Texas Association of Community Colleges

Aligning Systems: High School to College Pathways

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High School Endorsement to College Pathways

Abstract

This case study contains two parts. The first part involves examination of the results of a survey conducted between February 10, 2020 and March 12, 2020 of first time in college students who entered college in the fall 2018 or the fall 2019 and continued into the spring 2020. Key findings from the survey suggest students need more information regarding the connection of high school endorsements to college majors and career paths; the majority of students surveyed attained more than one endorsement and many indicated their endorsement(s) was not helpful in selecting the degree or certificate pathway. According to participants, the Multidisciplinary Studies endorsement was selected because they did not know what career they wished to pursue. The majority of the students in the survey aspire to pursue a transfer degree. Due to the lack of connection between endorsement and degree plan, there is also a need to build out transfer plans for students and showcase careers by specific pathways. Respondents were split in their responses as to whether having a discussion about their endorsement or courses in their endorsement during college academic advising would beneficial. Additional research on whether attaining multiple endorsements is beneficial to students is recommended.

The second part of this case study takes an in-depth examination of the 1,437 first time in college students who entered who entered college in the fall 2018 or the fall 2019 and either continued (1,002) or did not continue (435) through spring 2020 enrollment. Nearly a third of non-continuing students had a degree or certificate plan of General Studies or Undecided. Sixty-two percent of the non-continuing students were students of minority status and 23% of non-continuing students were financial aid eligible. High School GPA was a significant correlation to College GPA and students from in-district high schools had the greatest variation between students with a high school GPA below 2.00 and those with a college GPA below 2.00. Similar to the survey results, the majority of students attained multiple endorsements with one of the endorsements being Multidisciplinary studies. Nearly 61% of the students with only one endorsement attained Multidisciplinary Studies as that endorsement. As with the survey participants, 87% of the students were degree-seeking with 68% of degree-seeking students pursuing a transfer degree. Few correlations existed between endorsements and college degree or certificate plan with the exception of Multidisciplinary Studies endorsement and General Studies or Undecided degree plans and the Business and Industry endorsement with Business and Manufacturing and Industry degree plans/certificates. Key recommendations include development of seamless endorsement to college and career plans involving collaborative partnerships between school districts, colleges, and the Texas Workforce Commission; a focus on the career end goal and exposure to careers with students early and throughout their K – 12 education; increasing the number of students entering dual credit courses in high school by the development of a Learning Frameworks course specifically tailored for learning development, careers, and the future early in a student's high school career; programs that build culturally relevant practice; college dropout prevention and recovery programs; and academic advising which includes a holistic review the student and their high school grades, course taking and experiences.

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Please visit https://tacc.org/tsc for companion resources and to learn more about the fellowship.

Table of Contents

List of Figures and Tables

High School Endorsement to College Pathways

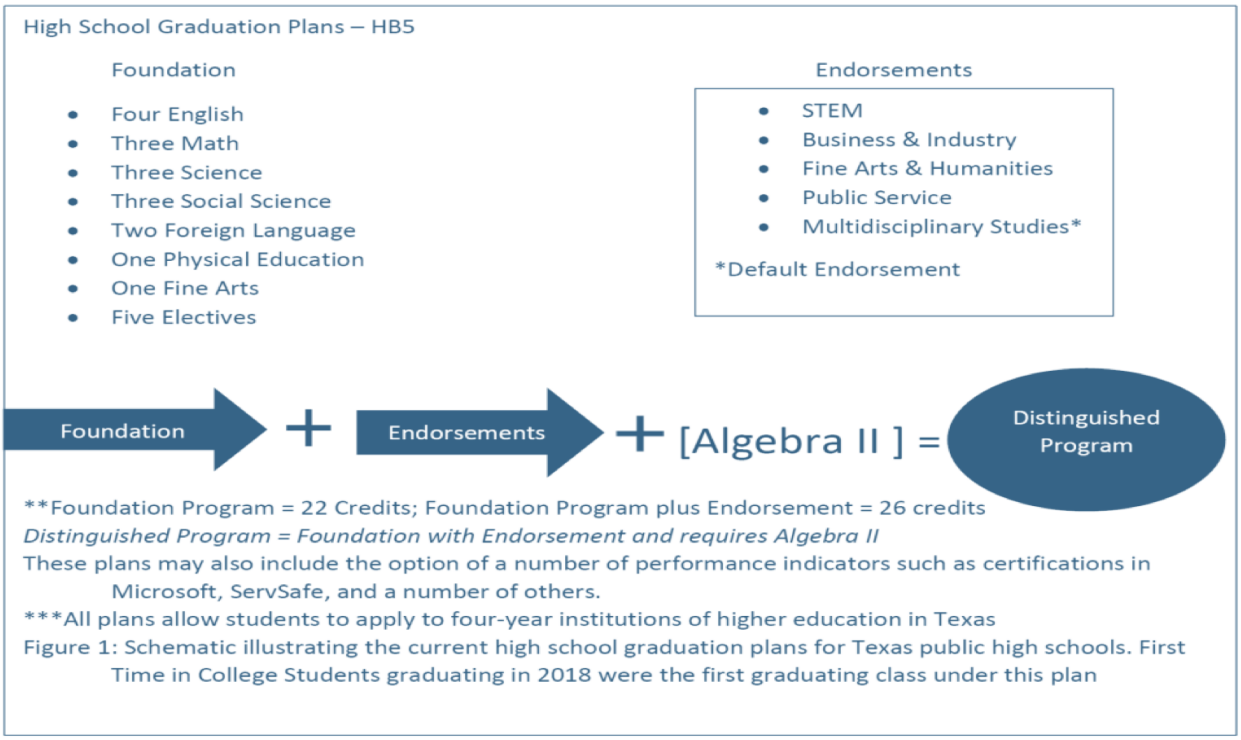
While the first part of this case study focused on all students in the dataset classified as first time in college (FTIC) students in fall 2018 and fall 2019, part two of the case study examines the results of a survey conducted with the students in the dataset who were registered and enrolled in classes on the first day of the spring semester 2020, students who continued in college in spring 2020, and students who stopped out of college at some point between their enrollment and spring 2020. The dataset, provided by the Lee College Office of Institutional Research included all 1,809 designated FTIC students who graduated from high school in 2018 and/or 2019 and applied to Lee College. It is noted in the first report 1,811 students were in the initial count of students (Lane-Worley, 2020); two students were later found to have been listed twice.

In January 2020, a review of the advising worksheets of all students in the original dataset was conducted to determine student status of enrollment, continuing students, and overall college GPA. For the purpose of definition, advising worksheets are the computer-generated record of a student's course-taking and GPA at the college. Of the 1,809 students in the original dataset, further examination of the enrollment data to determine which students continued and did not continue to spring 2020, found 226 students applied, but never enrolled at Lee College. An additional 144 students only attended as dual credit or summer students and did not enroll at Lee College in the long semester following their respective high school graduation dates. The current dataset included students who stopped attending after one or two long semesters. This group of students totals 435 students with the largest group, 236, leaving following the fall 2018 semester, followed by an additional 199 students who left between spring 2019 and spring 2020. The majority of the students who did not return, 353, were from the high school graduating class of 2018.

Endorsements

In the 2013 Texas legislative session, the 83rd Texas legislature revised state testing requirements, graduation plans, and increased requirements of collaboration between institutions of higher education and school districts. Texas moved to a plan that emulates, to some degree, the core curriculum and degree plans of higher education. Beginning with the high school freshman class of 2014, students have been required to take a set of courses as part of the Foundation graduation program and select from one of five endorsements (Figure 1) (adapted from Lane-Worley, 2013).

Figure 1. Texas High School Graduation Plans with Endorsements



The Multidisciplinary Studies endorsement is indicated in Figure 1 as the "Default Endorsement" as per Chapter 74.13 Endorsements (5) Multidisciplinary Studies: A student completes this endorsement when completing the foundation plan and part A as listed below:

(A) four advanced courses that prepare a student to enter the workforce successfully or postsecondary education without remediation from within one endorsement area or among endorsement areas that are not in a coherent sequence (Texas Education Agency, 2018).

One should also note per Chapter 74.13 Endorsements (5) Multidisciplinary studies (2018): A student may also complete this endorsement when completing the foundation plan and part A, B, or C with parts B & C outlined below:

(B) four credits in each of the four foundation subject areas to include chemistry and/or physics and English IV or a comparable AP or IB English course; or

(C) four credits in Advanced Placement, International Baccalaureate, or dual credit selected from English, mathematics, science, social studies, economics, languages other than English, or fine arts (Texas Education Agency, 2018).

However, according to the Texas Education Agency (2020, p. 6), "Districts and charter schools are not required to offer all endorsements. If only one endorsement is offered, it must be multidisciplinary studies."

Survey Methodology and Analysis

Based on the spring 2020 enrollment of the students in the original dataset, 999 students who were enrolled at the time of the survey implementation were sent a survey regarding their experiences with high school endorsements, college certificate and degree planning, and academic advising. Students received an email in their college email regarding the purpose of the survey, consent for completing the survey, the ability to opt out of the survey at any time, and with a notice of the survey's availability through clicking on a link to the survey in the email, logging into the college's LMS where a reminder for the survey popped up each time the student logged into the LMS until they completed the survey, or through logging into their student account where a radio button to take the survey was at the top of the student's home page. In addition to the popup reminder in the LMS, reminders to complete the survey were sent out via the student email once per week during the survey period. The survey began on February 10, 2020 and remained open through March 12, 2020. The survey was entitled "Relationship Between High School Endorsement vs. Certificate/Degree Choice Survey."

The survey had a mixture of closed and open-ended questions (see Appendix A). In order to analyze the open-ended questions, the survey results were tabulated in excel spreadsheets and categorized based on the responses to each open-ended question following the phenomenological research methodology approach (Creswell, 2018). Categories of responses were then analyzed for themes across the data (Creswell, 2018). Closed-ended questions were analyzed using descriptive statistics (Trochim, 2020).

Results

The full population of FTIC students who entered college in fall 2018 or fall 2019 and continued enrollment into spring 2020 were included in the survey. One-hundred fifty-five or 15.5% of the participants responded to all questions on the survey. One student skipped the first 14 questions including the demographic questions but answered the remaining questions for a total of 156 participants. A disproportionate number of responses were from participants identifying as female as reflected in Table 1 below:

Table 1. Gender Identification

Gender	Number	Percentage
Female	109	70.32%
Male	45	29.03%
Other	1	0.65%
Total	155	100%

While responses to the survey primarily came from female participants, a representative sample of students across ethnic groups responded as indicated in Table 2 below:

Table 2. Race-Ethnicity

Race-Ethnicity	Number	Percentage
African American or Black	18	11.61%
Asian	11	7.09%
Caucasian or White	48	30.97%
Hispanic	71	45.81%
Mixed Race	6	3.87%
Native American	0	0.00%
Other, indicate: Afro-Caribbean	1	0.65%
Total	**155**	**100.00%**

In order to assess which high schools the participants attended, participants were asked which high school they attended as reflected in Table 3 on the next page:

Table 3. High School Attendance

High School	Number	Percentage
Anahuac	4	2.58%
Baytown Christian Academy	0	0.00%
Barbers Hill	23	14.83%
Crosby	7	4.52%
Dayton	12	7.74%
East Chambers	0	0.00%
Goose Creek Memorial	29	18.71%
Hardin	3	1.94%
Huffman	0	0.00%
Hull-Daisetta	0	0.00%
Impact	1	0.65%
Kountze	0	0.00%
Liberty	6	3.87%
Premier	1	0.65%
Robert E. Lee	26	16.77%
Ross S. Sterling	38	24.51%
West Hardin	1	0.65%
Other, please indicate*	4	2.58%
Total	**155**	**100.00%**

*Note. Each of the four other schools are from outside the service area.

In addition to the data collection on gender and race/ethnicity identification and high school attendance, participants also indicated the year graduated from high school which indicates a fairly close split between participants as reflected Table 4 below:

Table 4. High School Graduation

Year of Graduation	Number	Percentage
2018	71	45.81%
2019	84	54.19%
Total	**155**	**100%**

Participants were asked to indicate which endorsement they completed in high school and were asked to indicate all that applied. Since participants selected more than one endorsement completion, the data adds up to more than 155 endorsements as indicated in Table 5 below:

Table 5. Endorsements Selected

Endorsement	Number	Percentage
Business and Industry	25	16.13%
Multidisciplinary Studies	55	35.48%
Public Service	54	34.84%
STEM	36	23.23%
Visual and Performing Arts	36	23.23%
Total	**206**	

As reflected in Table six, the majority of participants selected their endorsement on their own with 28.39% indicating their counselor assisted in the endorsement selection.

Table 6. Assistance with Endorsement Selection

Who helped you select your endorsement?	Number	Percentage
No one, I selected myself	88	56.77%
My parent	14	9.03%
My brother	1	0.65%
My sister	2	1.29%
My friend	0	0.00%
My counselor	44	28.39%
Other, indicate*	6	3.87%
Total	**155**	**100.00%**

*Note. Participants who indicated other, stated "Online test our school made us do," "My Law Enforcement Instructor," "My eighth-grade teacher," "forced by school," or left blank.

Participants were asked if they wanted to select an endorsement not offered at their school and 16 students indicated this had occurred. The participants who answered "yes" were then asked which endorsement they wanted that was not offered as reflected in Table 7 below:

Table 7. Requested Endorsement – Not Available

Requested Endorsement - Not Available	Number	Percentage
Business and Industry	4	25.00%
Multidisciplinary Studies	0	0.00%
Public Service	5	31.25%
STEM	4	25.00%
Visual and Performing Arts	3	18.75%
Total	**16**	**100.00%**

Participants were asked whether their high school endorsement assisted them with selecting their college certificate or degree plan and whether they picked a degree or certificate related to their high school endorsement as indicated in Tables eight and nine:

Table 8. Endorsement helped select degree/certificate

Endorsement helped select degree/certificate	Number	Percentage
Yes	50	32.36%
No	80	51.61%
Not Sure	25	16.03%
Total	**155**	**100.00%**

Table 9. Picked a certificate/degree related to endorsement

Selected Degree/Certificate related to Endorsement	Number	Percentage
Yes	43	86.00%
No	7	14.00%
Total	**50**	**100.00%**

The majority of survey participants indicated they are pursuing a degree or certificate and degree as indicated in Table 10.

Table 10. Certificate/Degree Pursuit

Pursuing Degree or Certificate	Number	Percentage
Degree	117	75.48%
Certificate	6	3.87%
Both	32	20.65%
Total	**155**	**100.00%**

Participants who indicated they were only pursuing a certificate were asked if planned to continue to attain a degree as indicated in Table 11.

Table 11. Plan to pursue a degree following certificate

Plan to pursue a degree post certificate	Number	Percentage
Yes	3	50.00%
No	1	16.67%
Not Sure	2	33.33%
Total	**6**	**100.00%**

Participants were asked to list as many courses as they could remember which were a part of their high school endorsement(s). Participants' responses were tabulated and categorized in an excel spreadsheet. Table 12 reflects their responses. In order to provide some context to their responses, the aligned pathway for the college is also indicated in Table 12 on below.

Table 12. Student report of courses in endorsement

Courses identified by students in their endorsement	Number	Pathway Relationship
Courses related to the STEM	155	STEM Pathway - 115 ; Health Services Pathway - 40
Courses related to Visual & Performing Arts	100	Liberal and Fine Arts Pathway - 100
Courses related to Public Service	24	Public Services Pathway - 24
Business & Industry	33	Applied Business Pathway - 25; Manufacturing & Industry Pathway - 8
Multidisciplinary Studies	10	Not related to pathways (yearbook, teen leadership, & other miscellaneous)
Couldn't remember or said "core"	43	N/A

Participants were asked to provide comments related to their experiences with endorsements as reflected in Table 13 below:

Table 13. Participants' comments on High School Endorsements

Experiences with Endorsements	No. of Responses	Percentage of respondents
Good experiences and helpful	33	47.82%
Bad experiences and unhelpful*	26	30.43%
High school advisors weren't helpful referring back to bad experiences	4	5.80%
Too much pressure for high schoolers referring back to bad experiences	10	14.50%
Wished for ability to explore other endorsements	1	1.45%
Total Responses:	**74***	**100.00%**
None	86	
Misunderstood question	4	

*Note. Some students elaborated on their bad experiences so their responses were counted more than once.

Participants were asked to indicate their current degree or certification. Some participants did not understand the question as their responses did not indicate a specific degree plan or certificate. Table 14 on the next page reflects the degree plans/certificates indicated and aligns the designated degree plans/certificates with Lee College's pathways as indicated on the college website (Lee College, 2020a).

In addition to asking participants about their chosen degree/certificate, students were asked about their career choices and while 14 participants were unsure of their career path, others listed several career choices within one or more fields for a total of 168 career choices. The students' degree/certificate plans were aligned with the Lee College Pathways listed on the website (Lee College, 2020a). Due to the number of career choices by participants, the Pathways and career choices were split into two tables as reflected in Tables 15 and 16 which follow on the next pages.

Table 14. Degree/Certificate Responses

Pathway	Degree Plan	Number	Percentage of Pathway Designation
Applied Business	Business	6	
	Management	3	
	Accounting Technology	3	
	Paralegal Studies	1	
	Marketing Certificate	1	
	Administrative Technology	3	
	Cosmetology Management and Instruction	1	
Total in Pathway and Percentage of students in Pathway		18	11.54%
Health Services	Nursing	22	
	Transfer in Allied Health	4	
	Alcohol and Drug Abuse Counseling	1	
	Kinesiology	3	
Total in Pathway and Percentage of students in Pathway		30	19.23%
Manufacturing & Industrial	Process Piping Design	1	
	Process Technology	5	
	Safety Management Technology	1	
	Electrical Technology	1	
	Instrumentation Technology	1	
Total in Pathway and Percentage of students in Pathway		9	5.77%
STEM	Computer Science	2	
	Game Development Specialist	1	
	Biology	8	
	Pre-Engineering	7	
	Environmental Science	1	
	Physics	1	
Total in Pathway and Percentage of students in Pathway		20	12.82%
Liberal & Fine Arts	Creative Arts	3	
	Social Sciences	3	
	General Studies	21	
Total in Pathway and Percentage of students in Pathway		27	17.31%
Public Service	Social Work	1	
	Teacher Education	9	
Total in Pathway and Percentage of students in Pathway		10	6.41%
	Core	3	
Not in a Pathway	Undecided	8	
	Left blank or did not understand question	31	
Total not in Pathway		42	26.92%
Total Responses		156	100.00%

Table 15. Career Choices by Applied Business, Health Service, and STEM Pathways

Pathway	Career Goal	Number	Percentage of Pathway Designation
Applied Business	Finance	2	
	Accounting	3	
	Justice of the Peace	1	
	Hotel Management	1	
	Business Management	2	
	Lawyer	1	
	Business Marketing	2	
	Human Resources	1	
	General Business & Business Admin.	14	
	Cosmetology	1	
Total in Pathway and		28	15.38%
Health Services	Ultrasound Technology	2	
	Rehabilitation Counselor	1	
	Medicine	1	
	Perfusion	1	
	Optometry	1	
	Occupational Therapy	1	
	Veterinarian	3	
	Radiology	1	
	Doctor	2	
	Nursing	33	
	Dental Hygiene	4	
	Athletic Trainer	1	
	Physical Therapy	5	
	Volleyball Coach	1	
	Mortuary Science	1	
Total in Pathway and Percentage of students in Pathway		58	31.86%
STEM	Automotive Engineering	1	
	Mechanical Engineering	1	
	Engineering	2	
	Chemical Engineering	1	
	Geneticist	1	
	Bioengineering	1	
	Data Analysis	1	
	Data Scientist	1	
	Zoology	2	
	Mycology	1	
	Marine Biology	1	
	Biological Illustrator	1	
	Computer Engineering	3	
	Quantum Engineering	1	
	Botanical Engineering	1	
	Hardware Engineering	1	
	Electrical Engineering	2	
	Wildlife Biology	1	
	General Biology	2	
	Computer Science	1	
	Computer Programming	1	
	Computer Information Systems	1	
	Cyber Security	1	
	IT	2	
	Museum Curation	1	
	Astronaut	1	
Total in Pathway and Total Applied Business, Health Service, and STEM		33	18.13%
		119	

Table 16. Career Choices by Liberal & Fine Arts, Public Service, Manufacturing & Industrial and Undecided

Pathway	Career Goal	Number	Percentage of Pathway Designation
Liberal & Fine Arts	Visual Arts	1	
	Architecture	2	
	Dancing	1	
	Fashion Design	1	
	Graphic Design	2	
	Digital Illustration	2	
	Musician	1	
	Film Making	2	
	Animation	3	
	Social Science	1	
	Psychology	1	
	Communications	1	
	Television-Radio Broadcasting	1	
Total in Pathway and Percentage of students in Pathway		19	10.44%
Public Service	Border Patrol	1	
	Criminal Justice	1	
	Forensic Psychology	1	
	Social Work	1	
	Counseling/Therapy	3	
	Sex Therapist	1	
	High School Science Teacher	1	
	Teaching & Education	11	
	Special Education	1	
	Elementary Education	1	
Total in Pathway and Percentage of students in Pathway		22	12.09%
Manufacturing & Industrial	Instrumentation Technology	1	
	Pipe Design	1	
	Electrical Technician	1	
	Safety Management	1	
	Process Technician	4	
Total in Pathway and Percentage of students in Pathway		8	4.40%
Not in a Pathway - Undecided	Undecided	14	
Total Undecided		14	7.70%
Total Responses- Liberal & Fine Arts, Public Service, Manufacturing & Industrial, and Undecided		63	

Table 17 reflects a side-by-side comparison of participants' stated degree and/or certificates and their stated career paths:

Table 17. Comparison of stated degree and/or certificate with stated career paths

Degree/Certificate Choice	Percentage	Career Path	Percentage
Applied Business	11.54%	Applied Business	15.38%
Health Services	19.23%	Health Services	31.86%
Liberal & Fine Arts	17.31%	Liberal & Fine Arts	10.44%
Manufacturing & Industry	5.77%	Manufacturing & Industry	4.40%
Public Service	6.41%	Public Service	12.09%
STEM	12.82%	STEM	18.13%
Undecided or did not indicate	26.92%	Undecided	7.70%
Total	**100.00%**	**Total**	**100.00%**

Participants were asked about their experiences with academic advising, class scheduling, accessing services on the campus, the influence of their endorsements on their degree plan choice, and transfer plans. Tables 18, 19, 20, 21, and 22 are related to the responses of participants with regard to academic advising and transfer.

Table 18. Advisement by an advisor or counselor about degree plan selection

Were you advised by your advisor or counselor regarding your degree plan?	Number	Percentage
Yes	81	51.92%
No	55	35.26%
Not Sure	20	12.82%
Total	**156**	**100.00%**

Table 19. High School Endorsement discussed by advisor or counselor

Did your college advisor/counselor discuss your high school endorsement when advising about degree choice?	Number	Percentage
Yes	42	26.92%
No	86	55.13%
Not Sure	28	17.95%
Total	**156**	**100.00%**

Table 20. Would discussion of endorsement be helpful in degree selection

If high school endorsement not discussed, do you believe it would have been helpful with degree selection?	Number	Percentage
Yes	54	34.62%
No	53	33.97%
Not Sure	49	31.41%
Total	**156**	**100.00%**

Table 21. Comments regarding experiences with academic advising and degree/certificate planning

Experiences with Academic Advising	No. of Responses	Percentage of respondents
Helpful/Good	19	48.72%
Not Helpful/Bad	12	30.77%
Takes too much time	1	2.56%
Disability Services has been helpful	2	5.13%
Puente Advising is Helpful	2	5.13%
Better than High School	1	2.56%
Faculty are helpful	2	5.13%
Total Respondents:	**39**	**100.00%**
Misunderstood question	17	
Stated "I don't know or Nothing"	100	

Table 22. University Transfer Plans

Do you plan to transfer to a four-year university	Number	Percentage
Yes	112	71.79%
No	18	11.54%
Not Sure	26	16.67%
Total	**156**	**100.00%**

Participants were also asked about class scheduling preferences and additional services provided on campus. Their responses are indicated in Tables below:

Table 23. Class Schedule

In thinking about your college class schedules, do you feel classes are scheduled at a time that works for your work or family schedule?	Number	Percentage
Yes	140	89.74%
No	16	10.26%
Total	**156**	**100.00%**

Table 24. Course Modality

What is the primary modality of the courses you attend?	Number	Percentage
Face-to-Face	119	76.28%
Hybrid	29	18.59%
Online	8	5.13%
Total	**156**	**100.00%**

Table 25. Preferred day of the week for classes

Which days of the week do you prefer to attend classes or would you attend if available?	Number	Percentage
Mon/Wed	90	57.69%
Tues/Thurs	55	35.26%
Monday evenings	6	3.85%
Tuesday evenings	0	0.00%
Wednesday evenings	0	0.00%
Thursday evenings	2	1.28%
Weekends	3	1.92%
Total	**156**	**100.00%**

Table 26. Preferred time of day for classes

What time or times of day do you find to be beneficial to your schedule? (check all that apply)	Number	Percentage
8:00 a.m.	69	44.23%
9:30 a.m.	111	71.15%
11:00 a.m.	113	72.44%
12:30 p.m.	91	58.33%
2:00 p.m.	64	41.03%
3:30 p.m.	30	19.23%
6:00 p.m.	29	18.59%
7:30 p.m.	23	14.74%
All respondents answered		

Table 27. Campus Services used by participants

Have you used any of the following services? (Check all that apply)	Number	Percentage
The Writing Center	97	62.18%
The Math Lab	29	18.59%
The Learning Hub	23	14.74%
Career Center	14	8.97%
Peer Mentors	17	10.90%
Student Instructors	9	5.77%
Workshops	11	7.05%
Library	117	75.00%
Puente	15	9.62%
TRIO	2	0.57%
Veteran's Center	1	0.28%
Honors Program	1	0.28%
The Student Success Center	1	0.28%
The Student Center	1	0.28%
Other	13	3.70%
Total	**351**	

Discussion of Survey Results

Participants in the survey represent 15.5% of the continuing 2018 and 2019 FTIC students. As noted above, the participants were over-represented by female respondents. However, the participants' ethnicity is generally representative of the continuing students. Representation of the 2018 and 2019 FTIC students was nearly evenly split with nearly 46% from 2018 and just over 54% from 2019. Similar to the case study presented in February 2020 and the data below, a number of participants in the survey selected more than one endorsement. Only 28.39% of the participants indicated their counselor assisted them in selecting their endorsement while 56.77% indicated they selected their endorsement on their own. Ten percent of the participants indicated wanting to take an endorsement their school did not offer. Slightly over 32% of participants indicated their endorsement helped them select their degree or certificate plan while 16% indicated they were not sure and nearly 52% indicated the endorsement did not make a difference in their degree or certificate selection. Consistent with the analysis of continuers and the leavers, the majority of the participants in the survey (86%) indicated they were pursuing a degree.

Participants were asked about their high school course taking and while nearly 35% of the students indicated Public Service as one of their endorsements only 24 courses were identified by participants as being related to the public service endorsement. This is consistent with the results of the Multinomial Logistic Regression Model on the Public Service Pathway which indicates two endorsements as significant in this pathway, that of Arts and Humanities and Business and Industry (see Table 61). Participants overwhelming listed courses related to the STEM (155 STEM and 40 Health Services) and Visual and Performing Arts (100 Liberal and Fine Arts) endorsements. Participants were asked to provide comments related to their experiences; four of the participants did not appear to understand the question, 86 of the participants did not respond; the remaining 65 made a number of comments. Several participants voiced concerns about being pressured to choose an endorsement as they were entering high school. Others expressed bad experiences with their high school counselor while others said the endorsements were unhelpful.

Participants were also asked why they chose their endorsements. The common themes which arose among students who picked a specific endorsement involved their likes or their career aspirations. For example, participants indicated picking visual and performing arts because they liked photography, art, music, drama, or band. Others selected STEM as interested in a STEM related field such as nursing, engineering, or physical therapy and others picked public service because of an interest in serving their community or teaching. Some of the participants indicated they selected Multidisciplinary Studies because they did not know what career they wanted to pursue or switched around endorsements so much that Multidisciplinary Studies was the one endorsement that worked. One participant indicated they selected the endorsement to align with the program they were interested in as they were participating in band and while they continued to participate in band switched to Business and Industry because they took cosmetology in their sophomore year, but then switched back to Visual and Performing Arts because of the continuation in band and the dropping of cosmetology. One participant stated: "The STEM endorsement was an accident, I took too many sciences. Multi endorsement because I took AP world history, I took ap (sic) to get college credit. And I took arts because I took 4 years of art."

Another participant stated:

> *At first, in GCM, I had wanted the business and industry endorsement for computer and information systems, but my scheduled (sic) consisted of three years of Spanish and both sciences, so my scheduled (sic) was incomplete for the business and industry endorsement, but did fill in for the Humanities, STEM, and multidisciplinary, which is fine by me, I am a jack of all trades type of person.*

One other participant wrote the following:

> *In Junior high they made every student take a test on what endorsement would be more interesting to each student. Most people chose the result provided and others who thought their results didn't reflect what they wanted to do so they chose differently. I personally, had already chose my endorsement prior to the test and the results just validated my endorsement. I currently am on the path to become a registered nurse and in high school with my endorsement I graduated high school with a nursing assistant certification. I felt that the certification would make me stand out compared to others when it came down to the nursing program and also for more employment opportunities.*

Ten percent of the participants indicated they felt forced to select the endorsement or their counselor chose the endorsement for them while just under eight percent indicated picking Multidisciplinary Studies because they did not know what they wanted to do.

Participants were asked about their chosen degree and certificate as well as their career plans. Despite the number of students who indicated they were undecided in their degree plan or certificate, Table 17 suggests participants are more decisive about career plans as reflected in the differences between reported degree and/or certificate plans and reported career paths. Additionally, participants who indicated Liberal or Fine Arts for their degree plan may not be sure of their career path or may be considering a different career path in thinking about their future as reflected by the close to seven percent difference between those who indicated Liberal or Fine Arts as their pathway and those who selected Liberal or Fine Arts as their career path.

College academic advising questions centered around the discussion of endorsements and degree/certificate plans with academic advisors/counselors along with participant experiences in interactions with their advisors/counselors. More than half (51.92%) of the participants indicated being advised by a college advisor or counselor about their degree and/or certificate plan. However, only 26.92% indicated their advisor/counselor discussed their high school endorsement plan with them when advising about their degree plan. Participants were split with regard to whether it would be beneficial for the college advisor/counselor to discuss their endorsement experiences in relation to degree/certificate plans: 34.62% indicated “Yes”, 33.97% indicated “No”, and 31.41% indicated “Not Sure.” While fifty-six participants provided comments on their experiences with academic advising and their degree/certificate planning, 17 of those participants misunderstood the question. Twenty-seven of the remaining 39 participants indicated advising was helpful or good while 12 indicated the advising was not helpful or bad.

In regard to class scheduling, participants overwhelmingly indicated their college classes are scheduled at a time that works for their work or family schedule (89.74%). The majority of the participants were enrolled in face-to-face or hybrid classes (94.87%). Overall, the 9:30 a.m. and 11:00 a.m. course time slot as well as the Monday/Wednesday class meeting days were indicated as preferable or beneficial of the participants' schedule. In regard to academic and supportive services, The Writing Center and The Library were listed as the most used services followed by The Math Lab and The Learning Hub (provides peer mentoring and tutoring services).

Survey Implications and Recommendations

Based on the survey results, providing more information about endorsements and their connections to college major and career path in middle and high school may prove beneficial to help students have a better understanding of the connections of courses in a specific endorsement and the end goal of a career. Since many participants indicated pursuing more than one endorsement and also indicated their endorsement was not helpful in selecting their degree or certificate pathway, helping students hone in on the courses within specific endorsements that align with college majors and career pathways may prove beneficial. While some schools are limited in their ability to offer a variety of different courses within a specific endorsement, this may leave the door open for possible dual enrollment courses to fill some of the gaps, which means working to increase relationships between community colleges and their ISD partners at the advising level and beyond.

Participants who indicated making a specific endorsement selection stated they chose the endorsement based on subjects they liked or possible career paths within an endorsement. Other participants indicated selecting the Multidisciplinary Studies endorsement because they did not know what they wanted to pursue as a career. This reinforces the need to make better connections in the endorsement to college major and career pathways, particularly as some students indicated they picked the endorsement based on liking particular classes rather than thinking about future careers.

The results of the survey suggest the majority of the participants aspire to obtain a degree. Additionally, their stated career paths indicate nearly 90% of the participants are pursuing degrees which require transferring to a four-year institution. Therefore, just as there is a need to make the endorsement to degree/certificate/career pathway connection, there is also a need to build out transfer plans for students and showcase careers by specific pathways.

Due to the split opinions among the participants, on whether a discussion of high school endorsements or high school courses within an endorsement would be beneficial during a college academic advising session, further exploration around this issue should be conducted. Additionally, the ability of participants to complete more than one endorsement may be counter to the intent of helping students determine their college and career path. Further research around the role of multiple endorsements and making degree/certificate/career choices is needed. Finally, enhancing relationships between community colleges and high schools, business and industry, and four-year universities to better align the endorsement to college and career pathways is recommended to reach the goals of 60 X 30TX (Texas Higher Education Coordinating Board, 2015).

Case Study of Continuers and Non-Continuers

High school grade point average (GPA) has been used as a correlation in college readiness studies, though some studies indicate GPA may be influenced by the level of rigor in the student's course taking and that grade inflation appears present for some students (Merritt, 2019; Nord et al., 2011; Gallegos, 2006). Belfield and Crosta (2012) and Bowen, Chingos, and McPherson (2009) found high school GPA to be a strong predictor of college success. Belfield and Crosta (2012) indicated: "The relationship between high school GPA and college GPA is so powerful that it would seem important for colleges to more fully explore this measure in deciding on placement" (p. 39). This case study examined the possible relationship between high school and college GPAs and persistence in college. High school GPAs presented on high school transcripts often are weighted to a scale beyond a four point scale and not all high schools provide both the weighted and the four point scale. Therefore, for the purposes of this study, all high school GPAs listed as 4.0 or greater were normalized to a 4.0 scale. GPAs were then placed in scale categories in .49 increments, e.g. 3.5 to 3.99. This analysis will compare the relationship of high school to college GPA of the students who continued enrollment and students who did not continue enrollment into spring 2020. The alignment of endorsements to degree plans and college pathways as well factors such as gender, ethnicity/race, and high school attended will be examined for both groups (continuers and leavers). Implications of the data will be discussed along with recommendations.

Methodology for Participant Analysis

As discussed in the introduction, the advising worksheets of the 2018 and 2019 FTIC participants (1,809) in this case study were analyzed to examine their enrollment status and college GPA. Institutional research provided the initial set of data which included demographic information, degree selection, dual credit course taking, graduation, and high school information. Additionally, in part one of this case study, participants' high school transcripts were reviewed to determine high school GPA, endorsement completion, distinguished achievement, and any performance measures earned by the participants.

In January 2020, a list of continuing students, students who never enrolled, and students who stopped attending college was compiled. During the summer 2020, Lee College offered free tuition to community members living in the Lee College Service Area. Based on the free course offerings, the advising worksheets of the dataset of non-continuing students and students who had applied but not enrolled were reviewed. Eight students who previously had not enrolled at Lee College enrolled during the free tuition summer from the high school graduating class of 2019. Additionally, 20 students who left after fall 2019 enrolled in summer classes, two students enrolled in fall classes, and one student enrolled in both summer and fall 2020 courses from the high school graduating class of 2019. Students from the high school graduating class of 2018 also enrolled in summer classes: 12 in summer 2020 only, nine in summer and fall 2020 classes, and three registered for fall 2020 classes. In total, 47 or 10.7% of students who previously stopped out of college returned in the summer/fall 2020. These students were included in the dataset of the students who left in each cohort and were not added back into the continuer dataset for the purposes of analysis of the GPA data.

Analysis of Continuers and Non-Continuers

Descriptive Statistics

Table 28 reflects the original dataset's enrollment status as of spring 2020 enrollment:

Table 28. Dataset enrollment data

Fall 2018 & Fall 2019 FTIC Enrollment	Number
Original Dataset	1809
Never Enrolled	228
Dual Credit/Summer only Students	144
Fall 2018 H.S. Graduates left between Fall 2018 and Spring 2020	351
Fall 2019 H.S. Graduates left between Fall 2019 and Spring 2020	84
Remaining enrolled cohort Spring 2020	**1002**

*Note. Original dataset indicated 1811; two students were counted twice

In general, the student population in this study are representative of the main campus population of Lee College in relation to ethnicity and gender. In the 2019 – 2020 academic year, the main campus population not including dual enrollment students included 14.99% African American, 0.20% American Indian/Alaskan Native, 2.32% Asian, 44.82% Hispanic, 2.83% Multi-Racial, 1.30% Not Specified, 0.12% International and 32.42% Caucasian (Lee College, 2020b). Additionally, the main campus population not including dual enrollment students included students who identified as females as 57.04% and males as 42.96% (Lee College, 2020b).

As noted in Tables 29, 30, and 31, 1437 FTIC students who graduated from high school in fall 2018 or fall 2019 enrolled at Lee College. These students identified as 9.11% African American, .14% American Indian, 2.16% Asian, 50.73% Hispanic, 3.06% Multi-Racial, 1.92% Not-specified, .21% Pacific Islander, and 32.64% Caucasian. FTIC African-American students are under-represented by 5.88% of main campus population while FITC Hispanic students are over-represented by 5.91% of main campus population.

Table 29. Cross-Tabulation of fall 2018 & 2019 Cohorts No Longer Enrolled Spring 2020 by Gender & Ethnicity

Gender	Ethnicity					
	African American	Hispanic	Multi-racial	Not Specified & Native American	Caucasian	Total
Female	29	95	8	6	85	225
Male	23	96	5	5	80	210
Total	52	191	13	11	165	435

Table 30. Cross-tabulation of fall 2018 & 2019 Cohorts Continued Enrolled Spring 2020 by Gender & Ethnicity

	Ethnicity						
Gender	**African American**	**Asian**	**Hispanic**	**Multi-racial**	**Not specified & Pacific Islander**	**Caucasian**	**Total**
Female	46	13	291	16	13	144	523
Male	33	15	247	15	9	160	479
Total	79	28	538	31	22	304	1002

The FTIC students included 52.05% female and 47.95% male in which FTIC males represent 5% more than the main campus population and FTIC females represent 5% less than the main campus population. When examining the data and comparing continuers versus non-continuers by ethnicity, 62% of the non-continuers are of minority status: 61.9% of non-continuer males are males of minority status and 62.2 of non-continuer females are females of minority status. Additionally, 53.2% of continuers are of minority status: 31.8% of continuer males are males of minority status and 72.5% of continuer females are females of minority status.

Table 31. Cross-tabulation of Continuers and Non-Continuers by Gender and Ethnicity

	Enrollment Status								
Ethnicity	**Non-Continuer Female**	**Non-Continuer Male**	**Total Non-Continuers**	**Non-Continuer Percentage**	**Continuer Female**	**Continuer Male**	**Continuer**	**Continuer Percentage**	**Total**
African American	29	23	52	12.00%	46	33	79	7.88%	131
American Indian	2	0	2	0.46%	0	0	0	0.00%	2
Asian	2	1	3	0.69%	13	15	28	2.79%	31
Hispanic	95	96	191	43.91%	291	247	538	53.69%	729
Multi-racial	8	5	13	2.98%	16	15	31	3.10%	44
Not specified	4	5	9	2.06%	10	9	19	1.90%	28
Pacific Islander	0	0	0	0.00%	3	0	3	0.30%	3
Caucasian	85	80	165	37.90%	144	160	304	30.34%	469
Total	225	210	435	100.00%	523	479	1002	100.00%	1437

Table 32 provides information related to financial aid eligible status, self-identification of first generation in college, and prior dual credit course completers. Thirty-two percent of the FTIC students were financial aid eligible and of the students who were financial aid eligible, 22% did not continue. Students who identified as first generation to college made up 16.2% of the total FTICs and of these 23.2% did not continue. Students who attained college credit while in high school made up 27.13% of the FTIC group and of these, 29.7% did not continue.

Table 32. Frequencies of Continuers and Non-Continuers eligible for federal financial aid, self-reported first-generation to college, and dual credit course attainment

Characteristic	Continuers	Percentage of Continuers	Non-continuers	Percentage of Non-continuers
Financial Aid Eligible	363	36.23%	102	23.44%
Self-Identified First Generation	179	17.86%	54	12.40%
Attained Dual Credit in High School	274	27.36%	116	26.66%

Tables 33 (non-continuers) and 34 (continuers) reflect the FTIC population by high schools. Nearly 52% (225) of the non-continuing FTIC students and 59.8% (600) of the continuing FTIC students were in-district students. Table 35 provides the percentage of non-continuers of all the FTIC students by high school. An examination of these three tables reflects FTIC students who attended high school outside the Lee College service area made up only 4.9% of the total group. In-district students made up 57.4% of the group (Goose Creek Memorial, Impact ECHS, Peter Hylands – ALP, Robert E. Lee, and Ross S. Sterling) and out of district but within the service area made up 37.7% with students from Barbers Hill High School making up 15.8%, those from Dayton High School making up 7.3%, those from Crosby making up 5.14%, and the remaining high schools in the service area making up 9.46% (Anahuac, East Chambers, Hardin, Hargrave, Hull-Daisetta, Liberty, Premier High School of Dayton, and West Hardin). Stuart Career Tech High School (SCTHS) was not designated as an Early College High School until 2017 and while students may have participated in programs at SCTHS, they graduated from their home high school. Table 35 reflects the percentage of non-continuers based on total enrollment per high school.

Table 33. Fall 2018 & 2019 Cohorts No Longer Enrolled Spring 2020 – High Schools

High School	Frequency	Percent
Anahuac HS	15	3.4
Barbers Hill HS	62	14.3
Crosby HS	23	5.3
Dayton HS	42	9.7
East Chambers HS, Premier HS, West Hardin HS	6	1.4
Goose Creek Memorial HS	70	16.1
Hardin HS	5	1.1
Hargrave HS	7	1.6
Hull-Daisetta HS	9	2.1
Impact Early College HS	16	3.7
Lee HS	43	9.9
Liberty HS	6	1.4
Peter Hyland Center - ALP HS	13	3.0
Sterling HS	90	20.7
Out of Service Area HS	28	6.4
Total	435	100.0

Table 34. Fall 2018 & 2019 Cohorts Enrolled Spring 2020 – High Schools

	Frequency	Percent
Anahuac HS	18	1.8
Barbers Hill HS	165	16.5
Crosby HS	51	5.1
Dayton HS	63	6.3
East Chambers HS, Premier HS of Dayton, West Hardin HS	8	0.8
Goose Creek Memorial HS	200	20.0
Hardin HS	12	1.2
Hargrave HS	10	1.0
Hull-Daisetta HS	6	0.6
Impact Early College HS	25	2.5
Lee HS	144	14.4
Liberty HS	27	2.7
Peter Hyland Center - ALP HS	13	1.3
Sterling HS	218	21.8
Out of Service Area HS	42	4.2
Total	1002	100.0

Table 35. Percentage of non-continuers by high school

High School	Percent
Anahuac HS	45.45%
Barbers Hill HS	27.30%
Crosby HS	31.08%
Dayton HS	40.00%
East Chambers HS, Premier HS of Dayton, West Hardin HS	42.80%
Goose Creek Memorial HS	25.90%
Hardin HS	29.40%
Hargrave HS	41.17%
Hull-Daisetta	60.00%
Impact Early College HS	39.02%
Lee HS	23.00%
Liberty HS	18.18%
Peter Hyland Center - ALP HS	50.00%
Sterling HS	29.22%
Out of Service Area HS	40.00%
Total percentage of non-continuers	30.27%

Tables 36 and 37 reflect the number of endorsements attained by continuers and non-continuers while in high school. The majority of FTIC students (62.2%) attained two or more endorsements while in high school. However, 44.4% of the non-continuers only attained one endorsement as compared to 34.9% of continuers.

Table 36. Number of endorsements of non-continuing students

Number of Endorsements	Frequency	Percent
1 endorsement	193	44.4
2 endorsements	174	40.0
3 endorsements	58	13.3
4 endorsements	10	2.3
5 endorsements	0	0.0
Total	**435**	**100.0**

Table 37. Number of endorsements of continuing students

Number of Endorsements	Frequency	Percent
1 endorsement	350	34.9
2 endorsements	437	43.6
3 endorsements	179	17.9
4 endorsements	34	3.4
5 endorsements	2	0.2
Total	**1002**	**100.0**

Tables 38 and 39 reflect 26.2% of non-continuers attained Multidisciplinary Studies as their sole endorsement as compared to 22.3% of continuers who only attained Multidisciplinary Studies as their sole endorsement. An examination of the tables reflect students who attained STEM as their only endorsement equaled 29 (non-continuers = 12 and continuers = 17); those who attained Public Service as their only endorsement equaled 48 (non-continuers = 13 and continuers =35); those who attained Business and Industry as their only endorsement equaled 87 (non-continuers = 34 and continuers = 53); and those who attained Arts and Humanities equaled 48 (non-continuers = 15 and continuers =33). When reviewing the data on endorsements 81.2% attained Multidisciplinary Studies as one of their endorsements, 26.65% attained STEM as one of their endorsements, 22.41% attained Public Service as one of their endorsements, 20.95% attained Business and Industry as one of their endorsements, and 33.54% attained Arts and Humanities as one of their endorsements.

Table 38. Cross-tabulation of non-continuers of number of endorsements by type of endorsement

	Type of Endorsement of Non-Continuers				
Number of Endorsements	**Multidisciplinary**	**STEM**	**Public Service**	**Business & Industry**	**Arts & Humanities**
One endorsement	114	17	13	34	15
Two endorsements	153	50	47	38	60
Three endorsements	56	41	19	15	41
Four endorsements	10	9	7	4	9
Total	333	117	86	91	125

Table 39. Cross-tabulation of continuers of number of endorsements by type of endorsement

	Type of Endorsement of Continuers				
Number of Endorsements	**Multidisciplinary**	**STEM**	**Public Service**	**Business & Industry**	**Arts & Humanities**
One endorsement	223	12	35	53	33
Two endorsements	402	115	106	95	156
Three endorsements	173	105	68	46	136
Four endorsements	34	32	25	14	30
Five endorsements	2	2	2	2	2
Total	834	266	236	210	357

Tables 40 and 41 present cross-tabulations of endorsements by ethnicity with Multidisciplinary Studies being the largest attained endorsement followed by Arts and Humanities by all FTIC students regardless of ethnicity or continuation status. The majority (68.3%) of the FTIC students who had Multidisciplinary Studies as one of their endorsements were of minority status as compared to FTIC Caucasian students (31.7%).

Table 40. Cross-tabulation of non-continuers of endorsement type by ethnicity

Endorsement	African American	Asian	Caucasian	Hispanic	Multi-racial, Not Specified, Native American, and Pacific Islander
Arts and Humanities	11	1	48	57	8
Business and Industry	13	0	43	32	3
Multidisciplinary	43	3	131	140	16
Public Service	4	1	32	43	6
STEM	11	1	50	49	6
Total	82	6	304	321	39

Table 41. Cross-tabulation of continuers of endorsement type by ethnicity

Endorsement	African American	Asian	Caucasian	Hispanic	Multi-racial, Not Specified, Native American, and Pacific Islander
Arts and Humanities	23	12	96	207	19
Business and Industry	14	3	79	99	15
Multidisciplinary	70	27	239	456	42
Public Service	17	6	55	144	14
STEM	14	14	78	152	8
Total	138	62	547	1058	98

As noted at the beginning of this case study, High School GPA is a strong predictor of student success (Belfield and Crosta, 2012). Similarly, Stewart, Lim, and Kim (2015) found both high school GPA and first semester of College GPA both contribute to student persistence. Tables 42 – 45 present high school and college GPAs of non-continuers and continuers in the case study. Only 5.2% of non-continuers (25) and 4.69% of continuers (38) had cumulative high school GPAs below 2.00. The examination of college GPA indicates 6.43% of non-continuers were enrolled in Developmental courses as compared to 0.6% of continuers. Additionally, 1.61% of non-continuers withdrew from all classes while only 0.09% of continuers withdrew from all classes. Nearly 40% of the non-continuers attained a college GPA of 2.00 or less as compared to nearly 18% of the continuers.

Table 42. High School GPA of non-continuing students

High School GPA normalized to a 4.0 scale	Frequency	Percent
Any HS GPA between .50 - .99	1	0.23%
Any HS GPA between 1.00 - 1.49	4	0.92%
Any HS GPA between 1.50 - 1.99	20	4.60%
Any HS GPA between 2.00 - 2.49	53	12.20%
Any HS GPA between 2.50 - 2.99	108	24.82%
Any HS GPA between 3.0 - 3.49	114	26.20%
Any HS GPA between 3.5 - 3.99	87	20.00%
Any HS GPA 4.00 or above	48	11.03%
Total	435	100.00%

Table 43. College GPA of non-continuing students

College GPA	Frequency	Percent
Enrolled & Withdrew all classes	7	1.61%
Developmental Education	28	6.43%
Any College GPA between 0.00 - 0.49	55	12.64%
Any College GPA between 0.50 - 0.99	26	5.98%
Any College GPA between 1.00 - 1.49	46	10.58%
Any College GPA between 1.50 - 1.99	46	10.58%
Any College GPA between 2.00 - 2.49	64	14.71%
Any College GPA between 2.50 - 2.99	46	10.58%
Any College GPA between 3.00 - 3.49	63	14.48%
Any College GPA between 3.50 - 3.99	35	8.04%
Any College GPA 4.0	19	4.37%
Total	435	100.00%

Table 44. High School GPA of continuing students

HS GPA	Frequency	Percent
No high school transcript	2	0.20%
Any HS GPA between .50 - .99	1	1.00%
Any HS GPA between 1.00 - 1.49	7	0.70%
Any HS GPA between 1.50 - 1.99	30	2.99%
Any HS GPA between 2.00 - 2.49	86	8.58%
Any HS GPA between 2.50 - 2.99	197	19.66%
Any HS GPA between 3.0 - 3.49	293	29.24%
Any HS GPA between 3.5 - 3.99	237	23.65%
Any HS GPA 4.00 or above	149	14.87%
Total	1002	100.00%

Table 45. College School GPA of continuing students

College GPA	Frequency	Percent
Withdrew all classes	1	0.09%
Developmental Education	6	0.60%
Any College GPA between 0.00 - 0.49	47	4.69%
Any College GPA between .50 - .99	17	1.70%
Any College GPA between 1.00 - 1.49	58	5.79%
Any College GPA between 1.50 - 1.99	58	5.79%
Any College GPA between 2.00 - 2.49	200	19.96%
Any College GPA between 2.50 - 2.99	180	17.96%
Any College GPA between 3.0 - 3.49	244	24.35%
Any College GPA between 3.5 - 3.99	141	14.07%
Any College GPA 4.00	50	4.99%
Total	1002	100.00%

Table 46 provides the frequencies of non-continuers and continuers with GPAs below 2.00 in high school and college aligned to high schools. The bolded high schools have the largest variation between students with a 2.00 or below in high school and those with a 2.00 or below in college. College students included in the below 2.00 demographic also include students who withdrew from all courses and students who were in developmental education courses as these students do not have a GPA.

Table 46. High School GPA to College GPA by High School

	Non-Continuers		Continuers		All	All
High School	High School GPA below 2.00	College GPA below 2.00	High School GPA below 2.00	College GPA below 2.00	Total High School below 2.00 GPA	Total College below 2.00 GPA
Anahuac High School	0	10	0	5	**0**	**15**
Barbers Hill High School	2	21	2	22	**4**	**43**
Crosby High School	6	10	14	11	20	21
Dayton High School	0	21	0	14	**0**	**35**
East Chambers High School	0	1	0	1	0	2
Goose Creek Memorial High School	1	37	1	38	**2**	**75**
Hardin High School	0	2	0	3	0	5
Hargrave High School	0	2	1	0	1	2
Hull-Daisetta High School	0	2	0	3	0	5
Impact ECHS	1	4	2	1	3	5
Lee High School	0	24	0	23	**0**	**47**
Liberty High School	3	4	6	8	9	12
Peter Hylands - ALP High School	4	8	5	8	9	16
Premier High School of Dayton	0	1	0	1	0	2
Sterling High School	5	46	7	44	**12**	**90**
West Hardin High School	0	1	0	0	0	1
Out of Service Area High Schools	0	14	2	5	**2**	**19**
Total	**22**	**208**	**40**	**187**	**62**	**395**

Similar to the data presented in part one of the research, the majority of both continuers and non-continuers declared pursuit of a degree plan over a certificate program as evidenced in Tables 47 and 48 which reflect pursuit of the Associates of Arts, Associates of Sciences, Associates of Arts in Teaching, Associates of Applied Sciences, and Certificates of each group. The majority of non-continuers (87.8%) and continuers (87.4%) were degree-seeking students. Seventy percent of the non-continuers and 68% of the continuers were transfer degree-seeking with only 17.7% of non-continuers seeking an Associates of Applied Sciences (AAS) and 19.8% of continuers seeking an AAS. Similarly, only 12.2 % on non-continuers and 12.6% of continuers were seeking certificates.

Table 47. Cross-tabulation of Ethnicity*Degree or Certificate*Gender of non-continuers

			Degree or Certificate					
Gender			**Certificate**	**AA**	**AS**	**AAT**	**AAS**	**Total**
Female	Ethnicity	African American	4	9	12	1	3	29
		American Indian	0	1	0	0	1	2
		Asian	0	1	1	0	0	2
		Hispanic	10	39	30	4	13	96
		Multi-racial	2	1	2	3	0	8
		Not specified	1	0	3	0	0	4
		Caucasian	14	32	28	10	1	85
	Total		31	83	76	18	18	226
Male	Ethnicity	African American	2	8	7	0	6	23
		Asian	0	0	1	0	0	1
		Hispanic	7	27	32	1	28	95
		Multi-racial	1	3	0	0	1	5
		Not specified	0	2	1	0	2	5
		Caucasian	12	31	14	1	22	80
	Total		22	71	55	2	59	209
Total	Ethnicity	African American	6	17	19	1	9	52
		American Indian	0	1	0	0	1	2
		Asian	0	1	2	0	0	3
		Hispanic	17	66	62	5	41	191
		Multi-racial	3	4	2	3	1	13
		Not specified	1	2	4	0	2	9
		Caucasian	26	63	42	11	23	165
	Total		53	154	131	20	77	435

Table 48. Cross-tabulation of Ethnicity*Degree or Certificate*Gender of continuers

Gender			Degree or Certificate					
			Certificate	AA	AS	AAT	AAS	Total
Female	Ethnicity	African American	3	20	17	1	5	46
		Asian	0	2	11	0	0	13
		Hispanic	24	94	128	25	20	291
		Multi-racial	1	8	6	1	0	16
		Not specified	2	6	2	0	0	10
		Pacific Islander	0	1	1	0	1	3
		Caucasian	29	45	44	17	9	144
	Total		59	176	209	44	35	523
Male	Ethnicity	African American	6	8	12	0	7	33
		Asian	1	5	9	0	0	15
		Hispanic	31	48	76	4	88	247
		Multi-racial	3	5	3	0	4	15
		Not specified	2	1	2	0	4	9
		Caucasian	24	36	36	4	60	160
	Total		67	103	138	8	163	479
Total	Ethnicity	African American	9	28	29	1	12	79
		Asian	1	7	20	0	0	28
		Hispanic	55	142	204	29	108	538
		Multi-racial	4	13	9	1	4	31
		Not specified	4	7	4	0	4	19
		Pacific Islander	0	1	1	0	1	3
		Caucasian	53	81	80	21	69	304
	Total		126	279	347	52	198	1002

Tables 49 and 50 provide a cross-tabulation of types of degrees and ethnicity and types of certificates and ethnicity of non-continuers. Given the large number of students with a Multidisciplinary Studies endorsement, it is not surprising that General Studies (105) combined with Undecided degrees/certificates (34) make up the largest (32%) group for non-continuers. Nearly 30% of the non-continuing African American students indicated General Studies or Undecided as their degree plan as did 27% of non-continuing Hispanic students; 27% of non-continuing American Indian, Asian, Multi-Racial, Not Specified, and Pacific Islander combined students; and 38% of non-continuing Caucasian students. No other degree or certificate plan had as high attrition rates, though Transfer Allied Health was the second largest group of non-continuing students (55).

Table 49. Cross-tabulation of Degrees by Ethnicity for non-continuers

	Ethnicity				
Degrees	**African American**	**Hispanic**	**American Indian, Asian, Mult-racial & Not specified**	**Caucasian**	**Total**
Accounting Degree	1	2	0	0	3
American Studies or Social Sciences Degree	0	3	1	2	6
Analytical Instrumentation Degree	0	3	0	0	3
Audio Engineering Degree	0	1	0	0	1
Biology, Chemistry, Env. Sci., Geology, or Physics Degree	3	11	2	8	24
Business, Marketing or Management Degree	5	11	0	7	23
Childhood Development Degree	0	1	0	0	1
Education Degree	1	5	3	11	20
CADD Degree	0	1	0	0	1
Computer Graphics Tech Degree	0	1	0	1	2
Computer Maintenance & Network Degree	1	0	0	1	2
Computer Science Degree	0	4	0	3	7
Cosmetology Degree	0	1	0	0	1
Creatrve Arts Degree	0	2	0	2	4
Criminal Justice Degree	2	9	0	2	13
Electrical Technology Degree	1	0	1	0	2
Engineering Degree	3	13	1	4	21
Game Design Specialist Degree	1	1	0	0	2
General Studies Degree	12	41	6	46	105
Health Information Management Degree	0	4	0	0	4
English, Humanities, & Mex. Am Studies Degree	0	0	0	1	1
Instrumentation Degree	0	6	1	2	9
Kinesiology Degree	1	1	1	2	5
Manufacturing Engineering Degree	0	2	0	0	2
Music Degree	0	2	0	0	2
Process Technology Degree	4	12	1	15	32
Safety Management Degree	0	1	0	0	1
Social Work Degree	0	2	0	1	3
Speech Communications Degree	1	1	0	1	3
Substance Abuse or Drug & Alcohol Counseling Degree	0	1	0	0	1
Transfer Allied Health	7	23	5	20	55
Undecided Degree	1	5	0	6	12
Welding Degree	0	0	0	1	1
Total	44	170	22	136	372

Table 50. Cross-tabulation of Certificates by Ethnicity for non-continuers

Certificates	Ethnicity African American	Hispanic	Multi-racial & Not Specified*	Caucasian	Total
Accounting Certificate	0	1	0	0	1
Analytical Instrumentation Certificate	1	0	0	1	2
Architectural Building & Construction Certificate	0	0	0	1	1
Marketing Certificate	3	2	0	2	7
Childhood Development Certificate	0	1	0	0	1
CADD_Merchanist, Mechanical Tech, or Process Inst & Elec Design Certificate	1	0	0	2	3
Computer Mainetenance Tech Certificate	0	1	1	1	3
Cosmetology Certificate	1	2	0	4	7
Electrical Tech or Elect Inst. Analytic Certificate	0	2	0	0	2
Entrepreneurship Certificate	0	1	0	0	1
Instrumentation Certificate	0	2	0	2	4
Millwright or Machinist Certificate	0	0	0	1	1
Nursing Certificate	0	1	0	0	1
Pipefitter Helper Certificate	0	0	0	1	1
Process Tech Certificate	1	0	0	0	1
Undecided Non Cred or Certificate	1	4	4	13	22
Welding Certificate	0	2	0	1	3
Welding Inspection Certificate	0	2	0	0	2
Total	8	21	5	29	63

Tables 51 and 52 provide a cross-tabulation of Pathways via degree and Pathways via certificate of non-continuers. In order to examine designated Pathways without the intervening degree plans of General Studies and Undecided, these degrees were separated into a separate "pathway" as there is no way to determine the specific career or transfer pathway for students indicating General Studies or Undecided. Among non-continuers, the General Studies/Undecided Pathway made up 32% of the degree/certificates; 16% were Manufacturing and Industry; 15% were Health Sciences;14% were STEM; 11% were Public Service; 9% were Applied Business; and 3% were Liberal Arts.

Table 51. Cross Tabulation of Degrees of non-continuers by Pathway

	Pathway							
Degrees	**Undecided**	**Applied Business**	**Health Services**	**Liberal Arts**	**Manufacturing & Industrial**	**Public Service**	**Science, Technology, Engineering, & Math**	**Total**
Accounting Degree	0	3	0	0	0	0	0	3
American Studies or Social Sciences Degree	0	0	0	6	0	0	0	6
Analytical Instrumentation Degree	0	0	0	0	3	0	0	3
Audio Engineering Degree	0	0	0	1	0	0	0	1
Biology, Chemistry, Environmental Sciences, Geology, or Physics Degree	0	0	0	0	0	0	24	24
Business, Marketing or Management Degree	0	23	0	0	0	0	0	23
Childhood Development Degree	0	0	0	0	0	1	0	1
Education Degree	0	0	0	0	0	20	0	20
CADD Degree	0	0	0	0	1	0	0	1
Computer Graphics Tech Degree	0	0	0	0	0	0	2	2
Computer Maintenance & Network Degree	0	0	0	0	0	0	2	2
Computer Science Degree	0	0	0	0	0	0	7	7
Cosmetology Degree	0	1	0	0	0	0	0	1
Creatrve Arts Degree	0	0	0	4	0	0	0	4
Criminal Justice Degree	0	0	0	0	0	13	0	13
Electrical Technology Degree	0	0	0	0	2	0	0	2
Engineering Degree	0	0	0	0	0	0	21	21
Game Design Specialist Degree	0	0	0	0	0	0	2	2
General Studies	105	0	0	0	0	0	0	105
Health Information Management Degree	0	0	4	0	0	0	0	4
English, Humanities, & Mex. Am Studies Degree	0	0	0	1	0	0	0	1
Instrumentation Degree	0	0	0	0	9	0	0	9
Kinesiology Degree	0	0	5	0	0	0	0	5
Manufacturing Engineering Degree	0	0	0	0	2	0	0	2
Music Degree	0	0	0	2	0	0	0	2
Process Technology Degree	0	0	0	0	32	0	0	32
Safety Management Degree	0	0	0	0	1	0	0	1
Social Work Degree	0	0	0	0	0	3	0	3
Speech Communications Degree	0	0	0	3	0	0	0	3
Substance Abuse or Drug & Alcohol Counseling Degree	0	0	1	0	0	0	0	1
Transfer Allied Health	0	0	55	0	0	0	0	55
Undecided Degree	12	0	0	0	0	0	0	12
Welding Degree	0	0	0	0	1	0	0	1
Total	117	27	65	17	51	37	58	372

Table 52. Cross Tabulation of Certificates of non-continuers by Pathway

	Pathway						
Certificate	Undecided	Applied Business	Health Services	Manufacturing & Industrial	Public Service	Science, Technology, Engineering, & Math	Total
Accounting Certificate	0	1	0	0	0	0	1
Analytical Instrumentation Certificate	0	0	0	2	0	0	2
Architectural Building & Construction Certificate	0	0	0	1	0	0	1
Marketing Certificate	0	7	0	0	0	0	7
Childhood Development Certificate	0	0	0	0	1	0	1
CADD_Merchanist, Mechanical Tech, or Process Inst & Elec Design Certificate	0	0	0	3	0	0	3
Computer Mainetenance Tech Certificate	0	0	0	0	0	3	3
Cosmetology Certificate	0	7	0	0	0	0	7
Electrical Tech or Elect Inst. Analytic Certificate	0	0	0	2	0	0	2
Entrepreneurship Certificate	0	1	0	0	0	0	1
Instrumentation Certificate	0	0	0	4	0	0	4
Millwright or Machinist Certificate	0	0	0	1	0	0	1
Nursing Certificate	0	0	1	0	0	0	1
Pipefitter Helper Certificate	0	0	0	1	0	0	1
Process Tech Certificate	0	0	0	1	0	0	1
Undecided Non Cred or Certificate	22	0	0	0	0	0	22
Welding Certificate	0	0	0	3	0	0	3
Welding Inspection Certificate	0	0	0	2	0	0	2
Total	22	16	1	20	1	3	63

Tables 53 and 54 provide a cross-tabulation of degrees and ethnicity and certificates and ethnicity of continuers. Similar to non-continuers, the General Studies Degree (178) combined with Undecided Degrees/Certificates (76) made up the largest group of continuing FTIC students. Twenty-seven percent of African American continuing students were pursuing either a General Studies degree or Undecided degrees/certificate; 41.9% of American Indian, Asian, Multi-racial, Not-Specified, and Pacific Islander continuing students were pursuing either a General Studies degree or Undecided degrees/certificate, 21.4% of Hispanic students were pursuing either a General Studies degree or Undecided degrees/certificate, and 30% of Caucasian students were pursuing either a General Studies degree or Undecided degrees/certificate. The second largest degree plan was Transfer Allied Health (178) which is typically the degree plan for students planning to enter a health science related career. Students pursuing this degree plan included: 21.4% of continuing African American students, 19.4% of continuing American Indian, Asian, Multi-racial, Not-Specified, and Pacific Islander students, 18% of continuing Hispanic students, and 23% of continuing Caucasian students. Very few students were pursuing low earning degrees or certificates with Childhood Development Certificate ($11.65 per hour) and Cosmetology ($12.45 per hour) coming in as the lowest per the U. S. Department of Labor - O*Net (2020).

Table 53. Cross-tabulation of Degrees by Ethnicity for continuers

	Ethnicity						
Degrees	**African American**	**Asian**	**Hispanic**	**Multi-racial**	**Not specified & Pacific Islander**	**Caucasian**	**Total**
Accounting Degree	0	0	2	0	0	1	3
American Studies/Social Sciences Degrees	3	0	10	1	1	4	19
Analytical Instrumentation Degree	0	0	8	0	1	6	15
Audio Engineering Degree	0	0	1	1	0	4	6
Biology. Chemistry, Environmental Science, or Chemistry Degrees	4	3	31	2	2	13	55
Business or Management Degree	6	0	26	2	2	18	54
Childhood Development Degree	0	0	1	0	0	1	2
Teacher Education Degree	1	0	29	1	0	21	52
Computer Aided Drafting & Design Adv. Tech. & related Degree	0	0	6	0	0	0	6
Computer Graphics Technical Degree	0	0	1	0	0	0	1
Computer Network Maintenance Tech. Degree	1	0	3	1	0	1	6
Computer Science Degree	3	3	15	0	0	4	25
Cosmetology Degreee	0	0	1	0	0	0	1
Creative Arts Degree	0	0	6	1	1	4	12
Criminal Justice Degree	1	1	17	2	0	4	25
Electrical Technical Degree	1	0	5	0	0	1	7
Engineering Degree	7	4	39	1	1	17	69
Game Development Degree	0	0	3	0	0	3	6
General Studies Degree	15	4	88	7	6	58	178
Health Information Management Degree	0	0	1	0	0	2	3
English, Humanities, or Mexican American Studies Degree	0	0	2	0	0	1	3
Industrical Systems Degree	1	0	1	0	0	2	4
Instrumentation Degree	1	0	30	1	1	14	47
Kinesiology	4	1	4	1	0	2	12
Manufacturing Engineering Degree	1	0	1	0	0	0	2
Math Degree	0	0	2	0	0	1	3
Music Degree	1	0	2	0	0	2	5
Nursing Degree	0	1	3	0	0	1	5
Paralegal Degree	2	0	1	0	0	0	3
Process Technology Degree	4	0	32	1	2	28	67
Safety Management Degree	0	0	7	0	0	2	9
Social Work Degree	1	0	6	0	0	1	8
Speech Communications Degree	0	0	1	0	0	1	2
Transfer Allied Health Degree	10	9	93	4	1	31	148
Undecided Degree	2	1	4	1	0	2	10
Welding Degree	1	0	3	0	0	1	5
Total	70	27	485	27	18	251	878

Table 54. Cross-tabulation of Certificates by Ethnicity for continuers

	Ethnicity				
Certificates	African American	Hispanic	Asian, Multi-racial, or Not Specified	Caucasian	Total
Accounting Certificate	0	1	0	0	1
Analytical Instrumentation Certificate	0	5	0	2	7
Architecture Construction & Building Technology Certificate	0	0	0	1	1
Audio Engineering Certificate	0	1	0	0	1
Cosmetology Certificate	1	6	1	8	16
Electrical Construction Certificate	0	1	0	0	1
Electrical Technology Certificate	0	0	0	1	1
Entrepreneural Certificate	0	1	0	0	1
Industrial Instrumentation Certificate	0	1	0	0	1
Instrumentation Certificate	0	5	1	3	9
Millwright or Machinist Certificate	0	1	0	0	1
Vocational Nursing Certificate	0	2	0	0	2
Process Technology Certificate	0	1	1	3	5
Substance Abuse Certificate	0	0	0	1	1
Undecided Certificate or Non-Credit	6	23	5	32	66
Welding Certificate	2	4	1	1	8
Welding Inspection Certificate	0	1	0	1	2
Total	9	53	9	53	124

Tables 55 and 56 provide a cross-tabulation of Pathways via degree and Pathways via certificate. As with non-continuers, in order to examine designated Pathways without the intervening degree plans of General Studies and Undecided, these degrees were separated into a separate "pathway" as there is no way to determine the specific career or transfer pathway for students indicating General Studies or Undecided. Among continuers, the General Studies/Undecided Pathway made up 25.4% of the degree/certificates; 19.8% were Manufacturing and Industry; 16.6% were Health Sciences; 16.5% were STEM; 8.7% were Public Service; 7.9% were Applied Business; and 5.1% were Liberal Arts.

Table 55. Cross Tabulation of Degrees of continuers by Pathway

	Pathway							
Degrees	**Undecided**	**Applied Business**	**Health Services**	**Liberal Arts**	**Manufacturing & Industrial**	**Public Service**	**Science, Technology, Engineering, & Math**	**Total**
Accounting Degree	0	3	0	0	0	0	0	3
American Studies/Social Sciences Degrees	0	0	0	19	0	0	0	19
Analytical Instrumentation Degree	0	0	0	0	15	0	0	15
Audio Engineering Degree	0	0	0	6	0	0	0	6
Biology. Chemistry, Environmental Science, or Chemistry Degrees	0	0	0	0	0	0	55	55
Business or Management Degree	0	54	0	0	0	0	0	54
Childhood Development Degree	0	0	0	0	0	2	0	2
Teacher Education Degree	0	0	0	0	0	52	0	52
Computer Aided Drafting & Design Adv. Tech. & related Degree	0	0	0	0	6	0	0	6
Computer Graphics Technical Degree	0	0	0	0	0	0	1	1
Computer Network Maintenance Tech. Degree	0	0	0	0	0	0	6	6
Computer Science Degree	0	0	0	0	0	0	25	25
Cosmetology Degreee	0	1	0	0	0	0	0	1
Creative Arts Degree	0	0	0	12	0	0	0	12
Criminal Justice Degree	0	0	0	0	0	25	0	25
Electrical Technical Degree	0	0	0	0	7	0	0	7
Engineering Degree	0	0	0	0	0	0	69	69
Game Development Degree	0	0	0	0	0	0	6	6
General Studies Degree	178	0	0	0	0	0	0	178
Health Information Management Degree	0	0	0	3	0	0	0	3
English, Humanities, or Mexican American Studies Degree	0	0	0	3	0	0	0	3
Industrical Systems Degree	0	0	0	0	4	0	0	4
Instrumentation Degree	0	0	0	0	47	0	0	47
Kinesiology	0	0	12	0	0	0	0	12
Manufacturing Engineering Degree	0	0	0	0	2	0	0	2
Math Degree	0	0	0	0	0	0	3	3
Music Degree	0	0	0	5	0	0	0	5
Nursing Degree	0	0	5	0	0	0	0	5
Paralegal Degree	0	3	0	0	0	0	0	3
Process Technology Degree	0	0	0	0	67	0	0	67
Safety Management Degree	0	0	0	0	9	0	0	9
Social Work Degree	0	0	0	0	0	8	0	8
Speech Communications Degree	0	0	0	2	0	0	0	2
Transfer Allied Health Degree	0	0	148	0	0	0	0	148
Undecided Degree	10	0	0	0	0	0	0	10
Welding Degree	0	0	0	0	5	0	0	5
Total	188	61	165	50	162	87	165	878

Table 56. Cross Tabulation of Certificates of continuers by Pathway

Certificates	Undecided	Pathway Applied Business	Health Services	Liberal Arts	Manufacturing & Industrial	Total
Accounting Certificate	0	1	0	0	0	1
Analytical Instrumentation Certificate	0	0	0	0	7	7
Architecture Construction & Building Technology Certificate	0	0	0	0	1	1
Audio Engineering Certificate	0	0	0	1	0	1
Cosmetology Certificate	0	16	0	0	0	16
Electrical Construction Certificate	0	0	0	0	1	1
Electrical Technology Certificate	0	0	0	0	1	1
Entrepreneural Certificate	0	1	0	0	0	1
Industrial Instrumentation Certificate	0	0	0	0	1	1
Instrumentation Certificate	0	0	0	0	9	9
Millwright or Machinist Certificate	0	0	0	0	1	1
Vocational Nursing Certificate	0	0	2	0	0	2
Process Technology Certificate	0	0	0	0	5	5
Substance Abuse Certificate	0	0	1	0	0	1
Undecided Certificate or Non-Credit	66	0	0	0	0	66
Welding Certificate	0	0	0	0	8	8
Welding Inspection Certificate	0	0	0	0	2	2
Total	66	18	3	1	36	124

In comparing non-continuers to continuers with regard to Pathways, there are 7% fewer General Studies and Undecided students among the continuers, 2.3% fewer continuers in the Public Service Pathway, and 1.1% fewer continuers in the Applied Business Pathway. Continuers exceeded non-continuers in the following pathways: Manufacturing and Industry (nearly 4%), Health Sciences (1.6%), STEM (2.5%), and Liberal Arts (2.1%).

Correlations

A key area of interest in this case study involved examining relationships or associations of a number of factors. The first relationship examined involved the relationship of high school GPA to college GPA for non-continuers and for continuers. Pearson correlation coefficient is generally used when both variables are interval as is the case with GPA (Pallant, 2010).

Table 57 reflects the correlation between high school GPA and College GPA of non-continuers. As indicated in the table, the results of the Pearson correlation indicated that there was a significant positive association between high school GPA and college GPA for non-continuers, $r = .195$, $n = 435$, $p < .001$.

Table 57. Correlation of High School GPA to College GPA of non-continuers

		HSGPA	College GPA
HSGPA	Pearson Correlation	1	.195**
	Sig. (2-tailed)		0.000
	N	435	435
College GPA	Pearson Correlation	.195**	1
	Sig. (2-tailed)	0.000	
	N	435	435

**. Correlation is significant at the 0.01 level (2-tailed).

Table 58 reflects the correlation between high school GPA and College GPA of continuers as both GPA designations are based on interval variables, Pearson correlation coefficient was computed. As indicated in the table, results of the Pearson correlation indicated that there was a significant positive association between high school GPA and college GPA for continuers, r =.365, n = 1002, p < .001.

Table 58. Correlation of High School GPA to College GPA of continuers

		HS GPA	College GPA
HS GPA	Pearson Correlation	1	.365**
	Sig. (2-tailed)		0.000
	N	1002	1002
College GPA	Pearson Correlation	.365**	1
	Sig. (2-tailed)	0.000	
	N	1002	1002

**. Correlation is significant at the 0.01 level (2-tailed).

These correlations align with prior research studies in which high school GPA and college GPA were positively correlated with persistence (Stewart, Lim, & Kim, 2015; Belfield & Crosta, 2012; Pascarella & Terenzini, 2005).

In order to examine the association between endorsements and pathways, chi-square test for independence and Phi or Cramer's V tests of association were performed as both variables are nominal or categorical. Phi is used when both variables have two categories and Cramers V is used when one or more of the variables has more than two categories (Field, 2009). The dataset was divided by the following pathways: General Studies or Undecided, Business and Manufacturing Industries, Public Service, Liberal and Fine Arts, and Health Sciences and STEM.

Cross tabulation of each endorsement to either the degrees in the pathway or the pathway were conducted in order to run chi-square test for independence and nonparametric statistics. The General Studies or Undecided pathway was coded as one pathway while each of the degree choices (general studies or undecided) were coded separately. Therefore, the degrees were run in cross tabulation with each of the endorsement plans.

A chi-square test for independence (with Yates Continuity Correction) indicated a significant association between the Multidisciplinary Studies endorsement and General Studies and Undecided degree plans χ^2 (1, n = 305) = 4.37, p $\leq$ .05, phi = -.136. However, the measure of association using Phi indicates a weak negative association. No other endorsements were found to be significant in relation to the General Studies or Undecided degree plan. Sixty-six students in the General Studies or Undecided pathway are pursuing an undecided certificate and were not included in the measurement.

A chi-square test for independence (with Yates Continuity Correction) indicated a significant association between the business and industry endorsement and Business and Manufacturing Industries pathways χ^2 (1, n = 393) = 8.81, p $\leq$ .05, phi = .156. However, the measure of association using Phi indicates a weak positive association. No association was found between endorsements and Liberal and Fine Arts, Public Service, and Health sciences and STEM pathways.

Multinomial Logistic Regression

Multinomial logistic regression analysis enables the researcher to test the influence of multiple predictor variables, (nominal, ordinal, and interval) have on the criterion variable (Field, 2009; Triola, 2006). Logistic regression is used when the criterion variable is categorical (Field, 2009; Pallant, 2010). The default procedure in SPSS is a "Forced Entry Method" where "...all predictor variables are tested in one block to assess their predictive ability while controlling for the effects of other predictors in the model" (Pallant, 2010, p. 168). A number of selections in SPSS for logistic regression were chosen to evaluate the model. Pseudo R-square was selected to run Cox and Snell and Nagelkerke R^2 to test effect sizes (Field, 2009). Cell probabilities was used to examine observed versus expected frequencies and Goodness-of-fit to "...produce Pearson and likelihood-ratio chi-square statistics for the model" (Field, 2009, p. 304). Estimates was selected to test for beta values, test statistics, and confidence intervals for the predictors in the model (Field, 2009). The selection of likelihood-ratio test computed individual effects in the model (Field, 2009). Multinomial logistic regression was performed to assess the impact of a number of factors on each Pathway. Each of the endorsements, STEM, Multidisciplinary Studies, Public Service, Business & Industry, and Arts and Humanities were included in the model with the dependent variable of a specific pathway.

Multinomial logistic regression was performed to assess the impact of a number of factors on the choice of the students' Health Sciences and STEM Pathways. The model contained five independent variables of endorsements (STEM, Multidisciplinary Studies, Public Service, Business & Industry, and Arts and Humanities). The model fitness was assessed using the Chi Square statistic: χ^2 (10, N = 459) = 8.23, p $\leq$ .144. This indicates the model was not able to distinguish between students who chose Health Sciences or STEM as their pathway based on endorsements. As shown in Table 58 none of the independent variables are statistically significant in relation to the dependent variable.

Table 59. Multinomial logistic regression endorsements to Health Sciences and STEM Pathways

Pathway[a]		B	Std. Error	Wald	df	Sig.	Exp(B)	95% Confidence Interval for	
								Lower Bound	Upper Bound
Health Services	Intercept	0.198	0.405	0.240	1	0.624			
	Multidisciplinary	-0.521	0.267	3.804	1	0.051	0.594	0.352	1.003
	STEM	0.076	0.205	0.139	1	0.709	1.079	0.722	1.613
	PublicService	0.106	0.225	0.223	1	0.637	1.112	0.716	1.727
	BusIndustry	-0.421	0.268	2.470	1	0.116	0.657	0.389	1.110
	ArtsHumanities	0.251	0.201	1.560	1	0.212	1.286	0.867	1.907

a. The reference category is: Science, Technology, Engineering, & Math.

Note: *R^2 = .018 (Cox & Snell), .024 (Nagelkerke). Model χ^2* (10, N = 459) = 8.23, p ≤ .144.

Multinomial logistic regression was performed to assess the impact of a number of factors on the choice of the students' Applied Business and Manufacturing and Industry Pathways. The model contained five independent variables of endorsements (STEM, Multidisciplinary Studies, Public Service, Business & Industry, and Arts and Humanities). The model fitness was assessed using the Chi Square statistic: χ^2 (5, N = 393) = 12.65, p ≤ .05. This indicates there is a significant relationship between the dependent variable of the Applied Business and Manufacturing and Industry Pathways and the independent variables of endorsements. As shown in Table 59 only one of the independent variables made a unique statistically significant contribution to the model (Business and Industry endorsement).

Table 60. Multinomial logistic regression endorsements to Applied Business and Manufacturing & Industry Pathways

Pathway[a]		B	Std. Error	Wald	df	Sig.	Exp(B)	95% Confidence Interval for Exp(B)	
								Lower Bound	Upper Bound
Applied Business	Intercept	-1.180	0.525	5.055	1	0.025			
	Multidisciplinary	-0.128	0.304	0.178	1	0.673	0.880	0.485	1.595
	STEM	0.209	0.258	0.661	1	0.416	1.233	0.744	2.043
	PublicService	-0.358	0.295	1.475	1	0.225	0.699	0.393	1.246
	BusIndustry*	0.757	0.315	5.798	1	0.016	2.133	1.151	3.951
	ArtsHumanities	-0.077	0.245	0.099	1	0.753	0.926	0.573	1.497

a. The reference category is: Manufacturing & Industrial.

*Note: R^2 = .032 (Cox and Snell), .045 (Nagelkerke). Model: χ^2 (5, N = 393) = 12.65, p < .05; *p < .05*

Multinomial logistic regression was performed to assess the impact of a number of factors on the choice of the students' degree choices within the Public Service Pathway (Childhood Development, Criminal Justice, Social Work, and Teacher Education). The sole pathway of public service could not be used as it contains only one value. The model contained five independent variables of endorsements (STEM, Multidisciplinary Studies, Public Service, Business & Industry, and Arts and Humanities). One further issue with the model is reflected in the floating point overflow. The model fitness was assessed using the Chi Square statistic: χ^2 (15, N = 125) = 14.38 p = .497, This indicates the model was not able to distinguish between students who chose their degree plan based on endorsements. As shown in Table 61 there are two independent variables which made a unique statistically significant contribution to the model (Business and Industry and Arts and Humanities endorsements) in relation to Teacher Education and Criminal Justice degree plans.

Table 61. Multinomial logistic regression endorsements to Public Service Pathway (Childhood Development, Teacher Education, Criminal Justice, & Social Work)

Degrees[a]		B	Std. Error	Wald	df	Sig.	Exp(B)	95% Confidence Interval for Exp(B)	
								Lower Bound	Upper Bound
Teacher Education Degree	Intercept	35.909	1.788	403.218	1	0.000			
	Multidisciplinary	16.555	5642.754	0.000	1	0.998	15471965.150	0.000	.[b]
	STEM	1.778	1.335	1.772	1	0.183	5.915	0.432	81.049
	Public Service	-0.369	1.289	0.082	1	0.775	0.692	0.055	8.649
	Business & Industry*	-17.448	0.945	341.073	1	0.000	2.644E-08	4.151E-09	1.685E-07
	Arts & Humanities*	-17.301	0.745	539.160	1	0.000	3.062E-08	7.109E-09	1.319E-07
Criminal Justice Degree	Intercept	35.000	1.854	356.332	1	0.000			
	Multidisciplinary	16.785	5642.754	0.000	1	0.998	19473672.348	0.000	.[b]
	STEM	0.975	1.341	0.529	1	0.467	2.652	0.191	36.739
	Public Service	0.077	1.313	0.003	1	0.953	1.080	0.082	14.157
	Business & Industry*	-16.648	1.018	267.209	1	0.000	5.887E-08	7.998E-09	4.333E-07
	Arts & Humanities*	-17.425	0.771	511.007	1	0.000	2.707E-08	5.976E-09	1.226E-07
Social Work Degree	Intercept	33.665	1.536	480.634	1	0.000			
	Multidisciplinary	16.440	5642.754	0.000	1	0.998	13797698.731	0.000	.[b]
	STEM	0.119	1.421	0.007	1	0.933	1.127	0.070	18.250
	Public Service	0.763	1.494	0.261	1	0.609	2.146	0.115	40.135
	Business & Industry	-16.884	0.000		1		4.648E-08	4.648E-08	4.648E-08
	Arts & Humanities	-16.747	0.000		1		5.331E-08	5.331E-08	5.331E-08

a. The reference category is: Childhood Development Degree.

*Note: R^2 = .110(Cox and Snell), .127 (Nagelkerke). Model: χ^2 (15, N = 125) = 14.38, p = .497; *p < .001*

Students in general studies and undecided degree plans were categorized into a "General Studies and Undecided Pathway." Multinomial logistic regression was performed to assess the impact of a number of factors on the choice of the students' degree choices within the "General Studies and Undecided" Pathway. The model contained five independent variables of endorsements (STEM, Multidisciplinary Studies, Public Service, Business & Industry, and Arts and Humanities). The model fitness was assessed using the Chi Square statistic: χ^2 (5, N= 393) = 12.10, p $\leq$ .001. This indicates there is a significant relationship between the dependent variables of General Studies and Undecided degree plans and the independent variables of endorsements. Table 62 reflects the model contains one endorsement variable of significance in the pathway (Public Service).

Table 62. Endorsements to "General Studies and Undecided" Pathway

Pathway[a]		B	Std. Error	Wald	df	Sig.	Exp(B)	95% Confidence Interval for Exp(B) Lower Bound	Upper Bound
General Studies	Intercept	2.070	0.555	13.909	1	0.000			
	Multidisciplinary	-0.509	0.299	2.899	1	0.089	0.601	0.334	1.080
	STEM	0.376	0.253	2.199	1	0.138	1.456	0.886	2.393
	Public Service*	-1.239	0.346	12.810	1	0.000	0.290	0.147	0.571
	Business & Industry	-0.252	0.294	0.734	1	0.392	0.777	0.437	1.383
	Arts & Humanities	-0.170	0.246	0.481	1	0.488	0.843	0.521	1.365

a. The reference category is: Undecided.

b. This parameter is set to zero because it is redundant.

*Note: R^2 = .052 (Cox and Snell), .075 (Nagelkerke). Model: χ^2 (5, N = 393) = 12.10, p ≤ .001; *p ≤ .001*

Multinomial logistic regression was performed to assess the impact of a number of factors on the choice of the students' degree choices within the Liberal and Fine Pathway. The model contained five independent variables of endorsements (STEM, Multidisciplinary Studies, Public Service, Business & Industry, and Arts and Humanities). The model fitness was assessed using the Chi Square statistic: χ^2 (25, N = 65) = 52.17; p ≤ .001. This indicates there is a significant relationship between the dependent variable of Liberal and Fine Arts Pathway and the independent variables of endorsements. Table 63 reflects the model with no one factor indicating statistically significant.

Table 63. Endorsements to Liberal and Fine Arts Pathway

Degrees[a]		B	Std. Error	Wald	df	Sig.	Exp(B)	Exp(B) Lower Bound	Upper Bound
Audio Engineering Degree	Intercept	-33.387	2838.225	0.000	1	0.991			
	Multidisciplinary	-0.368	1.179	0.098	1	0.755	0.692	0.069	6.977
	STEM	18.074	0.000		1		70694561.704	70694561.704	70694561.704
	Public Service	-2.801	1.544	3.290	1	0.070	0.061	0.003	1.253
	Business & Industry	-0.288	1.574	0.033	1	0.855	0.750	0.034	16.389
	Arts & Humanities	17.112	2838.224	0.000	1	0.995	27013453.066	0.000	.[c]
Creative Arts Degree	Intercept	0.443	2.104	0.044	1	0.833			
	Multidisciplinary	-1.049	0.828	1.602	1	0.206	0.350	0.069	1.777
	STEM	1.672	1.262	1.756	1	0.185	5.325	0.449	63.158
	Public Service	-1.980	1.094	3.276	1	0.070	0.138	0.016	1.178
	Business & Industry	-0.104	1.018	0.010	1	0.919	0.901	0.123	6.633
	Arts & Humanities	-0.572	0.819	0.489	1	0.484	0.564	0.113	2.807
English, Humanities, or Mexican American Studies Degree	Intercept	-35.502	3692.894	0.000	1	0.992			
	Multidisciplinary	-17.843	3746.271	0.000	1	0.996	1.783E-08	0.000	.[c]
	STEM	-0.838	1.659	0.255	1	0.613	0.432	0.017	11.169
	Public Service	17.683	0.000		1		47829421.896	47829421.896	47829421.896
	Business & Industry	0.013	1.453	0.000	1	0.993	1.013	0.059	17.498
	Arts & Humanities	18.046	3692.894	0.000	1	0.996	68760487.144	0.000	.[c]
Music Degree	Intercept	-52.227	4040.978	0.000	1	0.990			
	Multidisciplinary	-1.168	1.284	0.827	1	0.363	0.311	0.025	3.854
	STEM	18.646	0.000		1		125334810.351	125334810.351	125334810.351
	Public Service	16.687	0.000		1		17661054.739	17661054.739	17661054.739
	Business & Industry	17.065	4040.978	0.000	1	0.997	25781134.354	0.000	.[c]
	Arts & Humanities	-1.462	1.263	1.339	1	0.247	0.232	0.019	2.757
Speech Communications Degree	Intercept	-15.460	1.932	64.002	1	0.000			
	Multidisciplinary	-1.094	1.282	0.729	1	0.393	0.335	0.027	4.126
	STEM	-0.865	1.191	0.527	1	0.468	0.421	0.041	4.346
	Public Service	16.090	0.000		1		9727560.635	9727560.635	9727560.635
	Business & Industry	-0.839	1.562	0.289	1	0.591	0.432	0.020	9.232
	Arts & Humanities	-1.603	1.375	1.360	1	0.244	0.201	0.014	2.978

a. The reference category is: American Studies/Social Sciences Degrees.

b. This parameter is set to zero because it is redundant.

Note: R^2 = .557 (Cox and Snell), .583 (Nagelkerke). Model: χ^2 (25, N = 65) = 52.17; p ≤ .001

c. Floating point overflow occurred while computing this statistic. Its value is therefore set to system missing.

The models examining each endorsement and the relationship to pathways or degrees generally found little relationship of endorsements to pathways or degree plans chosen with regard to Health Sciences, STEM, and Public Service. Two endorsements were found statistically significant in the Public Service model in relation to the Teacher Education and Criminal Justice degree plans, that of Business and Industry ($p \leq .001$). and Arts and Humanities ($p \leq .001$). The full model with all predictors was statistically significant In the Applied Business and Manufacturing and Industry Pathway, General Studies and Undecided Pathway, and Liberal Arts Pathway. The predictor variable of Business and Industry ($p \leq .05$) was the most significant factor in the Applied Business and Manufacturing and Industry Model. While the full model of all predictor variables to General Studies and Undecided was significant, the predictor variable of public service had the greatest significance ($p \leq .001$). The full model with all predictor variables for Liberal Arts was significant ($p \leq .001$).

Multinomial logistic regression was performed to assess the impact of a number of factors on the students' enrollment status (continuer or non-continuer). The model contained five independent variables: Gender, Ethnicity, Number of Endorsements, College GPA, and Pathway. The model fitness was assessed using the Chi Square statistic: χ^2 (16, N= 1437) = 154.47; $p \leq .001$. Table 64 reflects five independent variables of college GPA, one endorsement, two endorsements, three endorsements and the Applied Business Pathway as significant factors in relation to enrollment status.

Table 64. Multinomial logistic regression of college GPA, Gender, Ethnicity, Number of Endorsement, Pathways to Enrollment Status

enrollment status[a]		B	Std. Error	Wald	df	Sig.	Exp(B)	Exp(B) Lower Bound	Exp(B) Upper Bound
Non-continuer	Intercept	-16.743	0.505	1099.689	1	0.000			
	College GPA*	-0.577	0.057	102.379	1	0.000	0.561	0.502	0.628
	Female	0.104	0.131	0.621	1	0.431	1.109	0.857	1.435
	Male	0[b]			0				
	African American	0.257	0.321	0.643	1	0.423	1.293	0.690	2.426
	Asian	-1.150	0.677	2.882	1	0.090	0.317	0.084	1.194
	Caucasian	0.377	0.279	1.822	1	0.177	1.457	0.843	2.518
	Hispanic	-0.084	0.274	0.094	1	0.759	0.919	0.537	1.574
	American Indian, Multi-racial, Not Specified, Pacific Islander	0[b]			0				
	One endorsement*	16.844	0.391	1853.135	1	0.000	20658152.769	9594839.570	44478000.151
	Two endorsments*	16.658	0.390	1828.961	1	0.000	17159174.100	7997283.020	36817160.911
	Three Endorsements*	16.619	0.410	1641.730	1	0.000	16503055.464	7386416.768	36871848.446
	Four Endorsements	16.624	0.000		1		16580917.270	16580917.270	16580917.270
	Five Endorsements	0[b]			0				
	General Studies & Undecided	0.520	0.199	6.803	1	0.009	1.682	1.138	2.487
	Applied Business	0.543	0.259	4.373	1	0.037	1.721	1.035	2.861
	Health Services	0.229	0.227	1.012	1	0.314	1.257	0.805	1.963
	Liberal Arts	-0.194	0.337	0.332	1	0.564	0.824	0.426	1.594
	Manufacturing & Industry	0.026	0.225	0.014	1	0.907	1.027	0.661	1.594
	Public Service	0.183	0.264	0.483	1	0.487	1.201	0.716	2.014
	STEM	0[b]			0				

a. The reference category is: Continuer.

b. This parameter is set to zero because it is redundant.

Note: R^2 = .102 (Cox and Snell), .144 (Nagelkerke) Model = χ^2 (16, N= 1437) = 154.47; $p \leq .001$

Discussion, Implications, and Recommendations

Endorsements to Pathways

According to the Texas Education Agency (TEA), (2020) "The foundation high school program and endorsements help students focus their interest, select their coursework, and better plan for their postsecondary training and education" (p. 3). Students may earn one or more endorsements as part of their high school diploma.

> *An endorsement consists of a sequence of courses that are grouped together by interest or occupational skill. They provide students with in-depth knowledge of a subject area or a high-wage, high-skill, and in-demand occupation. Every career and technical education (CTE) Program of Study leads to an endorsement (Texas Education Agency, 2020, p. 6).*

While the intention of endorsements is to help students with development of a plan for college and career, this case study suggests the endorsements may fall short of their intention for some students as evidenced by the number of students with the Multidisciplinary Studies endorsement and the number of non-continuers and continuers who attained multiple endorsements with 27% of the FTIC students entering college as General Studies or Undecided. Sixty-two percent of all the students entered with two or more endorsements; 71% of these students had Multidisciplinary Studies as one of their endorsements and 60.6% of the students with one endorsement had Multidisciplinary Studies as their endorsement. These data suggest students may not have attained an "...in-depth knowledge of a subject area or a high-wage, high-skill, and in-demand occupation" (Texas Education Agency, 2020, p. 6) either because so many attained Multidisciplinary Studies as their endorsement or because the mixture of courses and endorsements did not help streamline the college/career pathway and instead gave students a hodgepodge of courses with little connection to a specified career. This was also confirmed by the results of the survey in which students indicated their endorsement did not make a difference in their degree or certificate selection.

While endorsements, overall, did not have a strong influence on degree or certificate selection/Pathway, there are some positive indicators from the endorsement to college and career pathway. One example involves the number of FTIC students pursuing transfer degrees and associate of applied sciences degrees with high wage returns. Regardless of whether the student continued or did not continue in their studies, 87% of the students were degree-seeking and of those 68% were pursuing transfer degrees. Additionally, 26.6% of the students attained a STEM endorsement and 32% of the continuers and non-continuers selected Health Services or STEM as their Pathway. Twenty percent of the students attained a Business and Industry degree and 27% of continuers and non-continuers were pursuing Applied Business or Manufacturing and Industry Pathways.

Chi-Square test for independence (with Yates Continuity Correction) were run using each endorsement with each Pathway. Only two Pathways showed a significant relationship with any endorsement that of General Studies/Undecided and the Multidisciplinary Studies endorsement and that of Business and Manufacturing and Industry with the Business and Industry endorsement. Despite both of these tests indicating significance, the association between the endorsement and the pathway were weak. This suggests a need to examine the course alignment in endorsements to college pathways and whether students see a clear path from the endorsement they completed to the college/career choice.

Multinomial logistic regression models suggest the endorsements as a whole have a significant influence in relation to the Applied Business and Manufacturing and Industry Pathways, the Liberal and Fine Arts Pathway, and the General Studies/Undecided "Pathway." Significant endorsements in these pathways included the Business and Industry endorsement in relation to the Business and Manufacturing and Industry Pathways and the Public Service endorsement in relationship to General Studies and Undecided. Given the number of students with multiple endorsements, it is not surprising that few endorsements stood out alone as significant in relation to the various pathways. While the full model was not significant for the degrees and certificates in the Public Service Pathway, the Business and Industry and Arts and Humanities endorsements were significant factors with regard to Teacher Education and Criminal Justice. Perhaps a closer examination of courses taken in these endorsements could provide some clues as to why students with these endorsements chose these degree plans.

Equity & Persistence

Gaps in persistence among students identified as minority status (62% non-continuers equal minority status) with 61.9% males and 62.2% females of minority status raises concerns in relation to persistence. Among the non-continuers, 39.7% are African American students, 29.2% are Multi-Racial students, and 26.2% are Hispanic students. Of note, the largest group of non-continuers are Hispanic students (191) followed by Caucasian students (165). Stewart, Lim, and Kim (2015) suggest "...cultural diversity programs that educate the campus community on diverse cultural traditions may build a more inclusive campus..." (p.18). The number of degree-seeking students pursuing careers with higher wage-earning potential is positive. However, the number of degree-seeking non-continuing students, particularly the large number of students identifying as minority status (62%) and those eligible for financial aid (23.44%) have implications for practice with regard to culturally relevant education across systems (Aronson and Laughter, 2016) especially given the backdrop of the focus on increasing degrees and certificates for Hispanics, African-Americans, males (all races/ethnicities) and persons who are economically disadvantaged (THECB, 2018, p. i). While Lee College is designated as a Hispanic Serving Institution and has programs through grants to serve the student population, these programs do not appear to have brought about systemic cultural change and support for student success across all campus constituencies as demonstrated by the aforementioned gaps in persistence. In order to work toward the 60 X 30 goal of the THECB, colleges may need to consider hiring dropout prevention and recovery personnel who conduct outreach when students stop attending and work with students to assist them in continuing their college education.

Beyond the persistence issue for students of minority status and those eligible for financial aid, students who self-identified first generation to college 12.4% and students with prior dual credit attainment 26.66% were also non-continuers. In the original population examined in the study, students with prior dual credit attainment who transferred after graduating from high school were accounted for and were not included in this group. The data suggests additional supports for students eligible for financial aid and those who are first generation to college may be of value in retention of students. Previous studies regarding persistence and financial aid as well as persistence and parental college attainment have mixed results (Tinto, 2006; Paulsen & St. John, 2002; Cabrera, Nora, & Casteñeda, 1992;). Witkow, Huynh, and Fuligni (2015) found students with financial burdens are less likely to persist than those without financial burdens. Castleman and Page (2014) conducted a study on persistence of students with financial aid at university and community college levels. The experimental group received reminder text messages about reapplying for financial aid during their first year in college (Castleman & Page, 2014). While text messages did not have a statistically significant effect on university students, persistence rates of community college students who received text message reminders persisted at a 75% rate as compared to those who did not receive reminders who persisted at a 64% rate (Castleman & Page, 2014). The use of text message reminders may be of benefit as one effort for supporting student persistence. Consideration of development of programs targeting first-generation to college students in which the skillsets of those students are approached with an asset-based model is recommended for assisting students who are first generation to college (Rovitto, 2020). Additionally, discovering why dual credit students are leaving would be of value for determining whether they are stopping out or transferring to other institutions of higher education.

The cumulative high school GPA of the students in this case study was largely 2.00 or higher based on normalizing to a 4.00 scale. While slightly more non-continuers than continuers had high school GPAs below 2.00, this does not appear to be a significant factor with regard to enrollment status. However, it is worth noting high school GPA is positively correlated with College GPA for both continuers and non-continuers ($p \leq .01$), which aligns with previous research suggesting high school GPA is a good predictor of college GPA (Stewart, Lim, & Kim, 2015). Nearly 40% of the non-continuers attained a college GPA of 2.00 or less as compared to 18% of the continuers. Based on the strong correlation between high school GPA and college GPA, discussing high school GPA with FTIC students and helping students develop a plan for success may prove beneficial, particularly as more of the non-continuing students withdrew from all classes (7) or were enrolled in Developmental Education (28) courses than the continuers (1 and 6, respectively). Perhaps one of the concerning pieces of data comes from the number of non-continuers with a high school GPA of 2.50 or higher (82%) as compared to the number of non-continuers with a college GPA of 2.50 or higher (45%). Similarly, 87% of continuers also had a high school GPA of 2.50 and attained a college GPA of 2.50 or higher (62%). Follow up with students who did not persist to determine dropout reasons could assist in program design and academic support system development.

Additional exploration aligning high schools with high school and college GPAs revealed a large difference in the number of students who entered college with a GPA of 2.00 or less (62) and those who attained a college GPA of 2.00 or less including students who withdrew from all classes as well as those who were in Developmental Classes and have no GPA (395). In examining the students from in-district high schools of Goose Creek Memorial, Ross S. Sterling, and Robert E. Lee, only 14 students entered Lee College with a cumulative high school GPA of 2.00 or less (adjusted to a 4.00 scale), yet 212 students from those three schools attained a college GPA of 2.00 or less (including students who withdrew from all classes as well as those who were in Developmental Classes and have no GPA). Three of the out of district/in service area schools had similar differences (Anahuac, Barbers Hill, and Dayton High Schools), in which only four students from Barbers Hill High School entered with a GPA below 2.00 and 93 students attained a college GPA of 2.00 or below (including students who withdrew from all classes as well as those who were in Developmental Classes and have no GPA). There are a number of possibilities which may account for these disparities including students who completed high school with a good GPA but may have only taken regular academic classes and no Advanced Placement (AP) or Dual Credit (DC) courses; students who did take AP or DC courses and the weighted GPA boosted their overall GPA when normalized to a 4.00 scale; differences in rigor in college level courses as compared to high school courses; attending college because of parental requirements and not really being interested or ready for college; being unsure of what career path to follow and taking college classes because they are required in the core but not in an interest area; being in all developmental courses, and so forth.

One way to gain clarification regarding the disparities involves a deeper examination of high school transcripts to determine GPA in gatekeeper courses such as English or Math as well as to examine types of courses taken (math sequence as well as AP and/or dual credit). Interviewing students about their view of their academic preparedness for college and interests may also provide further information related to the GPA differences. Additionally, as advisors meet with students new to college, a discussion around grades, exploration of the courses students took in high school, study skills, and other outside responsibilities is recommended. Pairing students with a low high school GPA with a mentor and assisting the student in first semester course selection may be of benefit.

General Studies and Undecided

Entering college without knowing what one wants to study was common for 32% of the students who did not continue in their studies and for 25% of students who continued. Of the 62% non-continuing minority students, nearly 30% of African-American students followed by 27% of Hispanic and 27% of American Indian, Asian, Multi-Racial, Not Specified, and Pacific Islander were pursuing a General Studies degree or were Undecided for their degree/certificate. Additionally, among the 38% Caucasian non-continuers, 38% of these students also were pursuing General Studies or had Undecided as their degree/certificate. Lee College's Quality Enhancement Plan (QEP) centers on working with students who enter college as General Studies or Undecided (Lee College 2020d). The QEP requires students who declare their major as General Studies or

Undecided to complete the Learning Frameworks course with the goal of assisting students in determining their career path (Lee College, 2020d). However, if 32% of non-continuers were General Studies or Undecided in their major, and were required to take the Learning Frameworks course, further exploration of data around the DFW rate for the Learning Frameworks course should be analyzed, an examination of the effectiveness of the curriculum, and surveying students in the course to determine whether additional supplemental services are needed to support these students may be of benefit.

This case study suggests, despite exposure to multiple courses across multiple endorsements in high school, students need more intentional guidance and advising. One recommendation involves a shared review with students of their high school transcripts during the advising process to discuss the courses they enjoyed or despised as a way to help the student begin to explore career options. Most IHEs have career exploration software and many of them use this software in their Learning Frameworks courses, but if students have not considered the relationship between prior learning and future career, the career software may offer little meaning in the context of career decision-making. Students who do not know what they want to do, often feel frustrated and ashamed due to societal pressure to pick a career (Buford & Nestor, 2019). Many may have multiple interests but struggle to figure out how to match their diverse interests into the rigidity of college majors (Buford & Nestor, 2019). Providing students with positive responses and on-going structured support in their exploration with a focus on the students' personal strengths, goals, and interests along may prove beneficial in guiding students with diverse interests (Buford & Nestor, 2019).

The Education to Career Continuum

While the TEA produced *Graduation Toolkit: Information for Planning Your High School Years and Beyond,* provides information about each of the endorsements and the website provides information about graduation plans, very little language around endorsements can be found on the TEA website (TEA, 2020a). The area of College, Career, and Military Prep on the TEA website provides graduation requirement information and has moved much of their discussion around college and career to Pathways and CTE Programs of Study:

> *One strategic priority for the Texas Education Agency is connecting high school to career and college. TEA works closely with the Texas Higher Education Coordinating Board (THECB) and the Texas Workforce Commission (TWC) through a collaborative tri-agency initiative to boost college and career readiness in the development of high quality college and career pathways (TEA, 2020b).*

The website provides clear information about the importance of the pathways framework and how this framework can be used by school districts to work with institutions of higher education, business and industry to better prepare students (TEA, 2020b).

Given the above information, further development of partnerships among school districts, Institutions of Higher Education (IHEs), and local Texas Workforce Commission (TWC) representatives may help development of seamless pathways to college and career, build student interest in courses they take leading to a future career, and assist with alignment of endorsements and the CTE Programs of Study to college and career pathways. Extending endorsement plans to include clear follow-on transfer plans to college and career can provide students with a big picture perspective. Institutions of Higher Education along with the TWC can work in tandem with their ISD partners to develop aligned K – 12 to college and career pathways. Evidence-based programs such as Upward Bound, Gaining Early Awareness and Readiness for Undergraduate Programs (GEAR UP), Advancement Via Individual Determination (AVID), 21st Century Community Learning Centers, and others have long demonstrated early exploration and exposure to college and career is beneficial to students. In partnership with school districts, exposure to careers early and often while students are in elementary and middle school could assist students when they have to select their endorsement in eighth grade. Following TEA, THECB, and the TWC Tri-Agency model could further efforts in college and career planning (TEA, 2020b).

This case study suggests, despite exposure to multiple endorsements, many students are entering college without a clear pathway to the end goal of a career. While one option may be to limit the number of endorsements a student can attain and to provide students with more course selection choices in each endorsement, for smaller districts, offering more course selections could be difficult. However, IHEs, particularly community colleges could help districts fill that gap by supplementing courses through dual credit options. This may mean expanding dual credit so more students have the ability to attain college credit.

One model worth further exploration is currently in place at Boise State University (BSU) where high school students take a college course, ACAD 101 with mandatory components of learning how to learn, becoming a college student, cultural expectations, academic habits, graduation plan, a final project and supplemental units from which students must choose five options: Campus tour, minor exploration, career exploration, financial planning/literacy, media literacy, information literacy, self-care, and college soft skills (BSU, 2019). In Texas, many colleges and university have incorporated a first-year experience course based on the EDUC/PSYC course of Learning Frameworks, which similar to the Boise State University course design is intended to assist students in learning about how they learn as well as exploring their future. The course offering at Lee College has the "pre-requisite of ENRD 401 or equivalent scores/courses attached to the course for reading and writing levels" (Lee College, 2020c).This pre-requisite is not one required the THECB Academic Course Guide Manual (THECB, 2020). Removing the pre-requisite for a Learning Frameworks course aimed could allow for the design of a course, similar to the BSU Model, specifically for high school students in which they attain college credit while learning about learning and helping them focus on the future. Further, this option could expand college credit attainment for high school students while also engaging students early in their high school careers in exploring their future beyond high school. If school districts, IHEs, and TWC want to continue to build on the Pathways Initiative and the 60X30TX plan, providing early access to college credit may be one way to begin increasing student success across all racial and ethnic groups.

Conclusions

At the state level, TWC, TEA, and THECB are working together to build a strong "Pathways Initiative" with these core principles:

- Alignment with labor-market demand
- Integration of rigorous core academics and career-focused learning
- College and career information and advising
- Links between secondary and postsecondary education
- Credentials with value in the labor market
- Continuum of work-based learning experiences
- Cross-sector partnerships (TEA, 2020b)

This case study suggests the need to follow state agency leads and formulate strong collaborative partnerships in which the end goal of a career is central to discussion about endorsements/pathways/programs of study and where student gain early exposure to careers and college courses. As high school GPA is a predictor of college GPA, a deeper dive to evaluate course-taking, GPA in high school gateway courses, and the number of AP/dual credit courses in which a high school student has participated may be of benefit in order to account for some of the disparities between the high school GPA and college GPA. As many students had multiple endorsements and overall nearly 30% of the students (non-continuers and continuers) selected General Studies or Undecided as their degree plan, providing clearer connections between the endorsement, college and career pipeline is recommended.

While the majority of the students in this case study were degree-seeking, nearly one-third of the students stopped out of college in their first or second year. Many K – 12 systems employ dropout prevention and recovery specialists but no such role formally appears to exist the college level. Therefore, development of a "dropout prevention and recovery" or "graduation success" program along with retention specialists at the college level may assist in retention and persistence efforts. Academic advisors and counselors shoulder a large part of the enrollment and persistence role. Key discussions during the advising process around students' high school course-taking experiences, high school grades, study habits, work responsibilities, family responsibilities, and financial situation may help to serve FTIC students in making good choices about first semester course-taking and career options. Program development to support students whose academic experiences were not ideal, increase persistence rates of minority students, and which build on student assets are recommended.

To increase college-going rates, the partnerships between school districts, IHEs, and the Texas Workforce commission at the local level to build career interest and enthusiasm early in a student's life and designed around the core principles above are recommended. In addition, in order to engage more high school students in college access, broadening access to the Learning Frameworks course may be of benefit in not only opening the door for college credit but also teaching students how to learn and allowing them to more fully explore career options. Finally, continued research related to the endorsement/pathway/programs of study and partnerships across the state of Texas is recommended.

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Appendix A. Email sent to students for survey

Dear Student,
I am conducting a study to examine what relationship exists, if any, between students' high school endorsements and their certificate and/or degree selection in college. In this study, you will be asked to complete a survey about your experiences with high school endorsements, college certificate and degree planning, and academic advising. Your participation should take no longer than 15 minutes.

There are no risks to you. All information will be handled in a strictly confidential manner so that no one will be able to identify you when the results are recorded/reported.
Your participation in this study is totally voluntary and you may withdraw at any time without negative consequences. If you wish to withdraw at any time during the study, simply close the survey.

Below are ways to access the survey:
To access the survey from **Blackboard Learn**:

1. Log-in to Blackboard Learn
2. Click on the "Course Evaluation" Dashboard link

Or click this link High School Endorsement vs. Degree/Certification Choice Login *(Note: This link should not be shared with others; it is unique to you.)*

Or access your course survey(s) through your **MyLC Campus** account. The "***Take Survey***" link will take you to the surveys available for you to complete. **Note: If any students are using their phone or iPad to take end-of-course surveys they will need to use the web browser on the device to get into Blackboard not through their Blackboard student App.**

IMPORTANT: You will receive reminders until you have completed the survey(s). Once you complete and submit the survey reminder emails will stop.

Please feel free to contact Dr. Laura Lane-Worley, Lee College Faculty, at 281 – 425-6265 or via email at llaneworley@lee.edu , if you have questions about this study. To report any adverse events, complaints or concerns about this study please contact EvaluationKIT Administrator at ***evalkit@lee.edu.***

I understand the study described above. This email serves as a copy of the description. By completing the survey, I am consenting to participate.

Thank you!
Course Evaluation Administrator

Appendix B. Survey Questions

1. Please indicate your gender:
   Female Male Other

2. Please identify your racial/ethnic identity:
   Caucasian or White
   African American or Black
   Hispanic
   Asian
   Native American
   Pacific Islander
   Mixed Race
   Other, indicate _____

3. When did you graduate from high school?
   2018 2019

4. What high school did you attend?
   Anahuac
   Baytown Christian Academy
   Barbers Hill
   Crosby
   Dayton
   East Chambers
   Goose Creek Memorial
   Hardin
   Huffman
   Hull-Daisetta
   Impact
   Kountze
   Lee
   Liberty
   Premier
   Sterling
   West Hardin
   Other, please indicate: _____

5. What endorsement(s) did you complete in high school? Check all that apply:

   Public Service Business and Industry Visual and Performing Arts STEM
   Multidisciplinary

6. Why did you choose the endorsement plan(s)?

7. Who helped you select your endorsement?
   No one, I selected myself
   My parent
   My brother
   My sister
   My friend
   My counselor
   Other, indicate: _____

8. Did you want to select an endorsement that was not offered at your high school?
   Yes No

   If so, what endorsement, circle the one you wanted, but was not offered at your school.
   Public Service Business and Industry Visual and Performing Arts STEM Multidisciplinary

9. What courses did you take to meet the requirements of your endorsement?
   List as many as you remember:

10. Are you pursuing a certificate or degree?
    Certificate Degree Both

11. If you are pursuing a certificate, do you plan to continue your education in order to attain a degree?
    Yes No Not Sure

12. Did your high school endorsement help you with selecting your college certificate and/or degree plan?
    Yes No Not Sure
    If yes, did you pick a certificate or degree plan related to your endorsement? Yes No.

13. What is your current certificate or degree plan?

14. Were you advised by a college advisor or counselor regarding choosing your degree plan?
    Yes No Not Sure

15. Did your college academic advisor or counselor discuss your high school endorsement(s) with you when advising you with regard to your degree choice?
    Yes No Unsure

16. If your college academic advisor or counselor did not discuss your high school endorsement(s) with you with regard to degree plan selection, do you believe a discussion about the endorsement(s) you achieved in high school would have been helpful?

    Yes No Not Sure

17. Do you plan to transfer to a four-year university?
    Yes No Not Sure

18. What career are you interested in pursuing?

19. In thinking about your college class schedules, do you feel classes are scheduled at a time that works with your work or family schedule?

    Yes No

20. What is the primary modality of the courses you attend?

    Face-to-Face Hybrid Online

21. What time or times of day do you find to be beneficial to your schedule? (check all that apply)

    8:00 a.m.
    9:30 a.m.
    11:00 a.m.
    12:30 p.m.
    2:00 p.m.
    3:30 p.m.
    6:00 p.m.
    7:30 p.m.

22. Which days of the week do you prefer to attend classes or would you attend if available?
    Mon/Wed or Tues/Thurs Monday evening, Tuesday evening, Wednesday evening, Thursday evenings Weekends

23. Have you used any of the following services? (Check all that apply)
    The Writing Center The Math Center The Learning Hub, Career Center, Peer Mentors, Student Instructors, Workshops, Library, Puente Other (specify) _____

24. What other services would be helpful to you as a student?

25. Please provide any other comments you would like to make regarding your experiences with endorsements?

26. Please provide any other comments you would like to make regarding to your experiences with academic advising and your certificate and/or degree planning: