Collaborative Partner: Reedley College - Engineering Pathways to the Future: Building Interest, Engagement and Achievement

Project #20: JFF Facilitated: Engineering Pathways to the Future: Building Interest, Engagement and Achievement

Pathway(s): Engineering; Key Elements: DuE; Support Systems; Shared assets; Equity & Outreach; Curriculum Alignment; Replicable

Achieved	In Progress & Ongoing
• Jobs for the Future (JFF) has met with the pathway leaders and has held a series of design meetings to determine the scope of work in providing horizontal integration and shared resources. • Vision Statement for Intersegmental Integration has been drafted. • A Student Journey Map with Critical Milestones draft was developed that demonstrates students' pathways from elementary to post-graduation.	• Role-alike groups are meeting; the groups are - Recruitment and Outreach, Math Teachers and Tutors, Counseling/Building a Culture of STEM. • Movement from Individual Projects to Aligned Pathways is currently in the works. • Prototype work will occur in November and December with the Collaborative Design Session workshop to review integration opportunities identified by the role-alike groups and provide feedback on draft prototype.

Fresno K-16 collaborative's first pilot pathways project, Engineering Pathways to the Future: Building Interest, Engagement and Achievement. This project would be overseen by Reedley College as the co-lead of the Engineering Pathway. JFF proposed design and facilitation services to build out the horizontal and vertical integration design across the 4 working groups that have been formed to develop the core pathways components for this system.

The engineering pathway has set a goal of increasing associate's and bachelor's degree completion rates by 50% in two years, and transferring 100 more students per year through State Center CCD. The pathway plans to increase the ethnic and gender diversity of engineering students by 40% over two years, with increases in participation from Asian/ Pacific Islander, African American, and female students. This work will focus on building the collaborative infrastructure needed to meet these goals, with

objectives related to the key elements of academic and student support, IT platforms, and shared assets.

In our approach, JFF has applied the principle of dual transformation—a strategy that simultaneously incorporates both the technical elements of horizontal integration as well as the systems-change principles and key leadership characteristics that are critical for addressing entrenched equity gaps. JFF has partnered with the established working groups for 6 collaborative design sessions to produce a workplan and guide for the horizontal integration needed to design a seamless, student-centered pathway.

Participants will include key administrators focusing on instruction and student support across the key partner institutions involved in the pilot, as well as frontline student support and instructional staff including counselors, outreach staff, tutors, mentors, and faculty.

At the conclusion of the project, JFF will produce a report outlining recommendations and provide a final presentation for the Fresno K-16 Collaborative leadership on the process, findings, and recommendations for this pathways prototype. This report will model the guided pathway approach to intersegmental cooperation that can be shared and replicated across the state with other programs of study across the curriculum. The successful launch of an equity-oriented, seamless K-16 engineering pathway for Fresno-area students will have a far-reaching impact that advances the larger goals of the DRIVE initiative and integrates the work of the Race and Equity Subcommittee. The work of the K-16 collaborative in establishing seamless pathways across the educational segments in the Fresno region serves as a key mechanism for creating a workforce that can increase the economic competitiveness of the region, attract businesses to the area and provide new pipelines to economic mobility for students who have previously not had access to such opportunities. JFF has learned that inclusive growth requires broad-based stakeholder engagement across the spheres of human capital, economic development, and place-based conditions. Our approach focuses on building leaders' skills in incorporating diverse perspectives on regional challenges and co-designing strategies for increasing students' economic and social well-being.

Engineering Pathway

"Guided Pathways" Group Progress to Date

- Collaborative Design Meetings. Jobs for the Future (JFF) has met with the pathway leaders and has held a series of design meetings to determine the scope of work in providing horizontal integration and shared resources.

- The Charge of JFF. During the "Laying the Foundation" stages of the project in July, the planning team and JFF have developed their charge for the project:

    - Engage leaders in developing a first-of-its-kind prototype for horizontal integration across an aligned engineering pathway that spans from K-12 through community college, transfer, and bachelor's degree completion.

    - Unpack the barriers that contribute to equity gaps in engineering programs and degree completion and design intersegmental solutions.

    - Leverage current efforts and map resources across institutions and develop a strategy for utilizing shared assets and aligned academic and student supports.

- Vision Statement for Intersegmental Integration. Drafts of mission statements for the "NorthStar" intersegmental work were developed by the planning team and revised by the Collaborative Design Sessions workgroups. The North Star Statement is the following:

    - Students in the Fresno region—particularly those from groups underrepresented in engineering fields— have the engagement, role modeling, support systems, financial resources, math instruction and work-based learning experiences to meet critical milestones from K-12 through bachelor's degree completion and see that engineering is for people of all backgrounds. This set of co-curricular supports is co-designed by K-12, community college, and university partners, with shared responsibility for key pathway assets, addressing institutional barriers, and increasing student achievement.

- A Student Journey Map with Critical Milestones draft was developed that demonstrates students' pathways from elementary school to post-graduation (See Attachment 1). In the student journey map, two critical milestones were identified as having the highest impact on students' success:

    - algebra readiness in middle schools

  - calculus readiness by the end of senior year in high school.

- Role-alike Groups. Role-alike groups are scheduled to be launched beginning in September and October to continue the process of resource mapping and design; many different role-alike groups were considered with three groups identified to meet. Role-alike groups include a leader from the design team and teams of:

  - Recruitment and Outreach

  - Math Teachers and Tutors

  - Counseling/Building a Culture of STEM

- Movement from Individual Projects to Aligned Pathways. Horizontal integration will look like moving FROM:

  - Isolated recruitment and outreach efforts TO a shared strategy for attracting students from underrepresented groups to the K-16 engineering pathway

  - Mapped course sequences beginning at community college level TO middle school and high school math and science curriculum aligned with engineering transfer pathways

  - Each institution taking its own approach to defining the baseline and identifying pathway students TO intersegmental data sharing and common data definitions allow partners to track pathway students across institutions

- Creating the Prototype. Prototype work will occur in November and December with the Collaborative Design Session workgroup to review integration opportunities identified by the role-alike groups and provide feedback on draft prototype.

- Barriers to Success: While fully implementing recommendations beyond the end date of the JFF consultation will be a challenge, the project will yield a workplan for horizontal integration and the leveraging of shared resources and assets that can be replicated and applied to any K16 pathway. Reedley College has also applied for a RP group Leading from the Middle Academy that would provide consultant support and leadership development from October 2021 to December 2022 to help build a more sustainable model for this regional pathway in order to carry out the process, structure, and design components from Jobs for the Future

and continuing the work of the shared “success teams” recommended in the protype.

Fall 2021 Updates:

- The number of students overall enrolled in engineering throughout the district has taken a sharp decline from 164in fall 2019 to 145 in fall 2021 at Reedley College; this decline is in keeping with the overall decline of students at Reedley College during the same time frame, from 7295 to 5054 (See Table 1). Clovis Community College’s total student enrollment remained about the same from fall 2019 of 8,557 to fall 2021 to 8,044, but enrollment in engineering fell from 321 to 132 (See Table 4). Enrollment at Fresno City College also fell from 23,548 in fall 2019 to19,569 in fall 2021, with overall enrollment in engineering also in decline, with 557 total students enrolled in fall 2019 to 435 in fall 2021(See Table 3).

- Student declines in enrollment in both the program and the colleges had an effect of the disproportionately impacted student groups as well of females; Asian/Pacific Islander; and African-Americans. Reedley College met its 40% increase goal for African-Americans and saw a rise in females from 13% in fall 2019 to 17.9% in fall 2021, just below the target of 19%. At Fresno City College, there was also a slight rise in female engineering students from13.3% in fall 2019 to 14.5% in fall 2021, still shy of the 18.6% growth goal. Asian/Pacific islander engineering students grew from 16.3% in fall 2019 to 22.8% in fall 2021, very close to the 23% growth goal. At Clovis Community College, female engineering students rose from 15.9% in fall 2019 to 18.2% in fall 2021, falling short of the growth goal of 22%. Similarly, enrollment of Asian/Pacific islander engineering students rose from 15% in fall 2019 to 22%in fall 2021, exceeding the growth goal. (See Tables 1-4)

- Two collaborative design sessions have been held by Jobs for the Future to establish common working objectives and finalize plans for the next steps. A North Star statement was shared and feedback gathered to create a revised statement. The development of a student journey map with critical milestones was created with feedback (See Attachment 1 for the draft). In the student journey map, two critical milestones were identified as having the highest impact: 1) algebra readiness in middle schools, and 2) calculus readiness by the end of senior year in high school.

- Role alike groups to be launched in the next few months to focus on key topics and roles identified as critical from the previous collaborative design sessions. A final Collaborative design session will be held in late fall to present drafts of recommendations for next steps to ensure engagement in the engineering pathway and success at milestones.

Table 1: Reedley College Program Growth Data, 2019-2021

	Fall 2019 Overall RC students	Fall 2019 Engineering AS Program Students	Fall 2020 Overall RC students	Fall 2020 Engineering AS Program Students	Fall 2021 Overall RC students	Fall 2021 Engineering AS Program Students	**50% Program Growth**	Difference between Growth Goal and Fall 2021 Actuals
Total Unduplicated Students	7295	164	6910	172	5054	145	**270**	-125
Gender								
Male	55%	138 (84%)	41.40%	144 (83.7%)	42.80%	116 (80%)	**221**	-105
Female	43%	22 (13%)	57.00%	24 (14%)	55.80%	26 (17.9%)	**35**	-9
Ethnicity								
Hispanic	75%	129 (79%)	74.50%	137 (79.7%)	75.60%	119 (82.1%)	**209**	-90
White (Non-Hispanic)	15%	24 (15%)	15.70%	28 (16.3%)	15.80%	16 (11.0%)	**41**	-25
Asian/Pacific Islander	5%	5 (3%)	4.60%	5 (2.9%)	3.00%	3 (2.1%)	**8**	-5
Multi-Ethnicity	2%	3 (2%)	2.20%	2 (1.2%)	2.30%	3 (2.1%)	**5**	-2
African-American	2%	2 (1%)	1.90%	0 (0.0%)	2.40%	3 (2.1%)	**3**	0
California Promise Recipient	62%	114 (70%)	57.40%	114 (66.3%)	58.80%	79 (54.5%)	**189**	-110

Table 2: Reedley College Goal Growth Data, 2019-2021

	Fall 2019 Overall Reedley College students	Fall 2019 Engineering AS Program Students	Fall 2020 Overall RC students	Fall 2020 Engineering AS Program Students	Fall 2021 Overall RC students	Fall 2021 Engineering AS Program Students	**40% Increase Goal**	Difference between Growth Goal and Fall 2021 Actuals
Total Unduplicated Students	7295	164	6910	172	5054	145		
Gender								
Male	55%	138 (84%)	41.40%	144 (83.7%)	42.80%	116 (80%)		
Female	43%	22 (13%)	57.00%	24 (14%)	55.80%	26 (17.9%)	**31 (19%)**	-5
Ethnicity								
Hispanic	75%	129 (79%)	74.50%	137 (79.7%)	75.60%	119 (82.1%)		
White (Non-Hispanic)	15%	24 (15%)	15.70%	28 (16.3%)	15.80%	16 (11.0%)		
Asian/Pacific Islander	5%	5 (3%)	4.60%	5 (2.9%)	3.00%	3 (2.1%)	7 **(4%)**	-4
Multi-Ethnicity	2%	3 (2%)	2.20%	2 (1.2%)	2.30%	3 (2.1%)		
African-American	2%	2 (1%)	1.90%	0 (0.0%)	2.40%	3 (2.1%)	**3 (2%)**	0

Table 3: Fresno City College Goal Growth Data, 2019-2021

	Fall 2019 Overall Fresno City College students	Fall 2019 Engineering AS Program Students	Fall 2020 Overall FCC students	Fall 2020 Engineering AS Program Students	Fall 2021 Overall FCC students	Fall 2021 Engineering AS Program Students	**40% Increase Goal**	Difference between Growth Goal and Fall 2021 Actuals
Total Unduplicated Students	23,548	557	21,099	473	19,569	435		
Gender								
Male	41.40%	468 (84%)	38.20%	377 (79.7%)	37.30%	368 (84.6%)		
Female	27.00%	74 (13.3%)	60.20%	84 (17.8%)	60.90%	63 (14.5%)	**104 (18.6%)**	-41
Ethnicity								
Hispanic	60.70%	305 (54.8%)	60.90%	250 (52.9%)	60.70%	231 (53.1%)		
White (Non-Hispanic)	16.40%	102 (18.3%)	16.70%	80 (16.9%)	17.70%	64 (14.7%)		
Asian/Pacific Islander	12.30%	91 (16.3%)	12.20%	89 (18.8%)	11.30%	99 (22.8%)	**128 (23%)**	-29
Multi-Ethnicity	3.60%	23 (4.1%)	3.70%	22 (4.7%)	3.80%	22 (5.1%)		
African-American	5.50%	27 (4.8%)	4.80%	25 (5.3%)	5.20%	17 (3.9%)	**38 (7%)**	-21

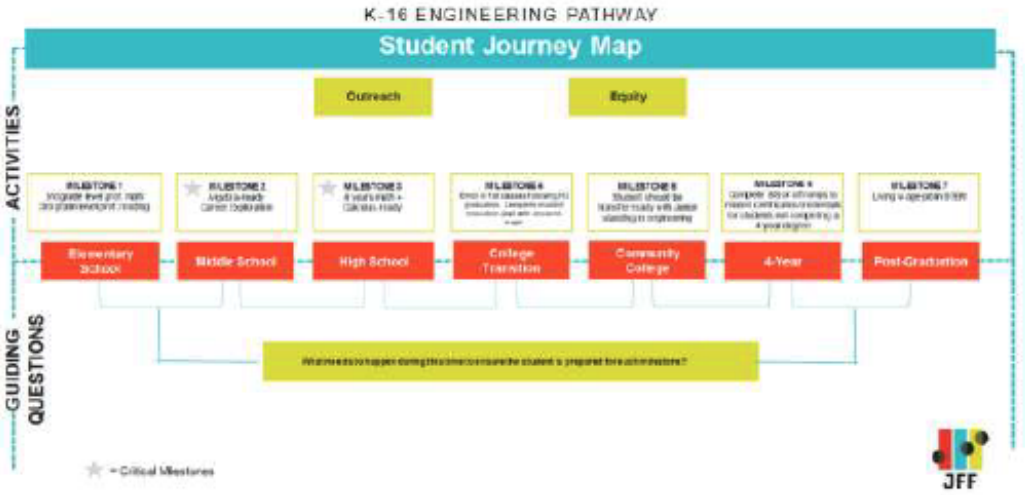
Table 4: Clovis Community College Goal Growth Data, 2019-2021

	Fall 2019 Overall Clovis Community College students	Fall 2019 Engineering AS Program Students	Fall 2020 Overall CCC students	Fall 2020 Engineering AS Program Students	Fall 2021 Overall CCC students	Fall 2021 Engineering AS Program Students	**40% Increase Goal**	Difference between Growth Goal and Fall 2021 Actuals
Total Unduplicated Students	8,557	321	9,004	205	8,044	132		
Gender								
Male	40.00%	267 (83.2%)	37.50%	169 (82.4%)	39.10%	106 (80.3%)		
Female	58.30%	51 (15.9%)	60.90%	33 (16.1%)	59.40%	24 (18.2%)	**71 (22%)**	-47
Ethnicity								
Hispanic	2.50%	128 (39.9%)	46.70%	96 (46.8%)	46.60%	50 (37.9%)		
White (Non-Hispanic)	34.60%	112 (34.9%)	31.60%	63 (30.7%)	31.70%	42 (31.8%)		
Asian/Pacific Islander	12.20%	48 (15%)	12.10%	33 (16.1%)	11.80%	29 (22.0%)	**67 (21%)**	-38
Multi-Ethnicity	3.60%	23 (4.1%)	5.20%	4 (2.0%)	6.00%	8 (6.1%)		
African-American	2.50%	24 (2.2%)	2.90%	6 (2.9%)	2.70%	3 (2.3%)	**7 (2.2%)**	-4

Table 5: Total Number of Engineering Degrees and Certificates Earned by SCCCD Students, 2019-2021

	2019-2020	2020-2021
Clovis Community College	11	70
Fresno City College	17	15
Reedley College	14	15
Total in SCCCD	**42**	**100**

Attachment 1: Engineering Pathway Student Journey Map (Draft)



Key Element	Relevant Objectives by 2030	Relevant Targets for Pilot Period
Academic and Student Support	• Adequate counseling support • Adequate academic support and tutoring • Basic needs support • Intentional cohort-based community building • Social-emotional support	• Lower student-to-counselor ratio from 500:1 to 400:1 • Establish a student-to tutor ratio of 30:1 • 70% attendance rate at tutoring sessions
IT Platforms	• Build intersegmental data system, including use of unique student IDs to support longitudinal tracking of students	• Drive CCGI adoption and use to provide actionable data for K-12 institutions
Shared Assets	• For engineering pathway: o Defined set of partner institutions for each pathway o Defined pool of faculty, facilities, and academic support o Centralized pool of counselors	• For engineering pathway: o 35% centralized administrative processes o Define partner institutions o Establish faculty pool o Establish pathway tutors o Start building central pool of counselors exclusively for K-16