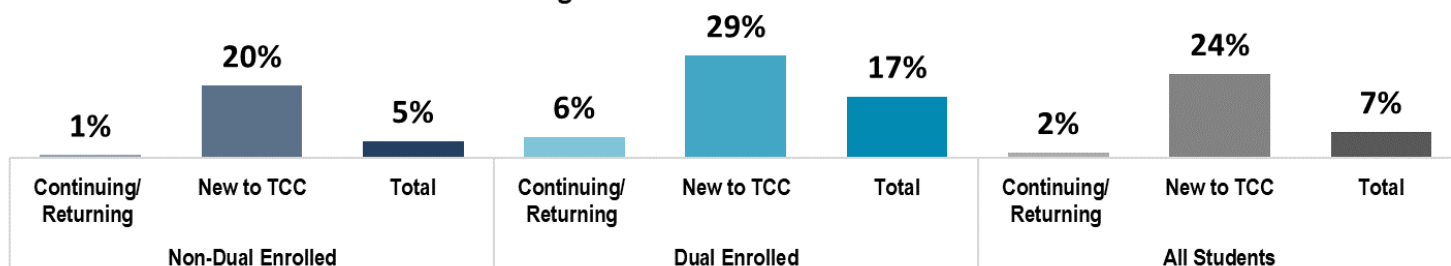Most recently, fall headcount increased about 3% from about 43,500 in Fall 2022 to about 45,000 in Fall 2023. This 3% growth can be almost entirely attributed to the growth in dual enrollment. In particular, there was about a 26% increase in the number of continuing/returning dual enrolled students.

In the summer of 2023, Texas established a new outcomes-based model through House Bill 8. As part of this legislation, the Financial Aid for Swift Transfer (FAST) program provides funding to participating higher education institutions to offer dual credit courses at no cost to economically disadvantaged students. TCC instead made the decision to waive tuition for all dual credit students.
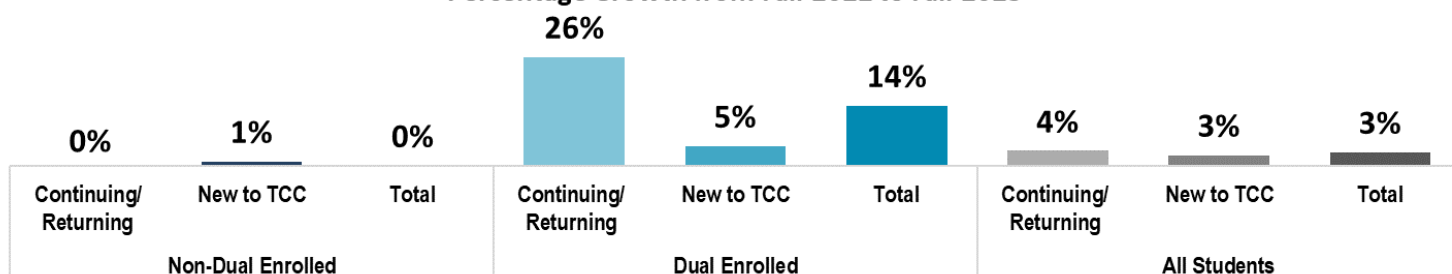
One might try to use this new tuition waiver to explain much of the growth in dual enrollment in Fall 2023. However, the growth was driven more by continuing/returning dual enrolled students who may have made the decision to enroll in TCC in Fall 2023 before learning of the new waiver.

As such, although TCC was short of the milestone goal of 45,700 in Fall 2023, House Bill 8 alongside the College's decision to waive tuition for dual credit students could accelerate the growth of new dual enrollment in the upcoming fall terms.

Percentage Growth from Fall 2021 to Fall 2022

	Non-Dual Enrolled			Dual Enrolled			All Students	
Continuing/Returning	New to TCC	Total	Continuing/Returning	New to TCC	Total	Continuing/Returning	New to TCC	Total
1%	20%	5%	6%	29%	17%	2%	24%	7%

Percentage Growth from Fall 2022 to Fall 2023

|	Non-Dual Enrolled			Dual Enrolled			All Students	
Continuing/Returning	New to TCC	Total	Continuing/Returning	New to TCC	Total	Continuing/Returning	New to TCC	Total
0%	1%	0%	26%	5%	14%	4%	3%	3%

Goal 2: Increase Progression to 8 in 10 Students for Fall 2024 Cohort

Baseline: Fall 2021 ~70% (7 in 10)

Progression: the number of credit fall students who were retained to TCC the following fall, retained to any other institution the following fall, graduated from TCC in the academic year, or graduated from any other institution in the academic year.

Progression

Year	Rate
2016FL	69%
2017FL	68%
2018FL	69%
2019FL	67%
2020FL	66%
2021FL	70%
2022FL	70%
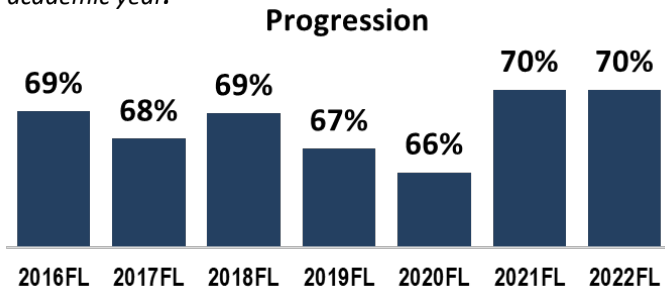
The 2016 to 2018 Fall cohorts had a progression rate just under 70%. Most recently, the rate has reached about 70% for the past two cohorts.
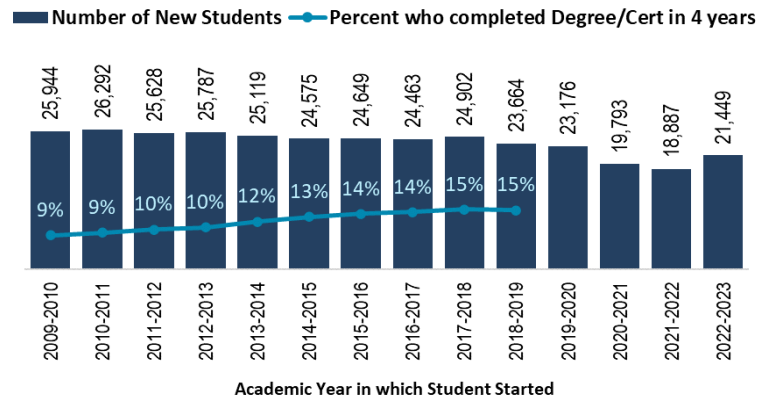
Goal 3: Increase Degree/Certificates to 8,000+ in 2024-2025

Baseline: 2021-2022 ~7,100

Degrees/Certificates: the number of degrees and certificates awarded by TCC in the academic year.

From academic years 2015-2016 to 2020-2021, the number of degrees/certificates awarded was near or above 8,000. This number decreased to about 7,100 in 2021-2022. From academic years 2021-2022 to 2022-2023, there was almost a 5% increase to about 7,400 in 2022-2023. As such, TCC met the milestone goal of 7,333 degrees/certificates in 2022-2023 and is on track to meet the overall goal if the appropriate growth continues.

Several factors influence the number of degrees/certificates awarded – changes in the number of new students, changes in the percentage who complete a degree/certificate, and the number of dual enrolled students. While the number of new students decreased over the past few years, the percentage who earn a degree/certificate in four years has been increasing.
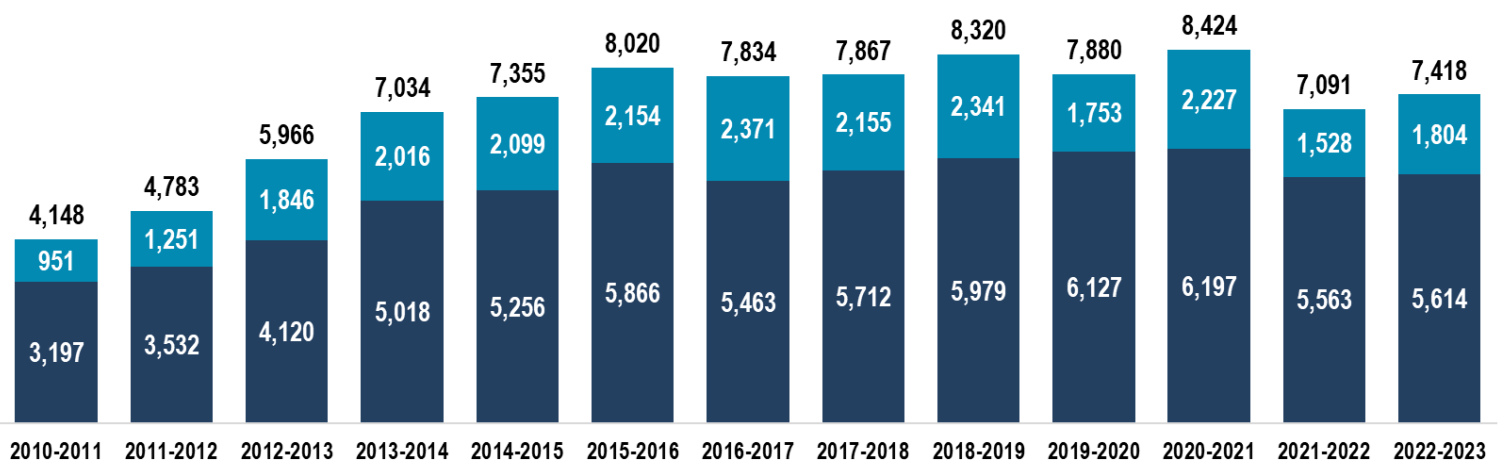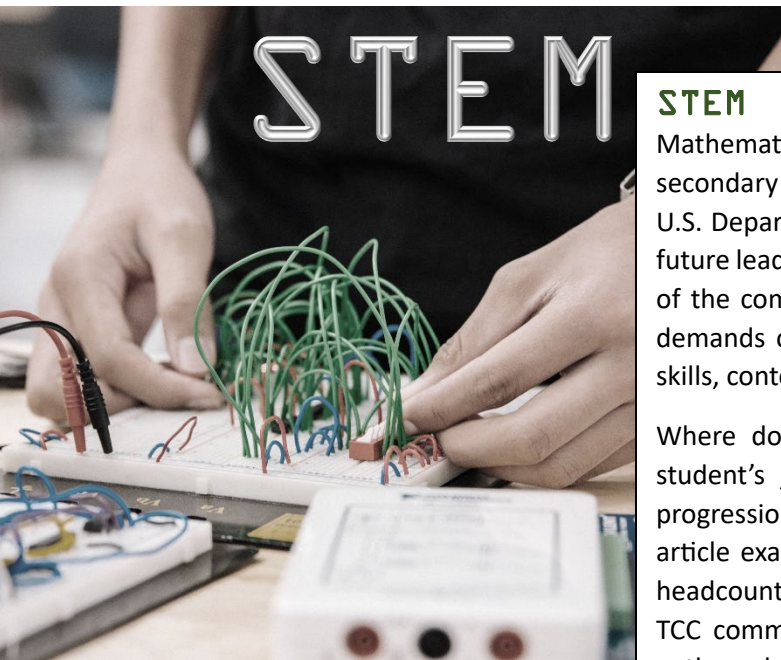
Number of New Students — **Percent who completed Degree/Cert in 4 years**

Academic Year in which Student Started	Number of New Students	Percent completed in 4 years
2009-2010	25,944	9%
2010-2011	26,292	9%
2011-2012	25,628	10%
2012-2013	25,787	10%
2013-2014	25,119	12%
2014-2015	24,575	13%
2015-2016	24,649	14%
2016-2017	24,463	14%
2017-2018	24,902	15%
2018-2019	23,664	15%
2019-2020	23,176	
2020-2021	19,793	
2021-2022	18,887	
2022-2023	21,449	

Note: Here, the percent who complete in four years in based on the student's first term at TCC regardless of whether they started as an FTIC, transfer-in, or dual enrolled student.

In addition, as dual enrollment becomes a larger percentage of the population, their decision of whether to earn a degree/certificate at TCC during their higher education journey will have an impact on this metric. Historically, many ECHS students earn a degree/certificate as they graduate high school or complete at TCC within a few years of their high school graduation. However, dual credit students typically continue at a four-year school after their high school graduation and complete a degree at the four-year school.

Number of Degrees & Certificates

■ Associate Degree ■ Certificate

Year	Associate Degree	Certificate	Total
2010-2011	3,197	951	4,148
2011-2012	3,532	1,251	4,783
2012-2013	4,120	1,846	5,966
2013-2014	5,018	2,016	7,034
2014-2015	5,256	2,099	7,355
2015-2016	5,866	2,154	8,020
2016-2017	5,463	2,371	7,834
2017-2018	5,712	2,155	7,867
2018-2019	5,979	2,341	8,320
2019-2020	6,127	1,753	7,880
2020-2021	6,197	2,227	8,424
2021-2022	5,563	1,528	7,091
2022-2023	5,614	1,804	7,418

STEM

STEM FIELDS - or Science, Technology, Engineering, and Mathematics – continue to be a hot topic of conversation amongst secondary and post-secondary educators across the United States. The U.S. Department of Education states: "If we want a nation where our future leaders, neighbors, and workers can understand and solve some of the complex challenges of today and tomorrow, and to meet the demands of the dynamic and evolving workforce, building students' skills, content knowledge, and literacy in STEM fields is essential." [1]

Where do discrepancies exist within the STEM pathway during a student's journey at TCC? What factors correlate with successful progression within the STEM pathway? To explore these questions, this article examines declared program upon admission to TCC, program headcounts, and completions for STEM fields compared to the greater TCC community as well as FTIC progression rates within the STEM pathway by various demographics and academic indicators.

BACKGROUND AT TCC

The article "STEM: The Leaky Pipeline" from the June 2021 *IR Corner* uncovered that about 17% of degree-seeking first-time in college students at TCC switched from a STEM pathway to a non-STEM pathway in their first year. About 61% of the STEM cohort stayed within STEM, about 22% left TCC, and less than 1% graduated from TCC.

Further, the article "Aligning Program of Study with Career Interest" from the June 2023 *IR Corner* tracked how all TCC students progressed through the various pathways at TCC, with about 45% of STEM students either continuing within or graduating from their pathway from one year to the next. Students on the STEM pathway were more likely to progress in a different pathway compared to students who started on a different pathway. Course success rates for those who progressed within the STEM pathway were, on average, about 24 percentage points higher than those who did not progress in STEM.

METHODOLOGY

This article is divided into two sections:

Section 1 - STEM pathway representation amongst demographics at various points in the TCC academic journey using percentage point differences, specifically applications, program declarations, and completions. All student applications, active programs, and completions were included in the analysis, for the terms 2016FL through 2023SU.

Section 2 - A comparison of first year FTIC progression rates within the STEM pathway disaggregated by demographics and academic indicators. Progression was defined as remaining within the STEM pathway from one fall term to the subsequent fall term, either by program declaration or through completion of a STEM credential within the first year. All FTIC students for the Fall terms 2016FL through 2022FL were included (about 47,000 FTIC). Academic indicators included first-term GPA, entering TSI status, entering TSI Math status, enrolling in a math course in first term, and enrolling in a science course in first term.

[1] https://www.ed.gov/stem#:~:text=If%20we%20want%20a%20nation,in%20STEM%20fields%20is%20essential

Sources: Student Programs, Enrollment Data by Term (no N, no quarters), Student Degrees, ODR, Applicants and Admissions (FAK, CEU, TRT removed)
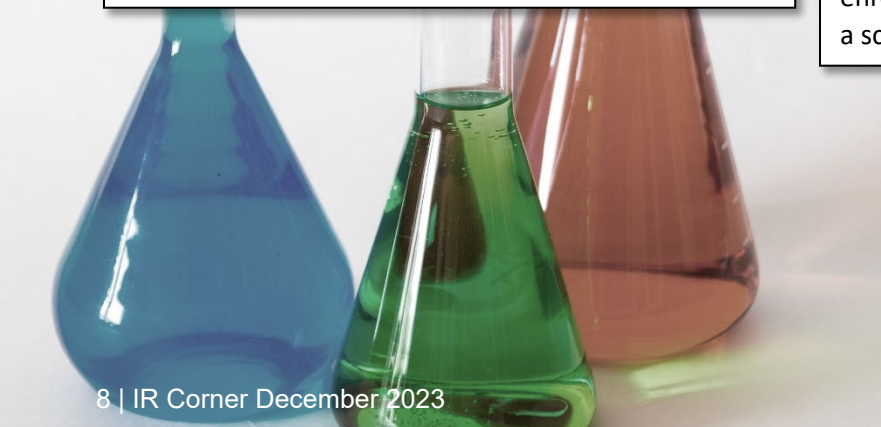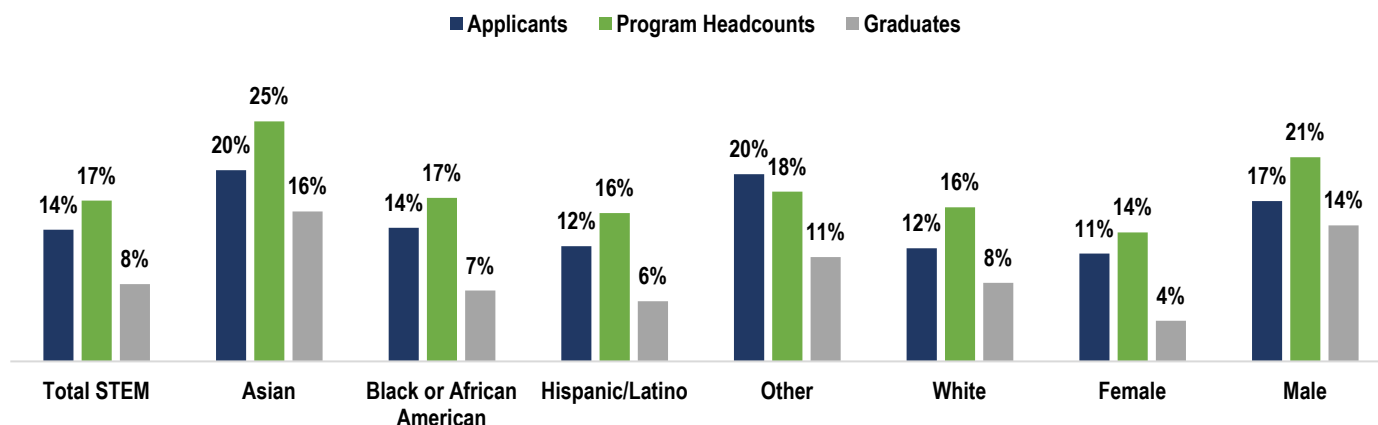
PATHWAY REPRESENTATION

A student's life cycle at TCC starts as an applicant, progresses through program declaration and coursework, and culminates with completion of a degree or certificate. Each time point has a program associated with it. With this timeline in mind, aggregated student program data from 2016FL through 2023SU were examined at application, program declaration, and completion. About 335,900 applicants, about 229,700 students in a declared program, and about 42,400 graduates were included in the analysis.

About **14% of applicants** to TCC selected a STEM program on their application during the time period analyzed. About half of these applicants selected the ASCI.D001.UG (Associate of Science) program as their major (about 51%).

Similarly, about **17% of all students** in a declared UG program at TCC were enrolled in a STEM program. About 59% of the STEM students selected the ASCI.D001.UG program as their major.

However, only about **8% of graduates** completed a STEM program. About 44% of the STEM graduates earned an ASCI.D001.UG degree.

Legend: ■ Applicants ■ Program Headcounts ■ Graduates

	Applicants	Program Headcounts	Graduates
Total STEM	14%	17%	8%
Asian	20%	25%	16%
Black or African American	14%	17%	7%
Hispanic/Latino	12%	16%	6%
Other	20%	18%	11%
White	12%	16%	8%
Female	11%	14%	4%
Male	17%	21%	14%

BY GENDER

When disaggregating the data by gender, female student representation in STEM programs was consistently lower than male student representation at all stages in the student life cycle.

- At application, about **11% of female applicants** indicated a STEM field while about **17% of male applicants** selected a STEM field.
- For students' declared programs, about **14% of female students** were enrolled in a STEM field compared to **21% of male students**.
- Upon graduation, about **4% of female graduates** completed a program in the STEM field compared to about **14% of male graduates**.

BY ETHNICITY

When disaggregating the data by ethnicity, Hispanic/Latino and White student representation in STEM programs were slightly lower than the average rates for all students while Asian student representation was consistently higher than the average rates.

- Black or African American rates in STEM mirrored the average for all students at each point along the student academic journey.
- About **20% of Asian student applicants** indicated a STEM field upon admission to TCC compared to an average of 14% for all applicants.
  - About **16% of all Asian students who graduated** within the timeframe completed a STEM program, compared to about 8% of all graduates.
- Hispanic/Latino student and White student STEM rates were similar at each point in the academic journey, **about 1-2 percentage points lower than the average** for all students.
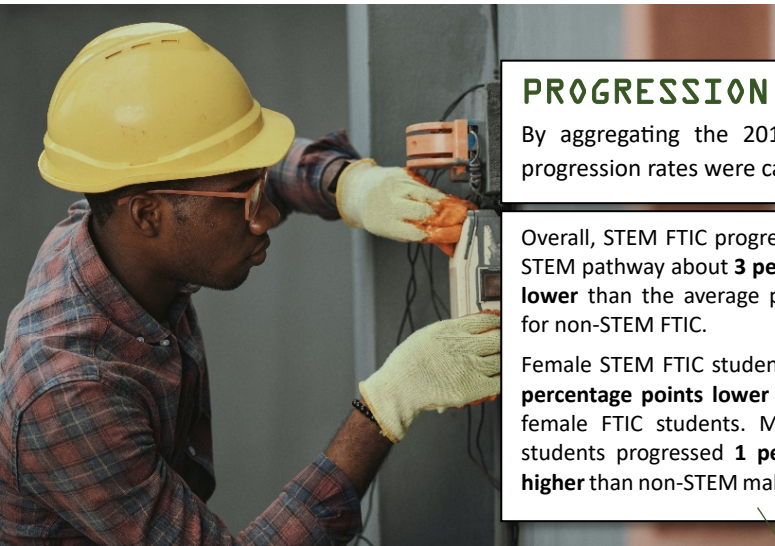
PROGRESSION BY DEMOGRAPHICS

By aggregating the 2016FL through 2022FL FTIC cohorts (about 47,000 FTIC students), progression rates were calculated for general demographics and various academic indicators.

Overall, STEM FTIC progressed within the STEM pathway about **3 percentage points lower** than the average progression rate for non-STEM FTIC.

Female STEM FTIC students progressed **9 percentage points lower** than non-STEM female FTIC students. Male STEM FTIC students progressed **1 percentage point higher** than non-STEM male FTIC students.

Asian STEM FTIC students progressed about **7 percentage points lower** than non-STEM Asian FTIC students. Hispanic/Latino STEM FTIC students progressed about **5 percentage points lower** than non-STEM students. Black or African American STEM FTIC students progressed similarly as Black or African American non-STEM FTIC students. White STEM FTIC students progressed about **3 percentage points lower** than White non-STEM FTIC students.

What were the Top STEM Declared Majors for FTIC?

- **ASCI.D001.UG** - Associate of Science (59%)
- **ITCS.D003.UG/ITPG.D001.UG** - Information Technology: Programming (5%)
- **ASCE.D005.UG** - Associate of Science in Engineering (5%)
- **ITCS.D007.UG/ITCY.D001.UG** - Information Technology: Cybersecurity (4%)

First term GPA and progression were highly correlated, as progression rates increased as GPA increased. In general, STEM FTIC students progressed at lower rates for almost all GPA groups than the average for non-STEM FTIC.
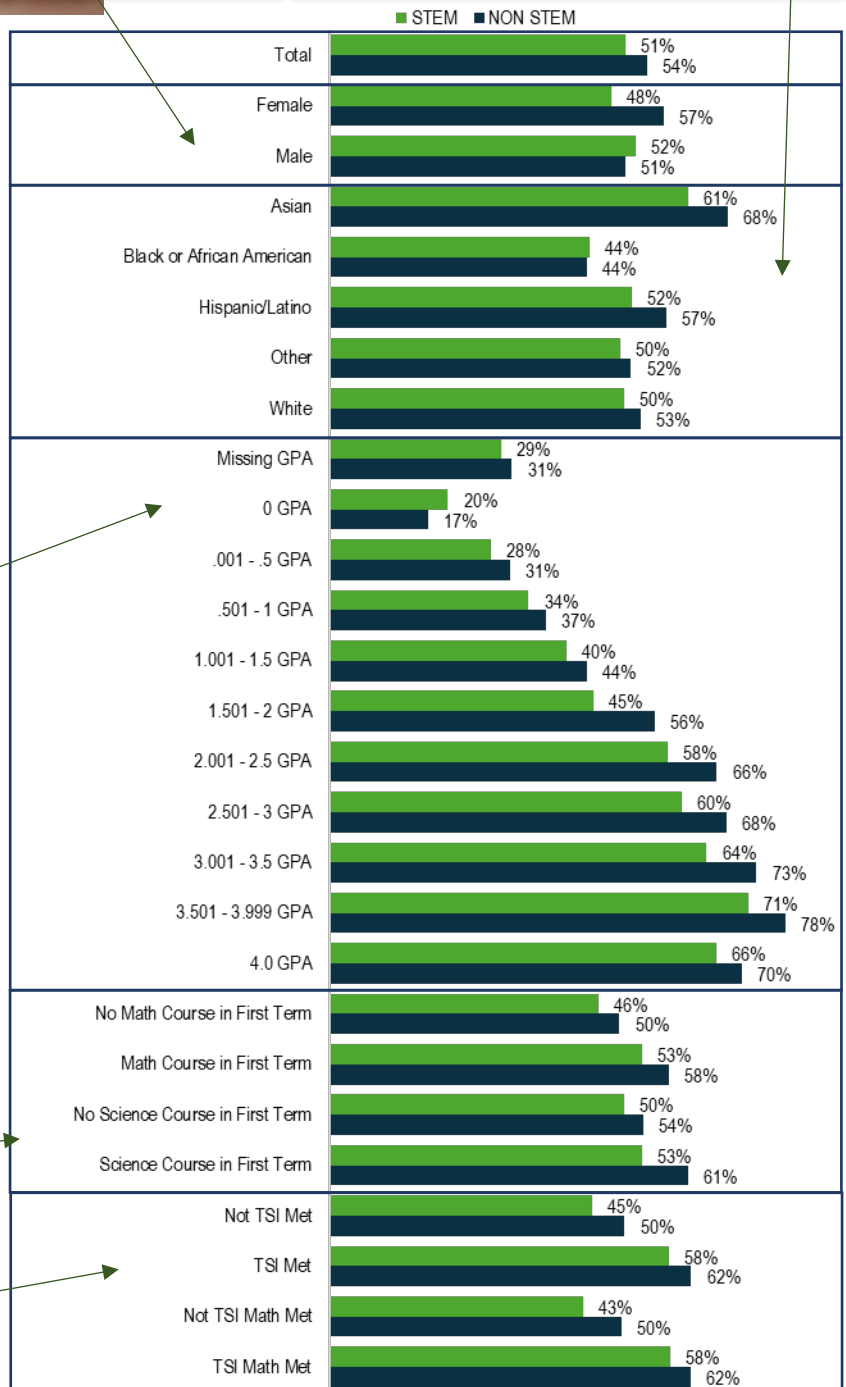
STEM FTIC students with a 0.00 first term GPA progressed about **3 percentage points more** than non-STEM FTIC students with 0.00 GPA.

STEM FTIC students with 1.00 - 3.99 first term GPAs progressed about **5-10 percentage points lower** than the non-STEM FTIC in the same GPA groups.

The highest progression rates (**over 70%**) were experienced by FTIC students with 3.5-3.99 GPAs.

Taking a **Math or Science Course in First Term** correlated with higher progression rates. STEM FTIC students who took a Math course in their first term progressed about **7 percentage points more** than STEM FTIC students who did not. Similarly, STEM FTIC students who took a Science course in their first term progressed about **3 percentage points more** than STEM FTIC students who did not.

Being **TSI Met and/or TSI Math Met** were highly correlated with higher progression rates, with STEM FTIC students being *Met* progressing about **13 percentage points higher** than STEM FTIC being *Not Met* and about **15 percentage points higher** being *Math Met*.

	STEM	NON STEM
Total	51%	54%
Female	48%	57%
Male	52%	51%
Asian	61%	68%
Black or African American	44%	44%
Hispanic/Latino	52%	57%
Other	50%	52%
White	50%	53%
Missing GPA	29%	31%
0 GPA	20%	17%
.001 - .5 GPA	28%	31%
.501 - 1 GPA	34%	37%
1.001 - 1.5 GPA	40%	44%
1.501 - 2 GPA	45%	56%
2.001 - 2.5 GPA	58%	66%
2.501 - 3 GPA	60%	68%
3.001 - 3.5 GPA	64%	73%
3.501 - 3.999 GPA	71%	78%
4.0 GPA	66%	70%
No Math Course in First Term	46%	50%
Math Course in First Term	53%	58%
No Science Course in First Term	50%	54%
Science Course in First Term	53%	61%
Not TSI Met	45%	50%
TSI Met	58%	62%
Not TSI Math Met	43%	50%
TSI Math Met	58%	62%

STEM PROGRAM REPRESENTATION DURING STUDENT ACADEMIC JOURNEY

Applicant Program (% of total applicants)		
ASCI.D001.UG	AS.Associate of Science	51%
ASCE.D005.UG	AS.Associate of Science in Engineering	5%
ASCI.D002.UG	AS.Associate of Science in Chemistry	4%
ELEC.D005.UG	AAS.Electronics Technology - Engineering Technology	4%
ITCS.D007.UG	AAS.Information Technology-Cybersecurity	3%
ITCS.D003.UG	AAS.Information Technology-Programming	3%
ASCI.D003.UG	AS.Associate of Science in Mathematics	3%
ASCE.D006.UG	AS.Associate of Science in Engineering	3%
ITCS.T010.UG	CRT.Programming I	3%
ITCS.T019.UG	CRT.Cybersecurity Specialist	2%

FTIC First Term Program (% of all FTIC)		
ASCI.D001.UG	AS.Associate of Science	59%
ITCS.D003.UG	AAS.Information Technology-Programming	5%
ASCE.D005.UG	AS.Associate of Science in Engineering	5%
ITCS.D007.UG	AAS.Information Technology-Cybersecurity	4%
ASCI.D002.UG	AS.Associate of Science in Chemistry	4%
ELEC.D005.UG	AAS.Electronics Technology - Engineering Technology	3%
ITCS.D006.UG	AAS.Information Technology-Game/Simulation/Animation Design	3%
ASCI.D003.UG	AS.Associate of Science in Mathematics	2%
ASCE.D006.UG	AS.Associate of Science in Engineering	2%
ITCS.T010.UG	CRT.Programming I	2%

Program Headcounts (% of total students)		
ASCI.D001.UG	AS.Associate of Science	59%
ITCS.D003.UG	AAS.Information Technology-Programming	6%
ITCS.D007.UG	AAS.Information Technology-Cybersecurity	6%
ASCE.D005.UG	AS.Associate of Science in Engineering	5%
ASCI.D002.UG	AS.Associate of Science in Chemistry	4%
ITCS.D002.UG	AAS.Information Technology-Network Support	4%
ITCS.T004.UG	CRT.Information Technology Support	4%
ITCS.T019.UG	CRT.Cybersecurity Specialist	3%
ITCS.T010.UG	CRT.Programming I	3%
ASCI.D003.UG	AS.Associate of Science in Mathematics	3%

Program Graduates (% of all graduates)		
ASCI.D001.UG	AS.Associate of Science	44%
ITCS.T004.UG	CRT.Information Technology Support	20%
ITCS.T019.UG	CRT.Cybersecurity Specialist	10%
ITCS.D007.UG	AAS.Information Technology-Cybersecurity	9%
ITCS.T001.UG	CRT.Cisco Support	8%
ITCS.D002.UG	AAS.Information Technology-Network Support	7%
ITCS.T020.UG	CRT.Ethical Hacking	7%
ITCS.T010.UG	CRT.Programming I	7%
ITCS.T009.UG	CRT.Network Support	6%
ITCS.D003.UG	AAS.Information Technology-Programming	5%

The top 10 STEM programs indicated by STEM students varied upon the point in the student timeline. The *Associate of Science* (ASCI.D001.UG) was consistently the top program. Three other programs were in the top 10 for all time period groups: *AAS Information Technology - Cybersecurity*, *AAS Information Technology - Programming*, and *CRT Programming I*.

- Half of the top 10 applicant STEM programs were transfer programs (ASCI/ASCE).
- For FTIC STEM students, only one certificate program was in the top 10 (*CRT Programming I*).
- While only 3 of the top 10 declared STEM programs were certificate programs, 6 of the top 10 STEM completion programs were certificate programs.
- ITCS programs dominated the STEM graduates, with 9 of the top 10 programs.
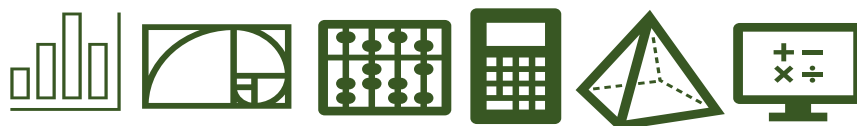
FINDINGS & CONSIDERATIONS

While the importance of STEM field promotion and completion for the success of our local community is undeniable, the individual success of each student's journey towards their academic and career goals is the first step.

About 14% of TCC applicants indicated the intent to study a STEM field upon admission to TCC, and about 17% of students declared a STEM field for their coursework. Female STEM students were markedly underrepresented at both the applicant phase and when declaring a program for coursework. STEM FTIC students progressed at a slightly lower rate when compared to all FTIC, and progress overall was correlated with first term GPA, taking a Math or Science class in the first term, and academic preparedness. About 8% of the graduates TCC produced during the time period of the analysis earned a credential in the STEM field.

Dictate Expectations of the Program – About 58% of STEM TSI Met students progressed within the STEM pathway to the next Fall term, compared to about 45% of STEM FTIC students who were not TSI Met. Providing clear expectations of program requirements and rigor may help guide students' decisions when selecting a program initially.

Promote Certificates – While many students declared a degree program upon admission to TCC, 6 of the top 10 STEM programs earned by graduates were certificate programs. Promoting certificates or stackable credentials earlier in the student's academic journey may assist in a student's completion of a credential.

Encourage Additional Academic and Student Support Services – Both First Term GPA and TSI status were correlated with STEM pathway progression. As students progress through their journeys at TCC, awareness of additional support will better ensure they reach their academic and personal goals, especially for those students who may not be academically prepared for a STEM program.

Educational Opportunities in Just Eight Weeks

Revisiting 8- and 16-Week Course Lengths

In our December 2022 issue, we explored some of the differences in outcomes when classes were offered in an 8-week format versus a 16-week format. Additional questions were raised during the research process:

- Do the observed relationships from the last article regarding success (defined as a grade of A, B, C, or CR) remain when examining student sub-populations?
- Is retention from first to second 8-week sessions comparable to retention between fall and spring for 16-week sessions?

Success Rates of 8- and 16-Week Courses by Sub-Populations

The article released last December demonstrated that overall courses taught in an 8-week format yielded marginally higher success rates. Here, we further subdivide the student body by Gender, Course Load, and status as a Dual Credit (DC) or Early College High School (ECHS) student using terms 2016FL to 2023SP (excluding summers). While subgroups vary in overall success, all seem to continue the previously observed trend that an 8-week format yielded marginally higher success rates with the exception of ECHS students. For ECHS students, when all terms were combined, students in 8-week courses underperformed those in 16-week courses by about **8%**. It must be noted that the number of course enrollments included for ECHS each term were much smaller than those of DC or UG; thus, term success rates had more variation. For DC students, when all terms were combined, students in 8-week courses outperformed those in 16-week courses by about **5%**.

The DC subpopulation was further explored, and it was found that most of the 8-week DC enrollments **(roughly 80%)** were English courses. Overall,
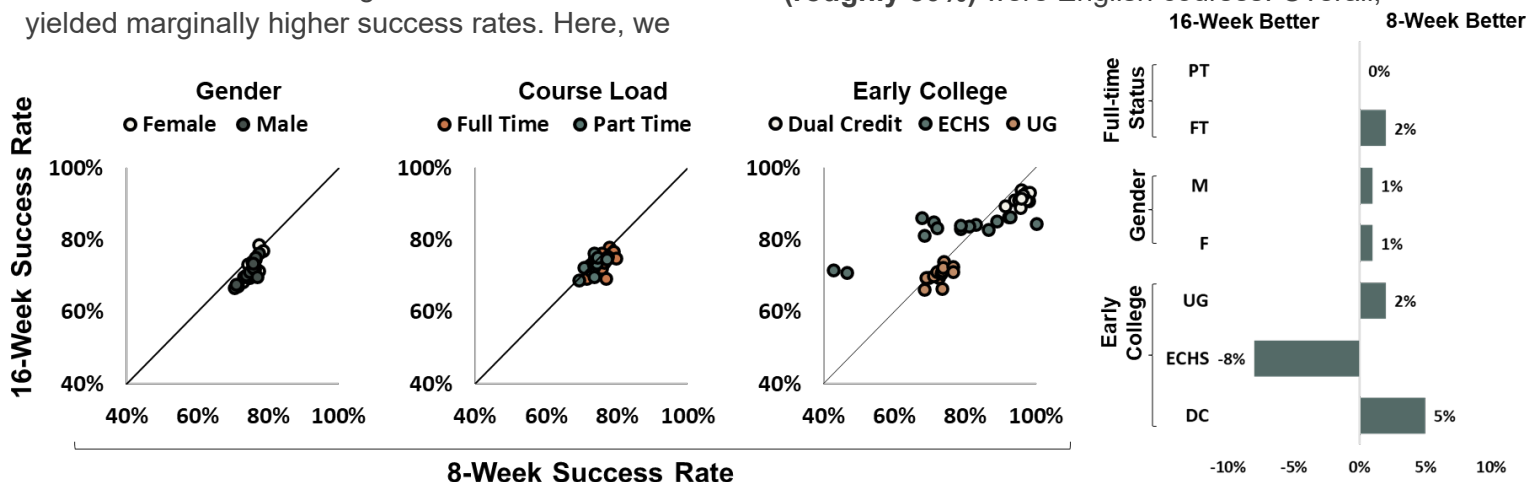
Each point represents the combined average success rates (A, B, C, CR) for courses that offered both 8-week (x-axis) and 16-week (y-axis) courses in the same term for Fall and Spring semesters. Any deviation from the 1:1 line indicates that one format outperformed the other in that term.

students in 8-week English courses outperformed students in 16-week English courses by several percentage points.

DC ENGL Success Rates by Course Length

	8 - Weeks			16 - Weeks		
	Total	Success	Success %	Total	Success	Success %
ENGL-1301	2,973	2,872	97%	17,066	15,376	90%
ENGL-1302	2,901	2,836	98%	14,071	13,123	93%
ENGL-2322	2,343	2,310	99%	3,685	3,485	95%
ENGL-2323	2,418	2,387	99%	5,263	5,070	96%

Thus, the high 8-week success rates seen in DC could largely be attributed to success in English, and further led us to explore English courses in an 8-week format.

The 8-week English model for DC students was almost exclusive to the Northeast campus with DC students from Carroll Senior High, Colleyville Heritage, and Grapevine Senior High accounting for about 90% of the enrollments in this model. DC students from these high schools have historically had success rates several percentage points higher than the overall DC population.

This raises the question: Are the higher success rates due to the 8-week modality, the high school, or a combination of both?

Retention to the Next Session / Semester

One of the claims in support of 8-week course formats is that the shorter timeframe is an effective means of preventing student burnout. We sought to investigate this claim by making a simple comparison between students with an entirely 16-week schedule and students with an entirely 8-week schedule.

- When all students were considered, 16-week fall-to-spring retention was **about 73%**, and 8-week retention from the first to second 8-week session was **about 69%**

- When **looking exclusively** at Dual Enrolled (DC & ECHS) students, 16-week fall-to-spring retention was **about 89%**, and 8-week retention from the first to second 8-week session was **about 94%**

- When **excluding** Dual Enrolled students, first to second 8-week session retention was about **58%**. However, when the definition of 8-week retention was expanded to include

retained to the second 8-week session or retained to the following spring, the retention rate rose to about **76%**, even higher than the comparable 16-week retention rate of **67%**

While it initially appears that students in 16-week courses have higher retention, allowing 8-week students to be retained to the following semester resulted in the retention rate for this group to greatly exceed the 16-week group. In other words, many Fall first 8-week students seem to be stopping out for the second 8-week session and then returning the following Spring.

Retention by Course Length
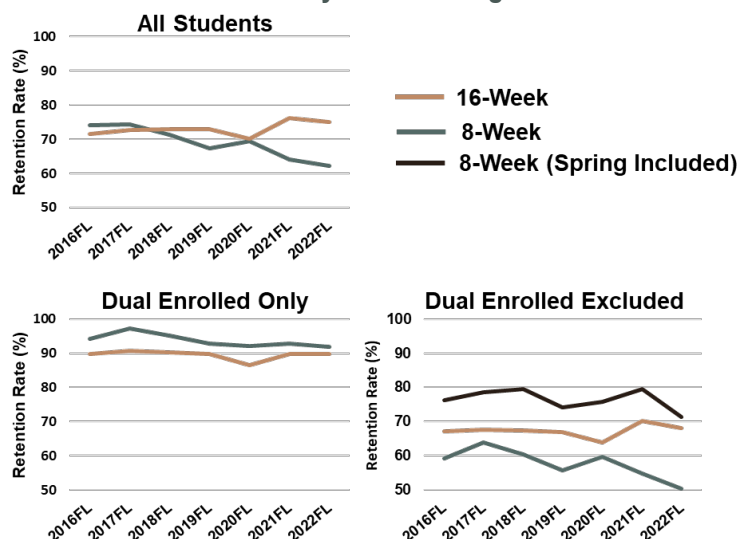
Conclusion

For DC students, it appeared that English may be well-suited to a shorter modality. Overall, findings for 8-week courses for DC students were limited since the model was largely used for English courses at the Northeast campus. However, using 8-week courses for DC students likely warrants discussion and further experimentation since this model might suggest that DC students can take more courses without detriment to their success.

Retention from one term to the next appeared at first to be much higher for 16-week modalities; however, students with first 8-week classes had higher retention when allowing for students to return the second eight weeks or the following Spring semester. Further research should be conducted to better understand the "second 8-week stop out" for these students with first 8-week classes.

ADRIFT – ARE STUDENTS IN CANCELLED SECTIONS LOST?

While the goal is to align course offering with student demand, ultimately some sections must be cancelled due to low enrollment or other factors. The hope is that students in these cancelled sections are guided or find their way to other sections.

How many students were affected?

For the past three fall terms (2021 to 2023), at least 2,000 students were dropped from a course due to its cancellation. Most recently, in Fall 2023 about 2,100 students were dropped from almost 2,300 course enrollments due to cancellations. Note that of those students in cancelled sections in Fall 2023, about 7% were in multiple cancelled sections.

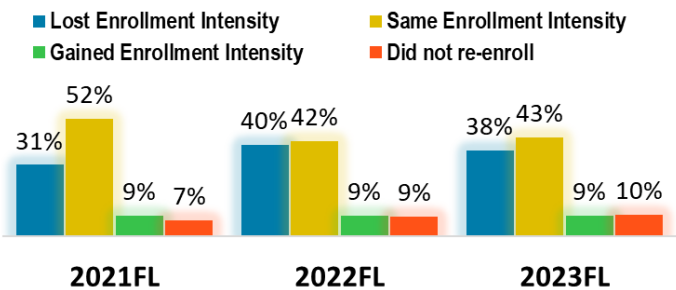|	Students in Cancelled Sections	Course Enrollments in Cancelled Sections
2021FL	4,026	4,692
2022FL	2,483	2,732
2023FL	2,123	2,275

Did students in cancelled sections enroll in other courses?

10% were "lost"

For each term, roughly 10% of students dropped due to a cancelled section were not enrolled in any other course at the end of the term. In other words, about 200 students were "lost" due to cancelled sections in Fall 2023.

For comparison, of the approximately 1,800 students who were dropped for non-payment (dereged) in Fall 2023, about 1,200 students (about two-thirds) were not enrolled at the end of the term.

While some students were not lost due to cancelled sections, they decreased their enrollment intensity. For example, a student who was enrolled in nine hours at the time of their first cancelled section might have been enrolled in six hours at the end of term.

Legend: Lost Enrollment Intensity, Same Enrollment Intensity, Gained Enrollment Intensity, Did not re-enroll

2021FL: 31%, 52%, 9%, 7%
2022FL: 40%, 42%, 9%, 9%
2023FL: 38%, 43%, 9%, 10%

For the past two fall terms, roughly 40% of those who were in cancelled sections decreased their enrollment intensity by the end of the term, and 40% of those who were in cancelled sections maintained their same enrollment intensity – meaning the student replaced the cancelled hours with a course(s) with the same number of hours.
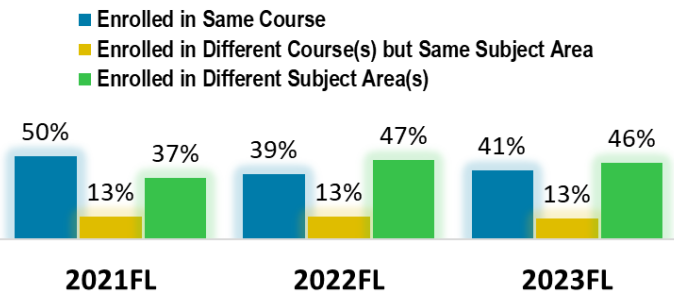
In which courses were students enrolled?

Overall, about 90% of students who were in sections that got cancelled remained enrolled in at least one other course at the end of the term. At the end of the term,

students in cancelled sections may have re-enrolled in the same course, have been enrolled in a different course(s) but in the same subject area, or have been enrolled in a different course(s).

In Fall 2023, for those who remained enrolled at the end of the term after having been dropped from a course due to cancellation, about 41% were enrolled in the same course from which they had been dropped. About 13% were enrolled in a different course(s) but in the same subject area, and about 46% were enrolled in a different subject area.

For those enrolled at the end of the term:

Note: Students dropped from multiple cancelled courses were counted more than once in the graph above.

In what modality were students enrolled?

The modality distribution shifted for students in cancelled sections. In Fall 2021, about 16% of students in cancelled sections were enrolled in at least one online course at the time their first section was cancelled. In Fall 2023, about 27% of students in cancelled sections were enrolled in at least one online course at the time their first section was cancelled.

Overall, roughly 90% of students in cancelled sections did not switch their schedule's modality.

For those enrolled at the end of the term:

| | Modality at Time of First Cancelled Section | Modality at End of Term | | |
		None online	Some online	All online
2021FL	None online	94%	5%	1%
	Some online	5%	76%	19%
	All online	3%	13%	84%
2022FL	None online	88%	10%	1%
	Some online	7%	78%	16%
	All online	3%	5%	92%
2023FL	None online	88%	11%	1%
	Some online	6%	81%	13%
	All online	3%	11%	87%

What does it mean?

Compared to the number of students lost due to non-payment, the number of students lost due to cancelled sections was much smaller in Fall 2023. However, while about 90% of students in cancelled sections remained enrolled in some other course, the number of credit hours the student took typically dropped. In Fall 2023, for those enrolled at the end of the term, about four in ten students from cancelled sections were re-enrolled in the same course, about 90% were in the same modality.

Precedence on Modality or Course?

Based on student respondents to scheduling preferences surveys: When asked if their preferred method were not an option, over 40% would enroll in the same course while roughly 30% to 35% would switch to a course taught in their preferred modality.
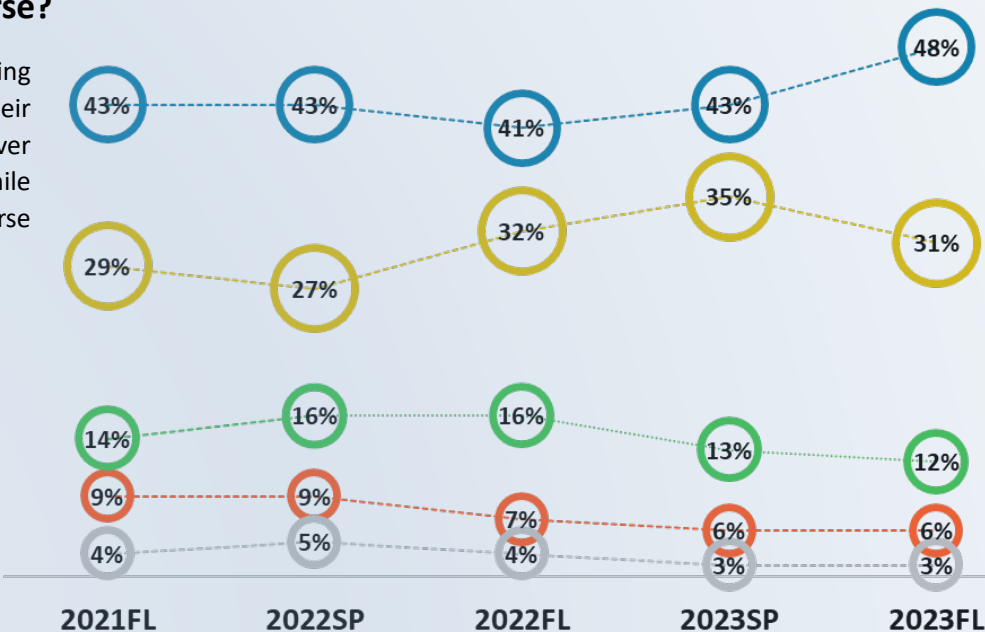
Are the New TSI English Cutoff Scores Placing Students Appropriately?

Introduction

Introduced in August 2013, the Texas Succes Initiative (TSI) assessment was designed to help Texas public institutions of higher education determine whether students were ready for college-level courses in English and math. Scores from the TSI test placed students at the adult basic education (ABE), developmental education (DE), or college level. In August 2017, the state adjusted the benchmark for college level, and in January 2021 the state introduced a new TSI assessment called TSI 2.0. In the December 2021 issue of IR corner, we examined the transition from the TSI to the TSI2 and showed that while the percentage of students who placed into each of the three categories remained consistent for math, a huge shift was seen in English placement. Specifically, over half of students who tested placed into ABE for English. In part, based on these findings, TCC adjusted the DE benchmark. Here, we seek to determine the impact of TCC changing the cutoff scores in March 2022.

Updated Placement

While the current placement distribution is less extreme than distribution from 2021 to 2022, the percentage of students who placed into ABE is still much higher than in the past. From 2021 to 2022, about 56% placed in ABE. After TCC adjusted the benchmark for DE in March of 2022, about 38% placed in ABE. Of special interest is the group of students who *would have* been placed into ABE in 2021 to 2022 but were placed into DE after 2022 (shown shaded in orange). About 60% of students who would have been placed in ABE under the 2021 to 2022 benchmarks were "bumped up" to DE.

Comparison of Student Outcomes by Placement

Ultimately, if students are succeeding in their college-level English classes, then their placement seems appropriate. Here we compare the outcomes for students by their placement in 2022FL and 2023SP. Of the students who took the TSI2 and later enrolled in ENGL-1301 at TCC in 2022FL or 2023SP, 1,577 were placed into DE English, and 850 of these were students who would have been placed into ABE under the old standards. The success rates for each group in ENGL-1301 are shown below.
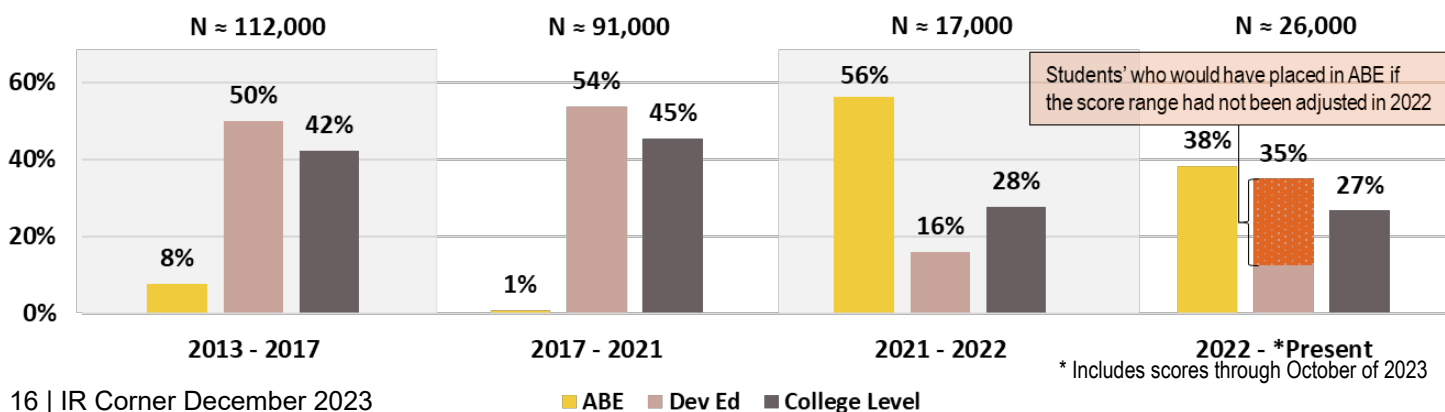
Success Rates (A, B, C, CR) in ENGL-1301 (2022FL/2023SP)

"Bumped" to DE	DE
68%	70%
850	727

Conclusions and Considerations

While the percentage who placed into ABE was reduced by almost 20 percentage points with TCC's adjustment to the DE cutoff in March 2022, it is still much higher than it was prior to the introduction of the TSI2 in 2021. Combining 2022FL and 2023SP, the success rates in ENGL-1301 for students who were "bumped up" to DE was only about two percentage points lower than those who placed into DE under either TSI2 standard. Thus, it may be worth discussing whether more students who place into ABE could be moved up to DE considering the somewhat comparable success rates in ENGL-1301.

Source: Student Tests; Enrollment by Term

Chart data:

N ≈ 112,000 (2013 - 2017): ABE 8%, Dev Ed 50%, College Level 42%

N ≈ 91,000 (2017 - 2021): ABE 1%, Dev Ed 54%, College Level 45%

N ≈ 17,000 (2021 - 2022): ABE 56%, Dev Ed 16%, College Level 28%

N ≈ 26,000 (2022 - *Present): ABE 38%, Dev Ed 35%, College Level 27%
* Includes scores through October of 2023

Students' who would have placed in ABE if the score range had not been adjusted in 2022

Legend: ABE, Dev Ed, College Level

College Ready Graduates

Based on Region 11 Texas Education Agency (Fort Worth) historical data, about half of annual graduates were considered *College Ready.* Between 2016-17 and 2020-21 this percentage ranged from a low of 47.2% to a high of 50.1%.
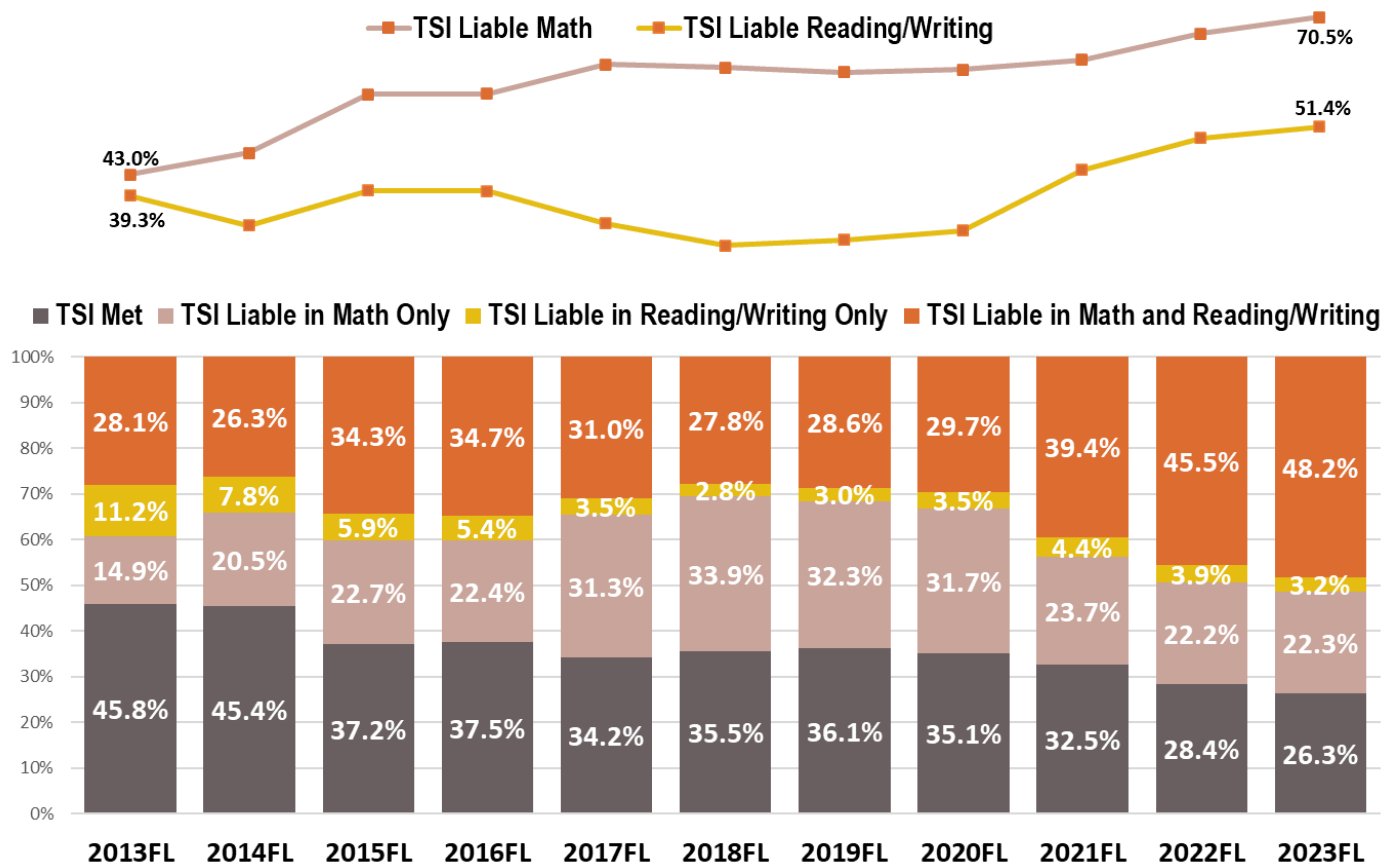
College Ready (Annual Graduates)

2016-17	2017-18	2018-19	2019-20	2020-21
47.2%	49.1%	50.1%	50.1%	48.8%
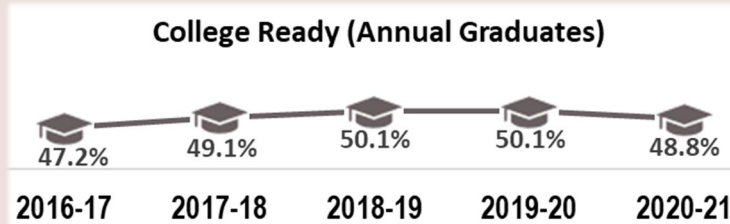
Source: TEA TARP Reports: https://rptsvr1.tea.texas.gov/perfreport/tapr/tapr_srch.html?srch=R

Implications of the TSI Test

In 2013, about 46% of first time in college (FTIC) students entered TSI met, meaning that they were considered "college-ready". At that time, about 43% of the 2013 Fall FTIC entered TSI liable in math, and about 39% entered TSI liable in reading/writing. The percentage of FTIC students who entered TSI met substantially decreased by Fall 2023 with only about one in four students entering "college-ready". About 71% of the 2023 Fall FTIC entered TSI liable in math, and about 51% entered TSI liable in reading/writing. Note that the percentage of TSI met students was fairly steady between 2017 and 2020, which corresponds with the 2017 to 2021 TSI benchmark time range in which the college ready standard was unchanged. This percentage dropped in Fall 2021 and continued to drop through Fall 2023. This decrease is likely related to the new TSI 2.0 test and/or a "pandemic" effect.

Academic Preparedness of FTIC Students

Legend: —■— TSI Liable Math   —■— TSI Liable Reading/Writing

TSI Liable Math: 43.0% (start) ... 70.5% (2023FL end)
TSI Liable Reading/Writing: 39.3% (start) ... 51.4% (2023FL end)

Legend: ■ TSI Met ■ TSI Liable in Math Only ■ TSI Liable in Reading/Writing Only ■ TSI Liable in Math and Reading/Writing

Category	2013FL	2014FL	2015FL	2016FL	2017FL	2018FL	2019FL	2020FL	2021FL	2022FL	2023FL
TSI Liable in Math and Reading/Writing	28.1%	26.3%	34.3%	34.7%	31.0%	27.8%	28.6%	29.7%	39.4%	45.5%	48.2%
TSI Liable in Reading/Writing Only	11.2%	7.8%	5.9%	5.4%	3.5%	2.8%	3.0%	3.5%	4.4%	3.9%	3.2%
TSI Liable in Math Only	14.9%	20.5%	22.7%	22.4%	31.3%	33.9%	32.3%	31.7%	23.7%	22.2%	22.3%
TSI Met	45.8%	45.4%	37.2%	37.5%	34.2%	35.5%	36.1%	35.1%	32.5%	28.4%	26.3%

Senior Education Program Overview

Introduction

The Senior Education Program (SEP) is a unique educational opportunity for individuals aged 55 and older. TCC offers a variety of course topics from current events and history to arts & crafts and recreational activities. The program is coordinated on each campus with Senior Advisory Councils organized through Lifestyle and Community Learning (LCL). Other general information about the SEP includes:

- Senior Ed. students must be at least **55*** years old prior to the start date of their first enrolled course in the program. (*some exclusions apply)

- **10-week** sessions are offered each Fall and Spring term, in person, on each TCC campus.

- Courses are taught by fellow seniors and **volunteers** with prior experience in any of the designated subject areas.

- Seniors pay one **$20** registration fee per semester, and there is no limit on the number of courses they can enroll in any given term.

- Senior Ed. students can register **online** or in-person at any Admissions or Registrar's Office.

Enrollment History

TCC has offered senior specific courses since the SEP was founded in the early 1970's. This overview examines 10 academic years' worth of enrollment data. However, these data exclude any courses with **zero** contact hours (initial Orientation/Registration courses).

SEP course enrollments peaked during the 2017-2018 AY with a total of **10,907** course enrollments.

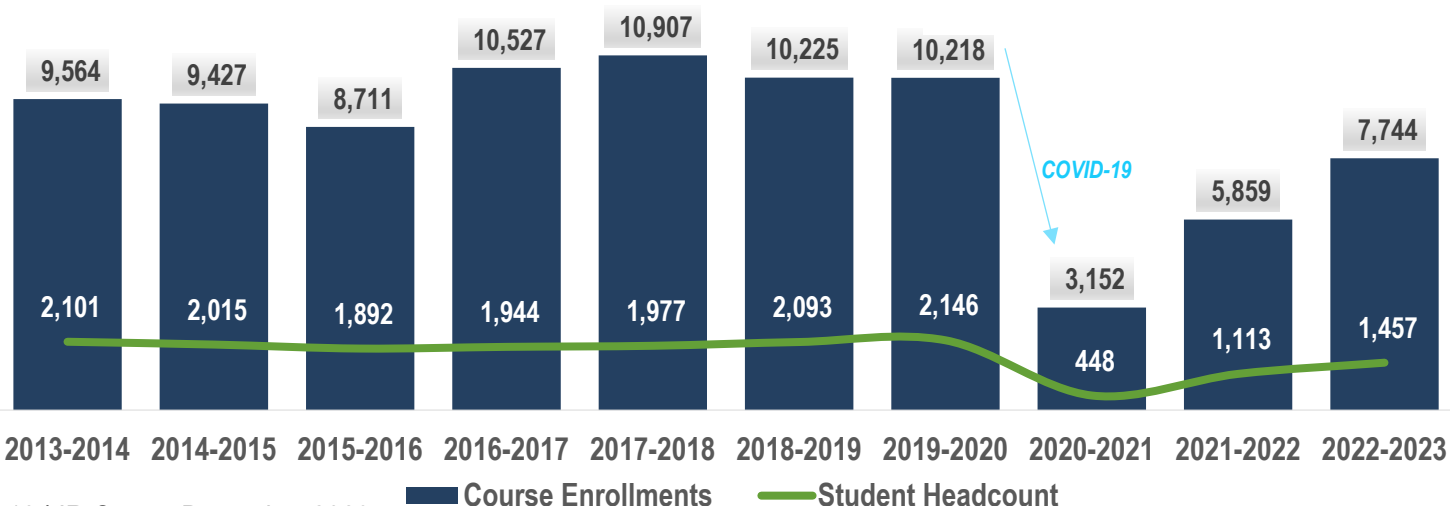The SEP headcount peaked with **2,146** students enrolled throughout the 2019-2020 AY.

Between 2019-2020 AY and the 2020-2021 AY, SEP course enrollment fell **69%,** to less than 4,000. The program headcount fell **79%** to 448 students.

SEP engagement recovered some since 2020, with **7,744** course enrollments and **1,457** students in the 2022-2023 AY.
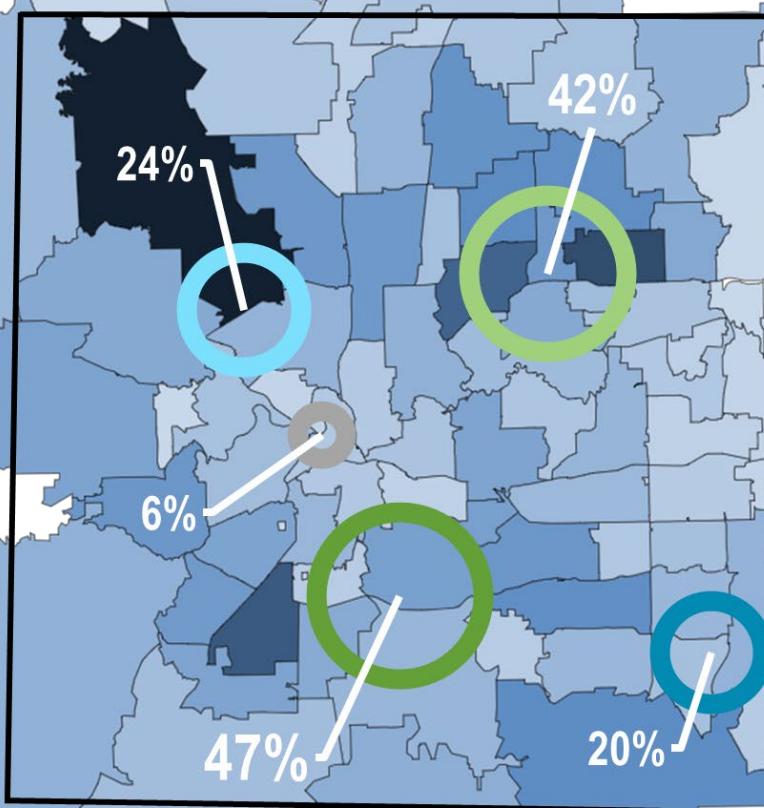
The SEP has a total unduplicated headcount of **8,007** students since 2013FL. Those students accounted for over **85,000** course enrollments.

	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023
Course Enrollments	9,564	9,427	8,711	10,527	10,907	10,225	10,218	3,152	5,859	7,744
Student Headcount	2,101	2,015	1,892	1,944	1,977	2,093	2,146	448	1,113	1,457

COVID-19

■ Course Enrollments ━ Student Headcount

Student Population

High — Low

- SO
- NE
- NW
- SE
- TR

24%
42%
6%
47%
20%

N=8,007

Note: This map utilizes SEP student ZIP Code data within Tarrant County. Some ZIP code values available for students are invalid/missing.
Note: *Percentages for each campus add to more than 100% due to students attending multiple campuses.*

Demographics

Most SEP students live within Tarrant County. Demographic information includes the following:

The highest concentration of SEP students currently live or lived in the **76179** ZIP code, totaling about **5%** of the SEP population.

About **47%** of SEP students attended South Campus since 2013FL. About **6%** of SEP students attended Trinity River Campus.

About **26%** of SEP students enrolled in courses at **more than one** campus since 2013FL.
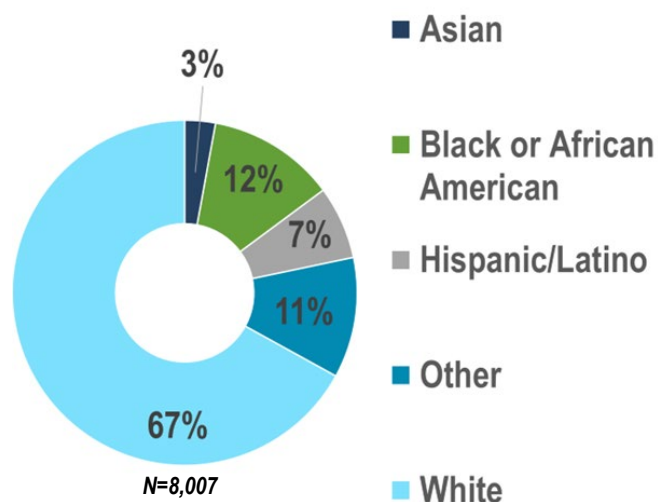
About 2 in 3 students identified as *White,* with no other race/ethnicity exceeding **15%**.
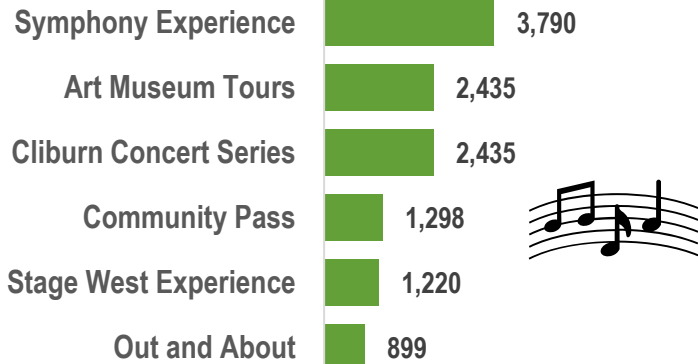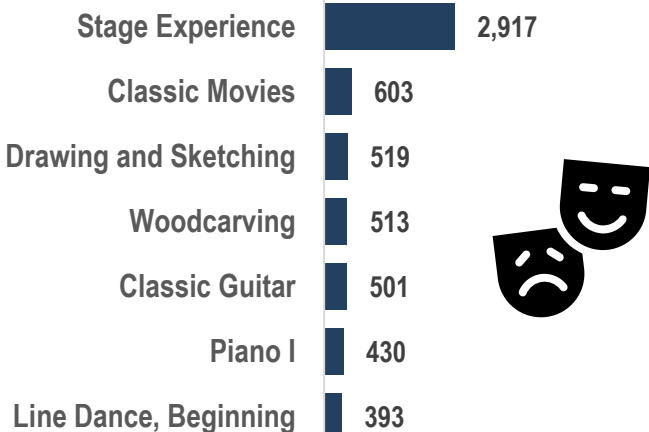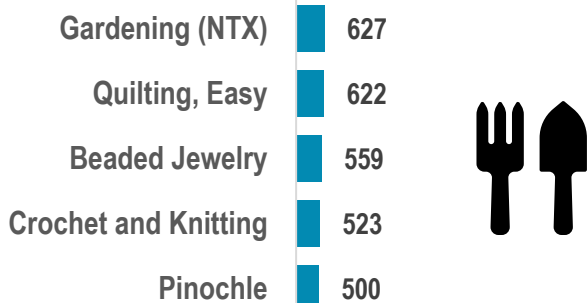
N=8,007

| Female, 72% | Male, 28% |

- Asian
- Black or African American
- Hispanic/Latino
- Other
- White

3%
12%
7%
11%
67%

N=8,007

19

Exercise/Sports

Course	Enrollment
Water Exercise	8,386
Water Aerobics	2,781
Weight Training	2,511
Yoga for Seniors	2,332
Exercise for Seniors	1,273
Golf	722
Pickleball	664
Tai Chi	548

Exploring Ft. Worth

Course	Enrollment
Symphony Experience	3,790
Art Museum Tours	2,435
Cliburn Concert Series	2,435
Community Pass	1,298
Stage West Experience	1,220
Out and About	899

Music/Arts/Movie

Course	Enrollment
Stage Experience	2,917
Classic Movies	603
Drawing and Sketching	519
Woodcarving	513
Classic Guitar	501
Piano I	430
Line Dance, Beginning	393

Hobbies/Crafts/Games

Course	Enrollment
Gardening (NTX)	627
Quilting, Easy	622
Beaded Jewelry	559
Crochet and Knitting	523
Pinochle	500

Top Courses/Content Areas

The SEP has offered many different courses since 2013FL. These courses fit into a variety of categories like exercise, community engagement, and general hobbies/personal improvement activities. SEP courses based on total enrollments:

- The *Sr. Ed. Registration/Orientation, Sr. Ed. Instructors, and Sr. Advisory Council* courses were **excluded** from the analysis, as they have **zero** contact hours associated with them.

- All the course titles listed accounted for about **46%** of total SEP enrollments since 2013FL.

- The course title with the **highest** enrollment was *Water Exercise*. This course accounted for about **10%** of total SEP enrollments.

- Some course titles were very similar and may contain the same course content (e.g. *Gardening in North Texas* and *Herb Gardening Workshop*). In this analysis, course titles were **not** combined.

Conclusion

Prior to the outbreak of COVID-19, the Senior Education Program had a consistent baseline of engagement/activity of roughly 2,000 seniors each academic year. Enrollment data from the last three years indicates the SEP program is steadily recovering from the pandemic's negative enrollment impact and even has the potential to grow over the next decade.

To expand SEP engagement in the future, LCL should evaluate what demographic groups & geographic areas are being underserved and how to program/schedule course offerings around attracting new members of the senior community in Fort Worth.

Current SEP students should be encouraged to spread information/resources regarding course offerings to increase community engagement and recultivate the previously established baseline enrollment for the program.

Source: Student Demographics, and Enrollment Data by Term – filtered by Topic Code (SENR)

COMING SPRING 2024

IR will release the first set of **PowerBI dashboards** which will be available through *IR's Data Hub* – a landing page for all dashboards. These first dashboards will include:

- IPEDS Comparison
- Tarrant County Demographics
- Programs
- Progression
- Course Completion
- Dual Enrollment

- Census Day Headcount & Enrollment
- Degree & Certificates
- Sections
- FTIC Cohort Overview
- FTIC One-Year Outcomes

Data on Demand – Your numbers are a click away!

WELCOME TO IR's DATA HUB

PUBLIC REPORTS & DASHBOARDS

IPEDS: Peer Comparison

Tarrant County Demographics

*REPORTS & DASHBOARDS WILL OPEN IN NEW TAB

INTERNAL REPORTS & DASHBOARDS
REQUIRES LOGIN

Daily Registrations

*REPORTS & DASHBOARDS WILL OPEN IN NEW TAB

"What helped you learn the material in this course?"

A qualitative analysis of course evaluation comments

Open-ended responses on course evaluations provide some information, but with small sample sizes and limited characters, much is not captured about a student's experience. By looking at comments in aggregate, a clearer picture emerges of what benefits students in learning the course material.

For this analysis, more than 10,000 comments from the course evaluation question *"What helped you learn the material in this course?"* from 2022FL and 2023SP were coded by theme.

THEMES

In answering the question, more than four in ten respondents focused on the **resources** related to the course materials, such as textbooks, videos, handouts, and online resources.

> *"The textbook with online practice modules was very helpful. Repetition is key with this amount of vocabulary."*
>
> *"The chapter handouts helped me the most in this course. They helped guide me through the material that was in each chapter."*

Online resources mentioned include:

- ✓ Alek
- ✓ Cengage
- ✓ Kahoots
- ✓ NetLab
- ✓ Quizlet
- ✓ VHL

Canvas was a commonly mentioned resource, with several respondents focused on the benefits of always having materials available to them through the modules.

> *"Online materials to read on canvas were helpful to me because I could access them anywhere I had access to the internet."*

About one in three respondents mentioned **instruction**. Many instruction-themed comments were general and positive about the professor/instructor, mentioned the lectures and PowerPoint slides, as well as the faculty's knowledge, supportiveness, availability, and understanding.

Comments about instruction were mentioned by about one in three respondents.

> *"Very helpful lectures using real life examples and detailed slides."*
>
> *"She was an amazing teacher who really cared about every student so she helped me learn the material."*

For more than one-quarter of respondents, the **application** of the learning through assignments, discussion boards, case studies, and labs was beneficial to their learning. Respondents frequently mentioned learning best through hands-on activities and making connections with the material by putting it into practice.

> *"The homework assignments were really helpful throughout this course. I was able to use the videos and homework assignments to enhance my learning."*

"The lab is definitely the most useful part in class, it provides material that is explained well and has engaging activities that expand on the class lecture material."

Communication was a factor in learning for close to one-fifth of respondents, with students noting when it was clear, timely, and readily available. Respondents mentioned a desire for feedback and further explanations.

"Our professor is very clear, concise and doesn't hesitate to help those who are still struggling with the material."

"One on one communication"

Effective **study strategies** also emerged as a common theme for about 10% of respondents. This included reading, studying, attending class, as well as tutoring and asking for help.

Specific TCC resources mentioned include the libraries, math lab, science lab, Supplemental Instruction, and TRIO.

"Studying with my peers and paying attention during lecture."

"SI is a great opportunity for you to be able to focus on a specific problem that you are having trouble with."

The **learning environment** also played a role, as mentioned by about one in ten respondents. Some of the factors that impacted the learning environment included the faculty's teaching style, engaging the students with each other through group work, as well as the organization of the materials and the coursework.

"[The instructor] did a great job creating a psychologically safe environment for us to learn in. Questions were encouraged and celebrated. If there was any confusion on a topic, she would continue to explain it using different verbiage or methods until she was certain that the students understood the concept."

"Teaching style and encouraging learning environment."

"I love the way the material was divided up, the speed of going through the material, how he relayed the material and made it interesting to learn. I'm almost sad this class is over!"

MAPPING COMMENTS

The model below shows some intersection of themes. For readability's sake, the model has limited overlap in themes and categories, while in reality these concepts are much more intertwined and nuanced.

It should also be noted that respondents often mentioned a combination of factors that helped strengthen the learning process, not just one.

"The PowerPoints really helped as well as the silly mnemonics. The videos were really helpful for when I didn't understand a concept. SI sessions really solidified my learning as well as going to meet the instructor during office hours to further understand the content. The homework problems helped me practice the content and helped me get a better understanding too."

"I was provided beneficial videos, readings, and slideshows which helped me understand numerous topics. Doing discussion boards and hearing feedback from other students was also very beneficial."
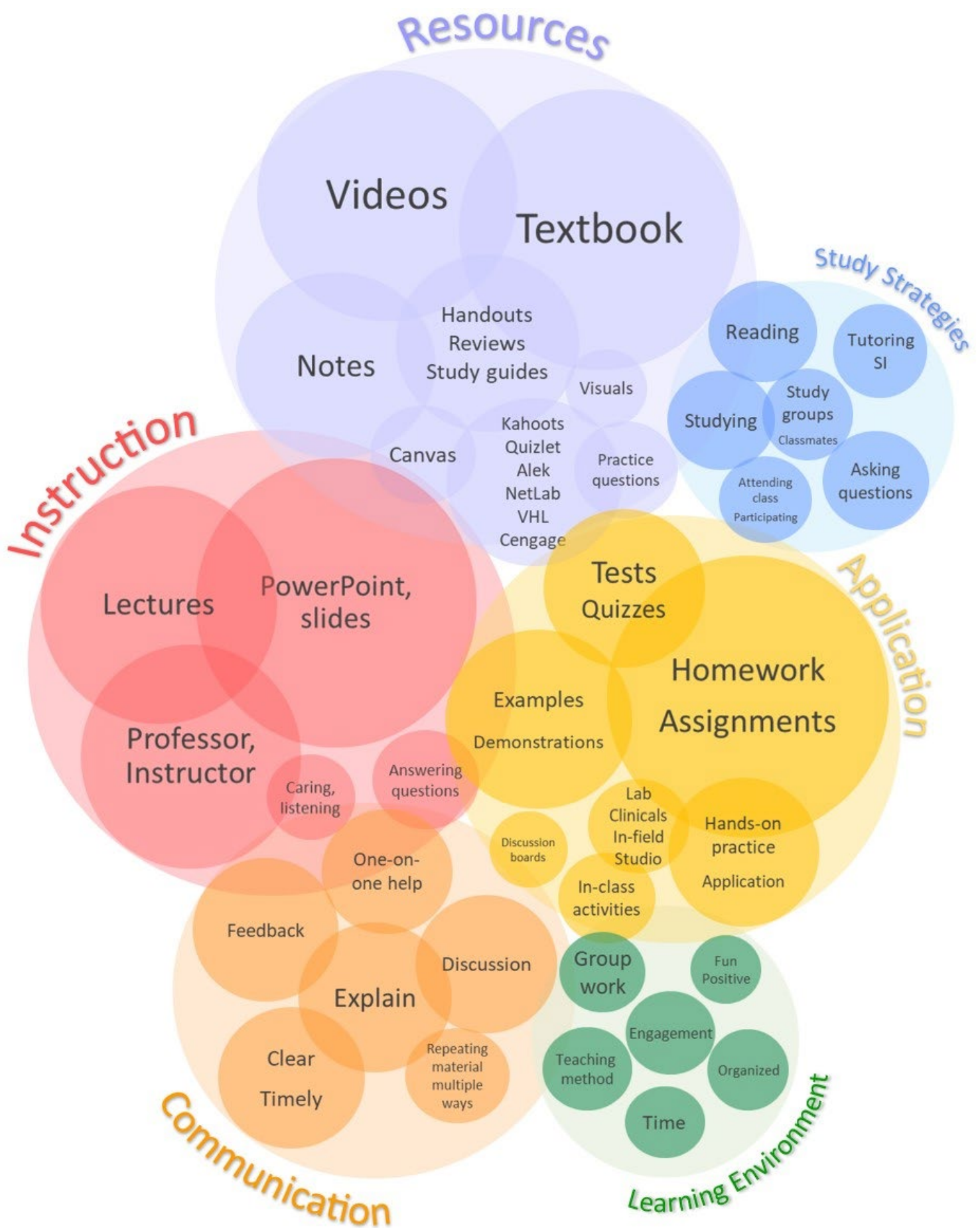
"The in-class group activities, discussions in class, power point, the text book, and the positive climate in class."

The overall picture presented by mapping student evaluation comments provides a holistic view of the factors perceived by students to impact their learning.

CONSIDERATIONS

While more comments were focused on the **resources** and **instruction**, it should be noted that the **application** of the learning material was frequently mentioned by respondents. They noted when the assignments, quizzes, and tests aligned with the material taught, as well as when it felt like busy work or disconnected. Respondents also focused on in-class activities and experiences that involved discussions and group work, as these experiences provided them with interaction with their peers and new perspectives.

Communication was also a key area of importance, with respondents regularly mentioning a desire for feedback and clarification. In-depth explanations from the instructor and presenting the same information in different ways were highlighted by many students as beneficial to their learning.

Resources
- Videos
- Textbook
- Notes
- Handouts
- Reviews
- Study guides
- Visuals
- Canvas
- Kahoots
- Quizlet
- Alek
- NetLab
- VHL
- Cengage
- Practice questions

Study Strategies
- Reading
- Tutoring SI
- Study groups
- Studying
- Classmates
- Attending class
- Participating
- Asking questions

Instruction
- Lectures
- PowerPoint, slides
- Professor, Instructor
- Caring, listening
- Answering questions

Application
- Tests
- Quizzes
- Homework
- Assignments
- Examples
- Demonstrations
- Lab
- Clinicals
- In-field
- Studio
- Hands-on practice
- Application
- In-class activities

Communication
- One-on-one help
- Feedback
- Discussion
- Explain
- Clear
- Timely
- Repeating material multiple ways
- Discussion boards

Learning Environment
- Group work
- Fun Positive
- Engagement
- Teaching method
- Organized
- Time

N=10,010 comments from 2022FL and 2023SP "What helped you learn the material in this course?" This sample represents 36.9% of all 27,159 comments and is representative by term, course type, instructional method, and campus. Course evaluations are administered online each semester and contain a series of Likert scale items and two open-ended questions. Not all students respond and not all respondents answer all items.

CONTACT US

Have you found an article interesting or used some research from IR Corner? Let us know!

Next time you walk along a beach, pick up a seashell and admire its shape. Unknowingly, seashells are created by a perfect mathematical sequence: Fibonacci, logarithmic, Archimedean… Nature's own *magic*, rooted in numbers. Indeed, it appears in today's data-informed world that we should be able to predict or solve almost any question, yet more questions arise. In reality, the sheer quantity of data can be paralyzing. Our team in IR, we are here to look for the figurative seashells ~ to find the patterns, cross-validate via different methods, and appreciate the details. We urge you to continue being unabashedly curious with your questions and undaunted by data. The true magic lives in each of you!

~ Team IR

> *"Mathematics is a place where you can do things which you can't do in the real world."*
>
> — Marcus du Sautoy

TCC Trinity River West Fork 3200

institutional.research@tccd.edu

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