



Do good statistics...

Do good for statistics...

Do good with statistics...

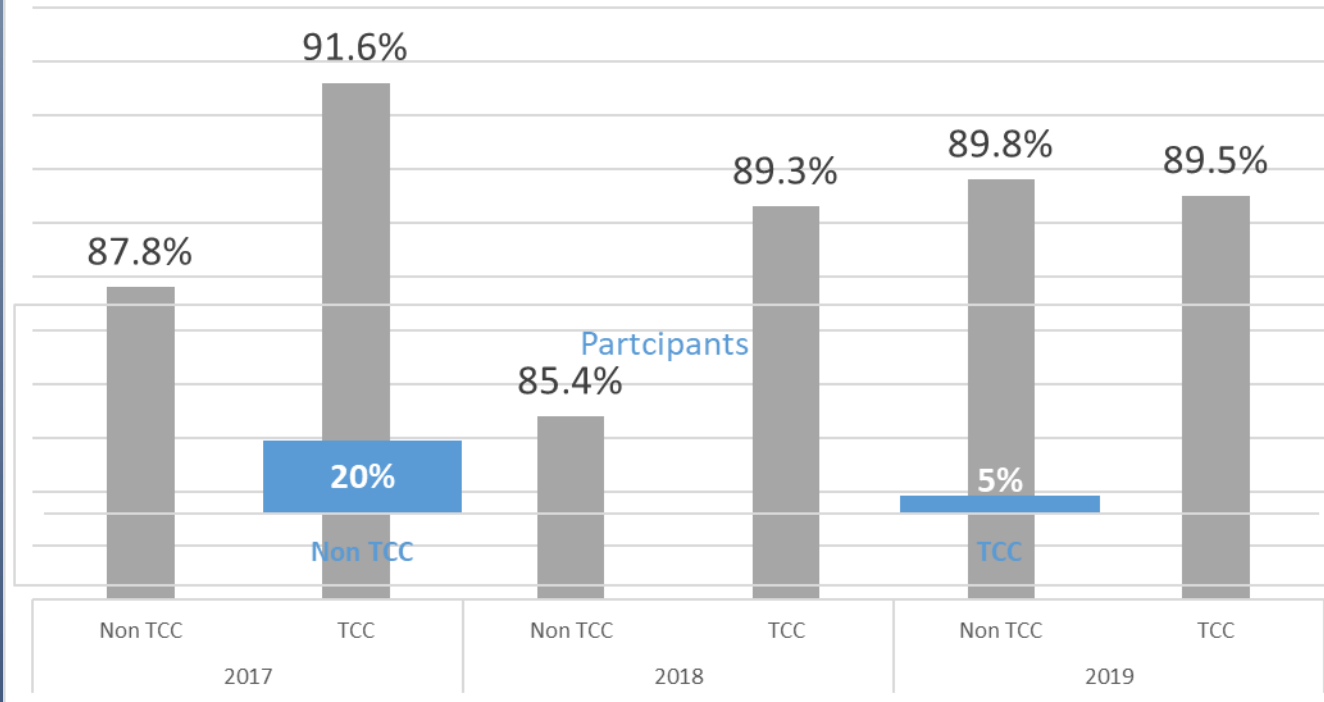
Telling stories to insplRe – *Sharing Data through an IR Journal*

TAIR 2020

Holly Stovall, Breanna Green, Liz Northern, Martin Salgado-Flores

Tarrant County College, Office of Institutional Research

Above Passing Threshold in Non 16-week term (Dec-Jan)



Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Pass	Equal variances assumed	.528	.508	-1.679	4	.168	-2.46667	1.46932	-6.54614	1.61281
	Equal variances not assumed			-1.679	3.203	.186	-2.46667	1.46932	-6.97920	2.04587

High Success in Wintermester

Are students from 4-year schools returning to TCC?

Over 20% of Wintermester students attended a 4-year school the prior fall.

Wintermester students who attended a four-year school the prior fall and those who did not attended a four-year the prior fall had similar success in Wintermester.



Creating an IR Journal:

- developing style
- creating content
- leveraging for marketing & branding

IR CORNER

September 2019 Issue 1

Uncovering the Story
Insights through Data



Co-Requisite Math Model
Accelerating the math pathway?

College for Kids
Do CFK 8-graders become
TCC college students?

TARRANT COUNTY COLLEGE
OFFICE OF INSTITUTIONAL RESEARCH

Style:

- length of article
- level of detail
- scientific rigor

Educating our Future Nurses

*TCC's Nursing Students:
Success at TCC & Beyond*

Holly Stovall & Liz Northern



90%

Passed Nursing
Licensure Exam

20%

Earned a BSN within 4 years
of their RN earned at TCC

70%

Of the RN to BSN graduates
earned BSN from UTA

As one of the primary providers of patient care, nurses are vital to the health of our nation, and the demand for these care givers is growing. According the US Bureau of Labor Statistics, employment for registered nursing is projected to grow 15% from 2016 to 2026, due in part to an aging population.^[1] Not only is an impending nursing shortage predicted, but the profession is also upskilling.^[2]

At TCC

Serving to educate the future nurses of our community, Tarrant County College's Nursing Program (RN) offers students entry into a healthcare pathway. For the past five academic years, about 700 to 800 students per year took an RNSG course, which included both 1st and 2nd year nursing students. The success rate in nursing courses was almost 95%.^[3] During this same time, about 200 to 300 nursing students graduated each year with their Associate's Degree in Nursing (RN).^[4] Moreover, the most recent success rates on the nursing licensure exam averaged almost 90%.^[5]

Beyond TCC

Since hospitals now prefer a Bachelor's Degree, 4-year schools have created programs to help nurses with an Associate's degree continue their nursing education and earn a Bachelor of Science in Nursing (BSN). Approximately 20% of RN's who graduated from TCC between 2008-2009 and 2013-2014 enrolled in a BSN program at a four-year school within two years of their graduation from TCC.^[6]

Overall, within four years from their graduation from TCC, about 20% of TCC nurses earned their BSN degree. Moreover, of the TCC nurses who enrolled in a nursing program at a four-year school within two years of their TCC graduation, about two-thirds graduated with a BSN within 4 years.^[6]

The top schools for TCC's RN to BSN graduates included the University of Texas at Arlington (UTA), Texas Tech, Texas Woman's University (TWU), and Tarleton. These schools accounted for about 85% of graduates with UTA accounting for about 70% of the graduates.^[6]

Even within four-years of their graduation from TCC, there were a few nurses who had earned a Master of Science in Nursing. Future research, such as a longer longitudinal study, might provide more insight on graduates earning a Master's degree as nurses may choose to gain years of experience prior to pursuing this degree.^[6]

In sum, TCC's Nursing Program has been an important step for many pursuing a nursing career as about one in five TCC nursing graduates made the transition from RN to BSN. With the substantial increase in demand for nurses, TCC stands poised to continue to provide the education needed for the next generation of nurses.

Sources:

[1] <https://www.bls.gov/oo/healthcare/registered-nurses.htm#tab-6>

[2] <https://www.jpmorganchase.com/corporate/Corporate-Responsibility/document/335911-jpmc-gap-dallas-aw6-online-2.pdf>

[3] TCC file: ST Student Enrollment Data

[4] TCC file: DA Degrees

[5] http://reports.thecb.state.tx.us/libi_apps/WFServlet.libi

[6] National Student Clearing house file (CIP 51.3801 was used to identify nursing enrollments and graduates

Content:

- highlighting programs
- driven by District-wide advisory panels and strategic initiatives
- impact of new policies
- analysts' curiosity

CYBER SECURITY

The Value Of Your Data

Imagine a cyber-thief hacks a company's database containing your personal information and profits from those data at your expense. They may take action immediately by selling those data to others, or they may lie dormant for years until the crisis of the breach dies down. Whatever the case, it is now up to you to monitor your credit for years, change all of your passwords, cancel debit and credit cards, consider a credit freeze, and file your taxes early.^[1] We have come a long way from when security meant making sure your front door was locked.



In 2016, Cybersecurity Ventures estimated that approximately \$6 trillion will be attributed to cybercrime by 2021.^[2] Your data can now be considered one of the most valuable, and lucrative, assets in the world.^[3] Thus, in the wake of recent data breaches such as the Equifax and Capital One Hack, Cybersecurity is becoming ever more crucial.

Cybersecurity As A Career

The growth of cybercrime is estimated to more than triple the amount of cybersecurity positions by 2021 with a 0% unemployment rate.^[4] Thus, there is a huge shortage in this sector – a surplus of positions with not enough IT or cyber security professionals to fill them.

CyberSeek, a site that provides detailed, actionable data about supply and demand in the cybersecurity job market, currently reports an average salary of \$75,000 for an entry-level cybersecurity specialist or technician.^[5]

Some common job titles may include:

- Information security specialist
- IT specialist information security
- IT security specialist

The top industry certifications requested in this field:

- CISSP
- GIAC
- Security+
- CISM
- CISA

The top skilled requested:

- Information security and assurance
- Network security
- Intrusion detection
- Linux
- Project management

Tarrant County College Cybersecurity Program

Tarrant County College (TCC) saw the ever growing need for cybersecurity and in early 2017 was selected to participate in the American Association of Community Colleges Pathways 2.0 project.^[6] The pathway project included the development of a pathway in cybersecurity: Information Technology: Cybersecurity, Associate of Applied Science (AAS) program, the Level I Cybersecurity Specialist Certification, and the Level II Ethical Hacking Certification.



The AAS can be completed in two years and the certifications are stackable, therefore a student who matriculates from the AAS program could also have 2 TCC accredited certifications in information technology.

In late spring 2018, the Cybersecurity Program Process Implementation Team (Cybersecurity Team) was formed to support the launch of these programs and develop a plan for highlighting the program as a guided pathway.^[7]

Data On The Programs

The Cybersecurity team first began tracking data on the growth of the programs in Fall 2018.

AT THE ONSET OF ENROLLMENT TRACKING



Source: Gender by Program

By the beginning of the Spring 2019 term, the AAS saw 123% growth, Level I saw 111% growth, and Level II saw 63% growth.

Within one academic year, the number of AAS declared and Level II declared students had more than doubled, while Level I declared students more than tripled.

All three programs showed similar demographics – majority male and predominately White, African American, or Hispanic Latino students. For example, the AAS was comprised of 78% males versus 22% females and was 42% White, 22% African American, and 19% Hispanic Latino.

By Summer 2019, the data suggested students were close to completing their studies, given that one student had already earned their Level I Certification in Spring 2019, and approximately 25 students were scheduled to take the AAS Security Assessment and Auditing Capstone course in Fall 2019.^[8]

Looking towards the future, it is apparent that more students will need the education to enter the cybersecurity profession. Clearly, TCC has strived to meet this need and will continue to expand and evolve the programs to meet the demands of this rapidly growing industry.

Sources:

[1] <https://www.lifelock.com/learn-data-breaches-steps-to-take-right-after-a-data-breach.html>

[2] <https://cybersecurityventures.com/cybercrime-damages-expected-by-2021/>

[3] <https://www.datavecity.net/what-is-data-value-and-should-it-be-viewed-as-a-corporate-asset/>

[4] <https://www.cyberseek.org/outlook.html>

[5] <https://www.tccd.edu/magazine/volume-05/issue-01/cybersecurity/>

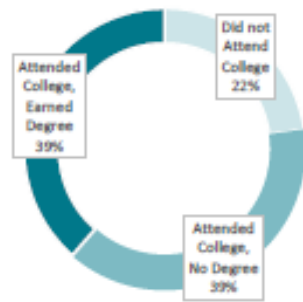
[6] Cybersecurity Process Implementation Executive Summary

[7] TCC files: DA student degrees and ST Student Enrollment Data

Did eighth grade students who participated in CFK attend and graduate from college at higher rates than eighth graders in Texas and in Tarrant County? Outcome data from the THECB for entering eighth graders and from entering eighth graders who participated in CFK at TCC were examined in this analysis, for years 2003 through 2007.

An example....

In the summer of 2003 at TCC, there were 259 eighth grade-aged students who attended CFK. These students started eighth grade in August of 2003. Of these students, about 77% attended a two or four year postsecondary school in Texas before fall of 2014. Additionally, about 30% of the 2003 CFK cohort who attended college completed a degree or certificate before fall of 2014. [4]

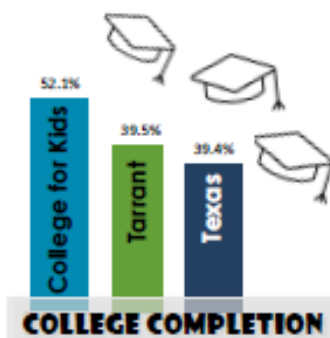
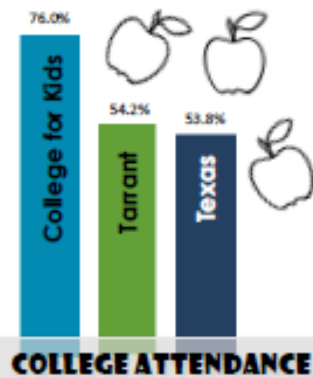


College Attendance...

Regarding college attendance, about 54% of eighth graders across the state of Texas attended a two or four year college in Texas within six years of completing high school. [4]

Similarly, about 54% of eighth graders in Tarrant County attended a two or four year college in Texas within six years of completing high school. [4]

For the eighth graders who attended CFK, about 22% attended TCC as a dual credit student during high school. Additionally, about 53% of CFK students returned to TCC for undergraduate courses. [4] Further, 3 in 4 CFK students attended a two or four year college in Texas within the tracking time period. [4]



College Completion...

For those eighth graders who attended post-secondary education, about 40% across the state of Texas earned a degree or certificate at a two or four year college in Texas within six years of completing high school. [4]

Similarly, about 40% of the eighth graders in Tarrant County who attended college earned a degree or certificate at a two or four year college in Texas within six years of completing high school. [4]

For the eighth graders who attended CFK and then attended TCC, about 12% graduated from TCC within the tracking time period. [4] However, over 50% of CFK students who attended college in Texas went on to complete a degree or certificate during the tracking period. [4]

[4] CFK eighth graders were defined as turning 12 within two years prior to September 1 of their entering eighth grade year. For example, the 2003 CFK cohort includes CFK students with birthdays between 6/1/1991 and 6/1/1993.

[5] ST Student Enrollment Data, DA Degrees, ST Students by Ethnicity and/or Gender by Program.

[6] Texas Higher Education Coordinating Board. (2010). Insights from the Eighth-Grade Cohort Longitudinal Study. Retrieved from <http://www.thehighereducation.com/insightsfromtheeighthgradecohort/>

So what does all of this mean...

Although causation cannot be determined through these data, especially considering each eighth grader's unique set of life experiences between middle school and college completion, data indicated stronger outcomes for CFK students. Hence, it is possible that early exposure to a college atmosphere through a program such as College for Kids might foster future college success.



Ideas for the future...

1. Currently, CFK is housed in the Office of Community Education and Engagement, but each campus operates their summer programs differently. Perhaps a more unified, streamlined approach towards a "One College" CFK administration would help better gauge and track future success of the students.

2. TCC's CFK program is one of many summer, collegiate enrichment programs offered by various higher education institutions across Texas. Collaboration with these other institutions may assist with larger research on early engagement and the possibility of future high school and collegiate success.

Cohort and Year	8th Graders	Attended College	% N	Earned Degree/ Cert			
				Earned Degree/ Cert	% N	% Attended College	
All Texas	2003	324,316	172,555	53.2%	65,920	20.3%	38.2%
	2004	329,095	177,527	53.9%	67,312	20.5%	37.9%
	2005	335,708	181,869	54.2%	70,323	20.9%	38.7%
	2006	338,342	182,389	53.9%	73,084	21.6%	40.1%
	2007	332,576	179,192	53.9%	75,694	22.8%	42.2%
Total	1,660,037	893,532	53.8%	352,333	21.2%	39.4%	
All Tarrant County	2003	22,278	11,969	53.7%	4,463	20.0%	37.3%
	2004	22,651	12,365	54.6%	4,723	20.9%	38.2%
	2005	23,159	12,558	54.2%	4,883	21.1%	38.9%
	2006	23,307	12,564	53.9%	5,074	21.8%	40.4%
	2007	22,874	12,429	54.3%	5,281	23.1%	42.5%
Total	114,269	61,885	54.2%	24,424	21.4%	39.5%	
College For Kids	2003	259	200	77.2%	100	38.6%	50.0%
	2004	246	179	72.8%	99	40.2%	55.3%
	2005	247	196	79.4%	106	42.9%	54.1%
	2006	237	185	78.1%	98	41.4%	53.0%
	2007	294	215	73.1%	105	35.7%	48.8%
Total	1,283	975	76.0%	508	39.6%	52.1%	

Cohort Year	CFK 8th Graders (N)	Enrolled in ECHS or Dual Credit at TCC		Attended TCC		Earned Degree/Cert at TCC		
		Count	% N	Count	% N	Count	% N	% Attended College
2003	259	58	22.4%	150	57.9%	14	5.4%	9.3%
2004	246	50	20.3%	134	54.5%	17	6.9%	12.7%
2005	247	48	19.4%	135	54.7%	20	8.1%	14.8%
2006	237	53	22.4%	129	54.4%	16	6.8%	12.4%
2007	294	69	23.5%	137	46.6%	17	5.8%	12.4%
Total	1,283	278	21.7%	685	53.4%	84	6.5%	12.3%

[5] ST Student Enrollment Data, DA Degrees, ST Students by Ethnicity and/or Gender by Program.

[6] Texas Higher Education Coordinating Board. (2010). Insights from the Eighth-Grade Cohort Longitudinal Study. Retrieved from <http://www.thehighereducation.com/insightsfromtheeighthgradecohort/>

Accelerating Completion of Mathematics?

An early look at the new co-requisite model

Holly Stovall & Breanna Green

Recent state legislation (House Bill 2223) has substantially altered the math pathway for many students entering their first math course through developmental education. The goal of the new co-requisite model, mandated to start in Fall 2018, is to accelerate the time to completion of college-level math by allowing students to take a developmental or non course based option (NCBO) alongside a college-level math course.

Prior to the introduction of the co-requisite model, most students who needed developmental math started in the more traditional sequential model where completion of a developmental math course was required prior to enrolling in a college level math course. Thus, these students may have needed two or more terms to complete a college level math course while students using the co-requisite model had the opportunity to complete a college level math course in one term.

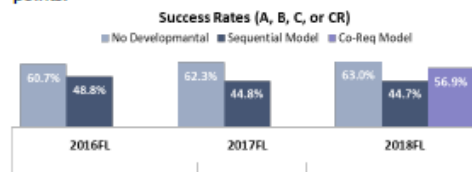
College Algebra

Considered the STEM pathway, College Algebra (MATH-1314) is a freshman level math course with the most stringent entry requirements based the Texas Success Initiative (TSI) Assessment.

For Fall 2016, 2017, and 2018, the success rate in College Algebra for students taking the course for the first time without prior developmental/NCBO math courses was just above 60%. However, the success rate for students who took College Algebra for the first time after completing developmental/NCBO math through the sequential model ranged from about 45% to 49%.

While students enrolled in College Algebra for the first time in Fall 2018 through the co-requisite model, had a success

rate lower than students who did not take a prior developmental/NCBO math course, they outperformed students who used the sequential model by 12 percentage points.



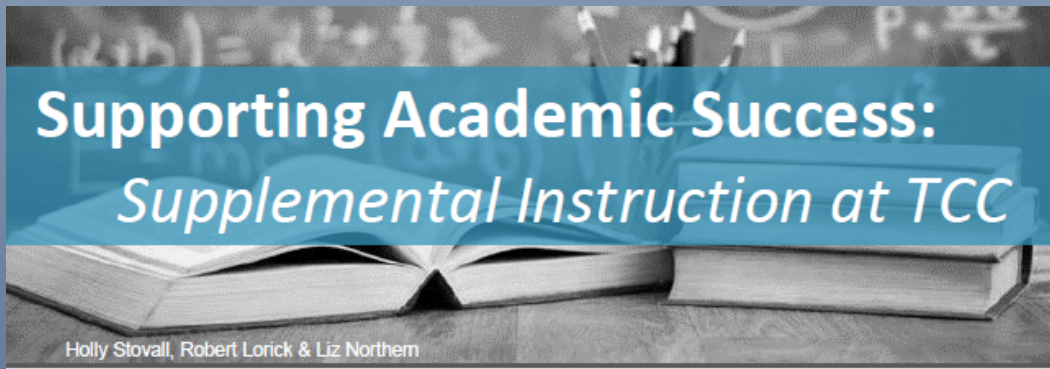
Most significantly, just over six in ten students who did not require developmental math completed College Algebra on their first attempt – within one term. Somewhat similarly, almost six in ten students who needed developmental math and enrolled in a co-requisite also completed College Algebra within one term instead of two or more typically required under the sequential model.

Early success rates for students using the co-requisite model appear promising, but future research must be conducted using several years of data for more definitive findings from the co-requisite model.

Fall 2018 Sequential vs. Co-Requisite Success Comparison for Other Math Courses

- Math for Business & Social Science (MATH-1324): the success rate for sequential model was about 2.5 percentage points lower than the success rate for co-requisite model
- Quantitative Reasoning (MATH-1332): the success rate for the sequential model was about 1 percentage point lower than the success rate for the co-requisite model.
- Statistics (MATH-1342): the success rate for the sequential model was about 2 percentage points lower than the success rate for the co-requisite model.

Source: Student Enrollment Data and HB 2223 file



Supporting Academic Success: Supplemental Instruction at TCC

Holly Stovall, Robert Lorick & Liz Northem

For over four years, students have been supported by TCC's supplemental instruction (SI), a free academic enrichment program aimed at helping students succeed in historically difficult courses. Led by students who had prior success in the course, current students participate in peer-assisted study sessions.

In SI supported sections, students who utilized SI had a success rate about 15 percentage points higher than students who did not use SI. However, students who participated in SI immediately distinguish themselves from the non-participants as having factors contributing to their choice to seek academic support that may also be associated with higher success. Thus, the question arises as to whether students who might gain the most from additional academic support are the ones who use and potentially benefit from SI.

Factors Contributing to Success

Multiple factors likely contribute to a student's academic success. While some factors such as motivation and determination are latent and difficult to gauge, other factors such as academic preparedness and prior academic success are more easily measured.

Academic Preparedness

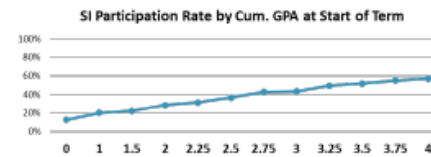
The number of liability areas as determined by the Texas Success Initiative (TSI) assessment is one indicator of academic preparedness. Students can be liable in up to three areas – reading, writing, and math. The SI participation rate for students liable in one or two areas was about 14 percentage points lower than students who were not TSI liable. However, the participation rate for students liable in all three areas was about six percentage points higher than students liable in one or two areas.



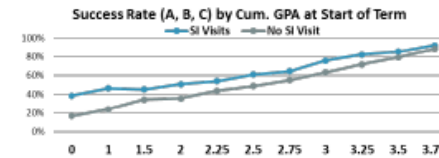
Moreover, the gap in success rates between SI participants and non-SI participants widened as the number of liabilities increased. SI participants who were not TSI liable outperformed comparable non-participants by 16 percentage points; whereas, SI participants liable in all three areas outperformed comparable non-SI participants by 27 percentage points.

Prior Success

Cumulative GPA at the start of a term provides a measure of previous academic success.^[a] Students who started the term with a lower GPA (less than 1.5) had a participation rate under 25% while the participation rate for students who started the term with a higher GPA (3.5 to 4) was over 50%.^[b]



Although the students who started the term with a lower GPA had much lower SI participation rates, the difference in success rates between SI participants and non-SI participants was higher among these students. SI participants who started with a lower GPA outperformed comparable non-SI participants by approximately 20 percentage points. However, SI participants who started with a middle GPA (1.5 to 3.49) outperformed comparable non-SI participants by approximately 10 percentage points. The difference in success rates for students who started the term with a higher GPA was closer to 5 percentage points.



In sum, students who started the term with a GPA less than 1.5 and participated in SI had a success rate similar to students who started the term with a GPA between 2.25 to 2.49 and did not participate in SI.

Predicting Success

A simple model using starting cumulative GPA and whether or not the student visited SI was a fair predictor of success.

$$\log \frac{\pi}{1-\pi} = \beta_0 + \beta_1 \text{VisitedSI} + \beta_2 \text{GPA}$$

Based on this model, the odds of success for students who used SI was 1.6 times the odds of success for students who did not use SI.

(Note: More sophisticated models using total visits and number of TSI liability areas were built but did not lead to a marked improvement in predictive ability. None could be classified as strong predictive models.)

Conclusion

The difference between the success rates for SI participants and non-SI participants was higher for both academically underprepared students and students who had less prior academic success. As students self-select whether to attend SI, results cannot prove a direct cause-and-effect relationship (i.e. SI caused higher grades). However, these data suggest the possibility that SI may foster success more among students who might be in need of academic support.

Summary of SI: Fall 2015 to Spring 2019

- The number of students using SI increased approximately 30% from about 1,500 students in Fall 2015 to about 2,000 in Spring 2019.
- The average number of visits per student was about 7.

	SI Supported Sections	Total Students utilizing SI from SI supported Sections	Total Visits to SI from SI Supported Sections
2015FL	124	1,561	10,451
2016SP	128	1,553	10,965
2016FL	149	1,567	10,326
2017SP	186	1,726	12,239
2017FL	204	2,062	14,805
2018SP	173	1,712	12,435
2018FL	179	1,731	13,607
2019SP	196	2,055	14,489

Source: ST Student Enrollment Data, Tutor Trac, and SI provided files

[a] Spring students must have attended the prior fall term, and fall students must have attended prior spring or summer term.

[b] Missing and 0 GPAs excluded due to overlapping coding

Layout/Marketing & Branding:

- news style/journal/magazine
- branding your IR office & services
- marketing resources



Brunch 'N Learn

Hungry for Knowledge and Collaboration?

Martin Salgado-Flores

The Office of Institutional Research is always seeking to learn more and collaborate with the greater TCC community to serve the evolving information needs of TCC's faculty, staff, and students. To this end, IR hosted *IR's Brunch 'n Learn*, an informal brunch-time lecture series where members from various offices around TCC share aspects of their work and function within TCC. Of course, as the name implies, there's more than just learning happening at a *Brunch 'n Learn*. Beyond information sharing, IR staff and guests form foundations for future collaboration and gain a sense of shared purpose.

Library Resources

IR's Brunch 'n Learn kicked off this summer with a presentation by Dr. Susan Smith, Director of Library Services at TCC. Dr. Smith's talk covered the wealth of resources and services that TCC's Libraries offer the community. This included how to navigate the Library's website and extensive catalog and various nifty tips on efficiently searching for the info one desires. In addition to their website, TCC's librarians are available to answer questions or schedule research consultations, either in person or via their website.

Please check out the Library's website at <https://library.tccd.edu/> for information about news/events at the Library, its operational hours, to search TCC's Catalog and Databases, and much more!

Financial Aid Services

At the next *Brunch 'n Learn*, Valerie Bustillos, Assistant Director of Financial Aid gave a presentation about her office's role in providing financial aid services to TCC's students. Topics covered types of financial aid, such as Federal, State, and Institutional funding. Asst. Dir. Bustillos, also delved into the process of reporting and processing financial aid gifts and loans. As the talk evolved into a conversation, IR staff and the guest were able to discuss possible actionable items to facilitate easier collaboration between IR and Financial Aid.

Please check out Financial Aid's student services at <https://www.tccd.edu/services/paying-for-college/financial-aid/> for information about eligibility, forms/documents, types of aid, and much more!

Registration/Hazlewood

The summer *Brunch 'n Learn* series ended with guest Christy Klemiuk, NW Registrar and Nadera Allache, NW Registrar. The main topic discussed involved the processes and details around Hazlewood benefits. The Hazlewood Act was passed by the State of Texas to provide veterans and their family with up to 150 hours of tuition exemption, including most fee charges, at public institutions of higher education in Texas. TCC was ranked as the number two community college in the nation by the *Military Times*.^[1]

Please check out TCC's veteran services at <https://www.tccd.edu/services/veterans-services/>

[1] <https://bestforets.militarytimes.com/2018-11-20/colleges/2-year/>

Questions?

Somewhere between the extremes of viewing our world as a collection of numeric facts, completely definable, or human behaviors, unexplained by logic and patterns, lays the realm of stories told through data. Although self-professed “data nerds,” we are equally passionate about the success of TCC’s students, faculty, and staff.

*Our goal in **IR Corner** is to bring life to the numbers by humanizing their narrative and hopefully inspire some creativity and innovation along the way.*