USING DATA-DRIVEN PROCESSES FOR SUCCESS IN ACADEMIC PROGRAM DEVELOPMENT

Dr. Vedaraman Sriraman
Dr. Valarie B. Fleming
Dr. Debbie Thorne (in absentia)

TASSCUBO Winter Conference

January 2023

TEXAS STATE UNIVERSITY

MEMBER THE TEXAS STATE UNIVERSITY SYSTEM

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LOGIC

AGENDA

I. TEAM & CONTEXT

II. JOB MARKET ASSESSMENT & ENROLLMENT PROJECTIONS

III. CURRICULUM DECISIONS & OUTCOMES

IV. RESOURCES & BUDGET NEEDS
- A. CURRICULUM & ENROLLMENT DRIVE COSTS
- B. CURRICULUM & ENROLLMENT DRIVE REVENUE

V. CONCLUSION

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I. TEAM & CONTEXT

Dr. Valarie B. Fleming

Assistant Vice President, Curriculum & Academic Programs

Professor, Communication Disorders

Dr. Vedaraman Sriraman

Associate Vice President, Academic Affairs

University Distinguished Professor, Engineering Technology

Dr. Debbie M. Thorne

Associate Provost

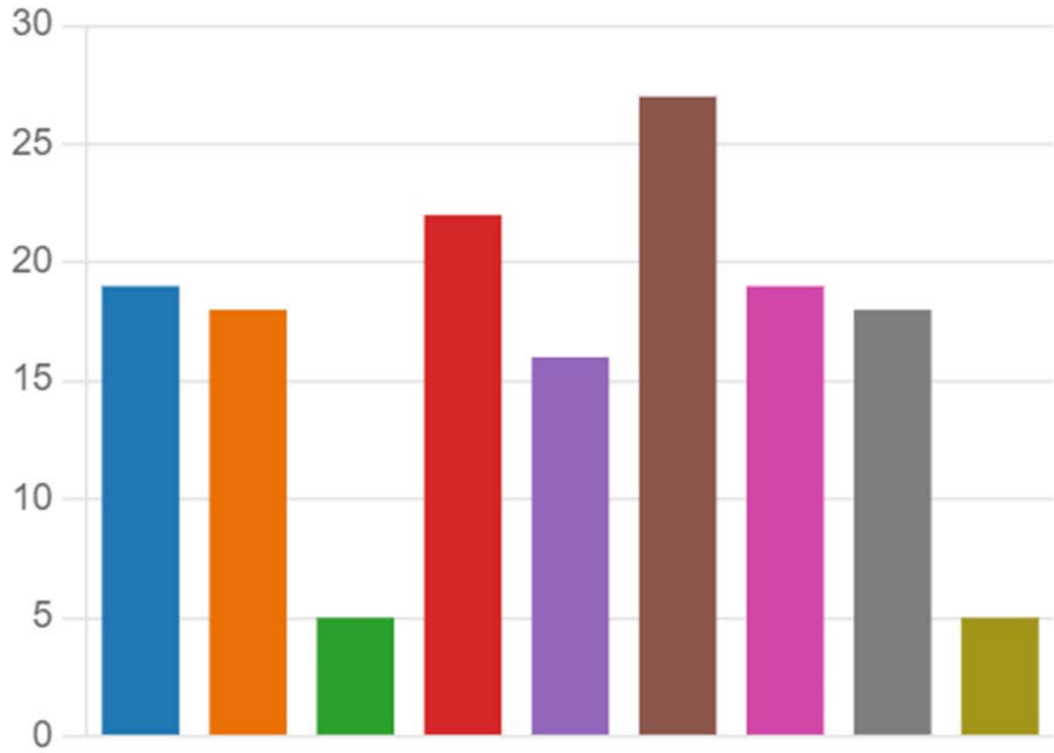
Professor, Marketing

SACSCOC DECEMBER 2022 PRE-WORKSHOP SURVEY RESULTS (1)

What areas or aspects of new academic program development could be improved at your college or university?

More Details

Budget forecasting	19
Curriculum development	18
Faculty qualifications document...	5
Job market need/employer dem...	22
Outcomes assessment plan	16
Projected student enrollments	27
Speed of development process	19
Student interest	18
Other	5

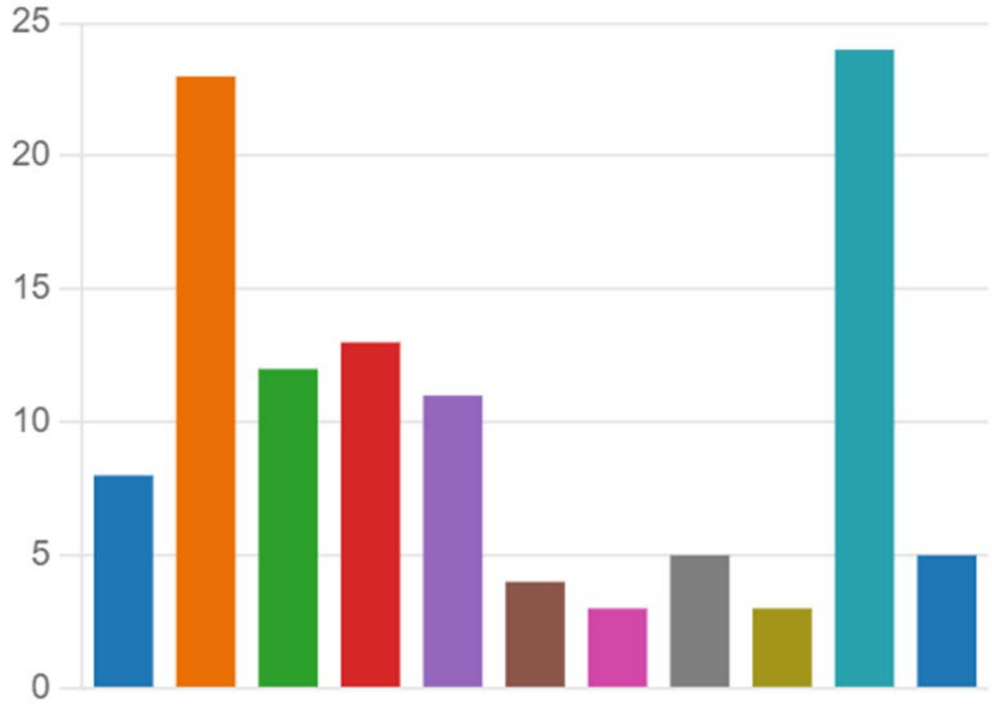


SACSCOC DECEMBER 2022 PRE-WORKSHOP SURVEY RESULTS (2)

What perceived barriers does your college or university face in developing new programs?

More Details

Accreditation concerns (regional...	8
Budget limitations	23
External influences (e.g., Board ...	12
Faculty willingness/interest	13
Lack of strategic direction	11
Opposition by other institutions	4
Regulatory/legislative constraint...	3
Risk aversion	5
Shift or change in mission	3
Time/staff to allocate to new pr...	24
Other	5



UNIVERSITY CONTEXT

- Teaching heritage and research trajectory (R2 to R1)
- 38,000 students
- Faculty-driven governance and curriculum model
- Strategic planning and resource allocation
- State funding mechanism and standards
- Transparency

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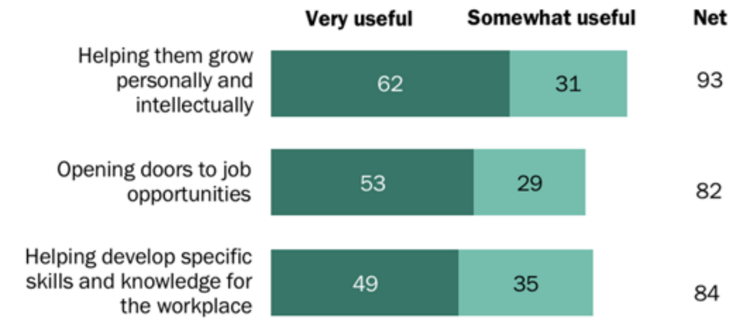
HIGHER EDUCATION CONTEXT

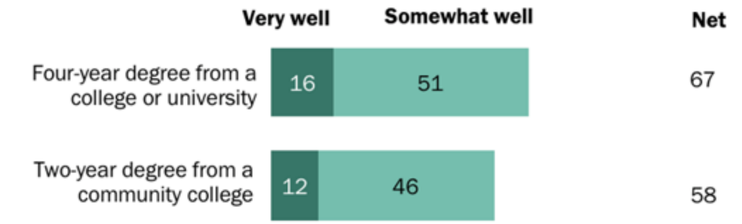
- Cost and value of a college degree
- Overall enrollment declines
- Trends in program of interest
- Student and family mindsets
- Regional needs and award gaps
- Pandemic

Most college graduates say their college experience was valuable, but public is more skeptical that college prepares people for well-paying jobs

% of college graduates saying their college education was very/somewhat useful for ...

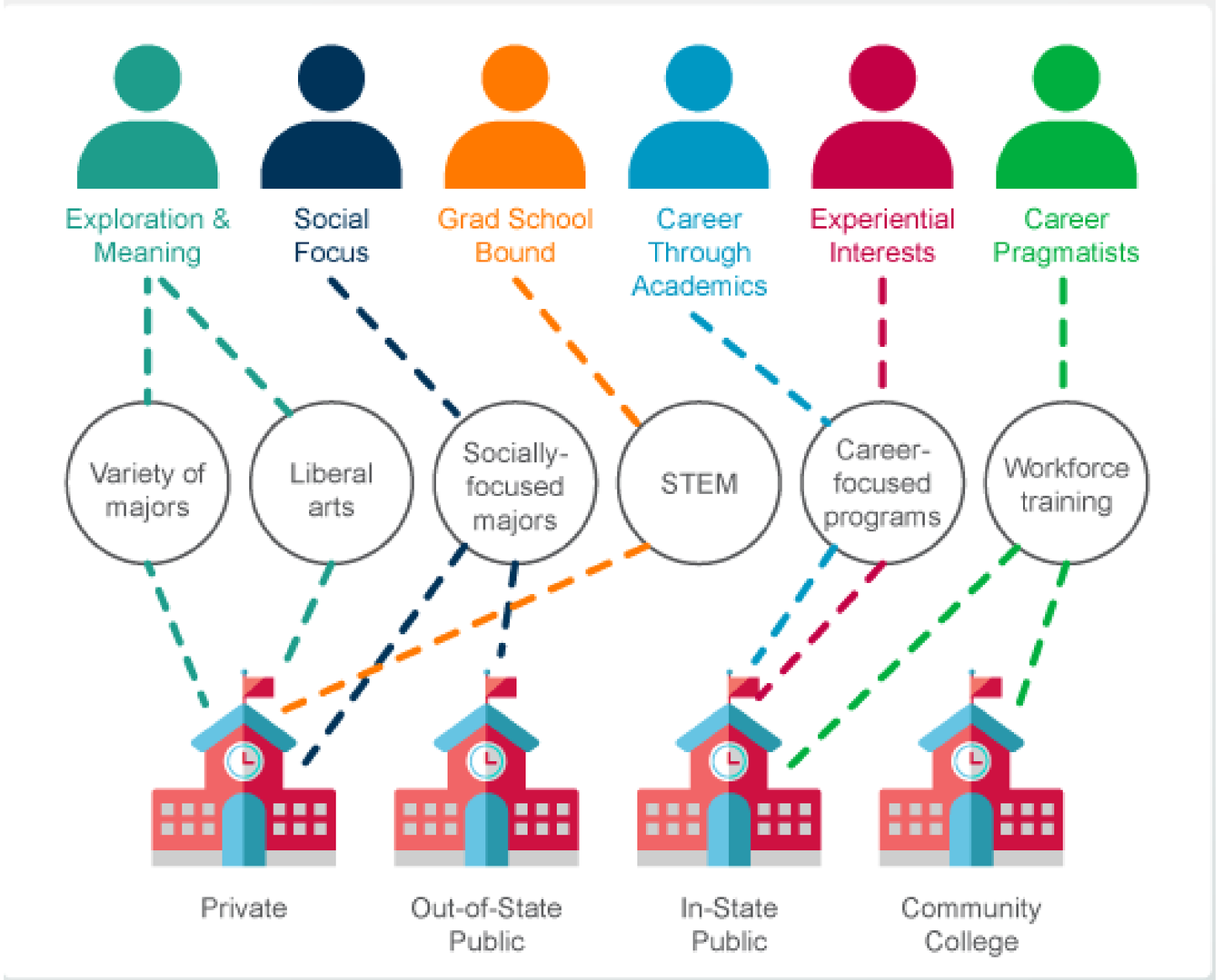


% of adults saying a four-year/two-year degree prepares people very/somewhat well for a well-paying job in today's economy ...



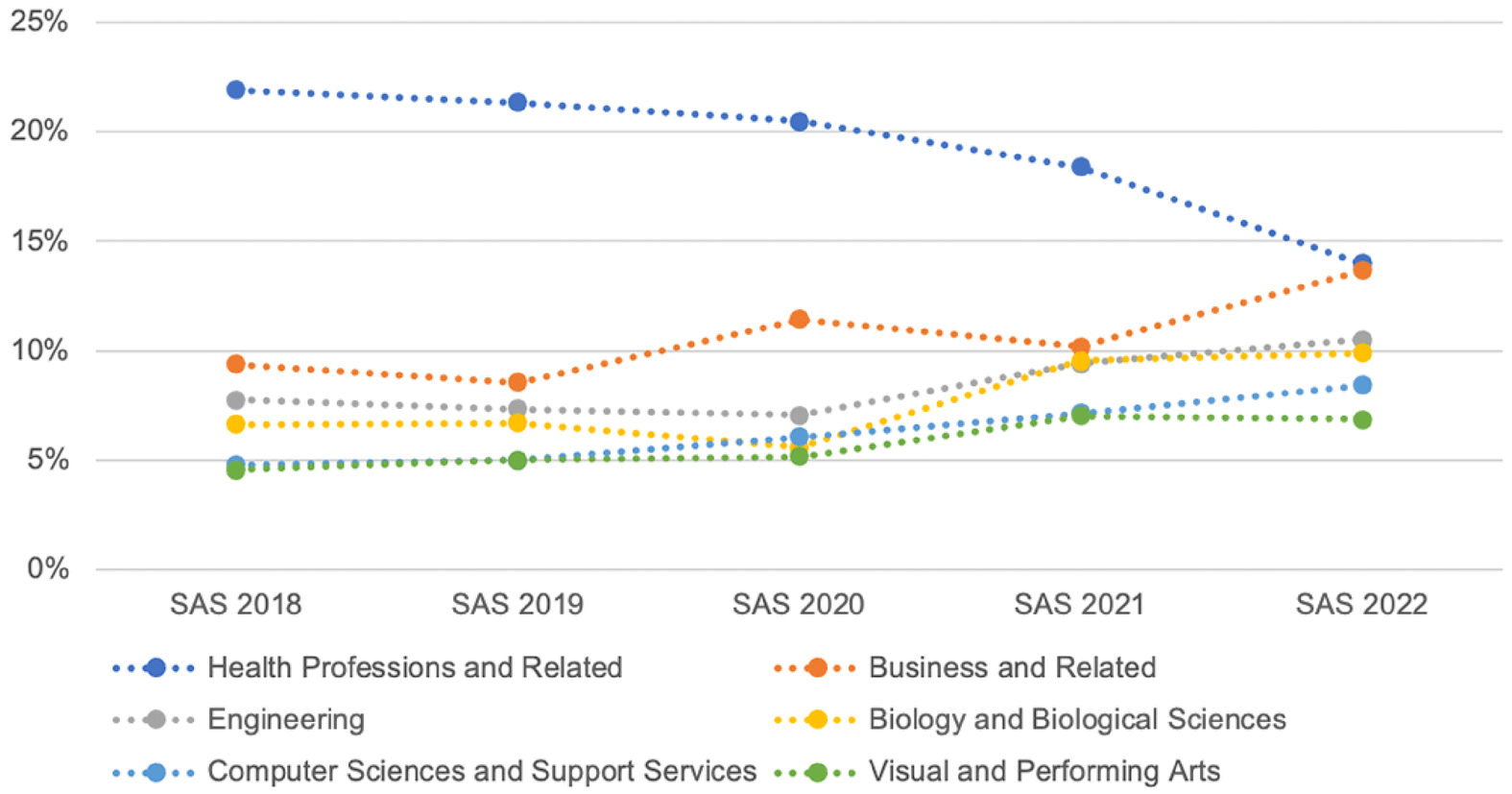
Note: "College graduates" includes adults with a two-year or four-year degree.
Source: Pew Research Center survey of U.S. adults conducted by telephone May 25-June 29, 2016.

Prospective Student Mindset Paths



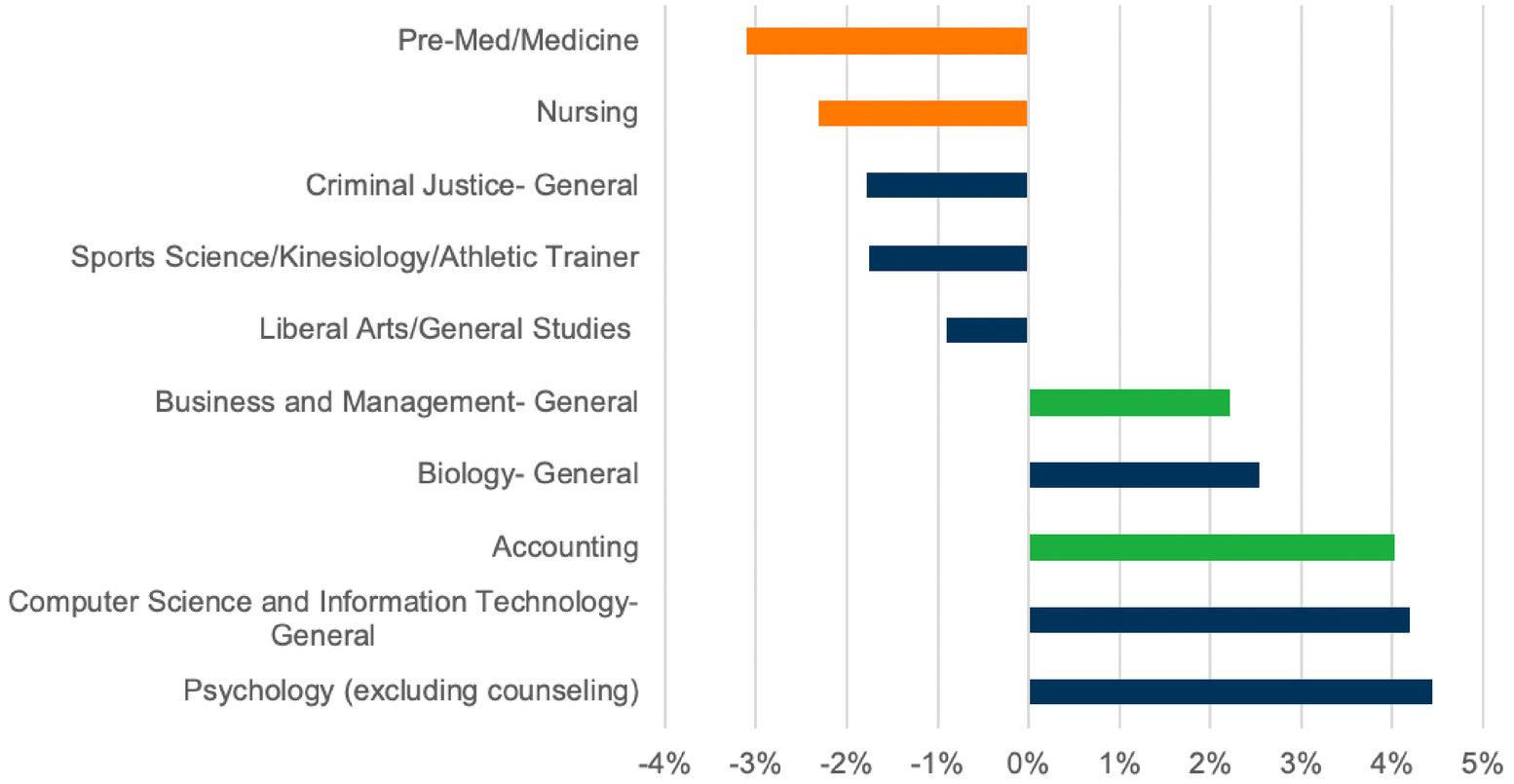
encoura
Eduventures Research

Change in Broad Academic Program Interest Among Traditional Undergraduate Students



***Source**: Eduventures' Admitted Student Research 2018 – 2022*

Largest Changes in Academic Program Interest Among Traditional Undergraduate Students between 2018 and 2022



***Source**: Eduventures' Admitted Student Research 2018 – 2022*

SOUTHWEST AWARD GAPS

SOUTHWEST PROGRAM GAPS SUMMARY

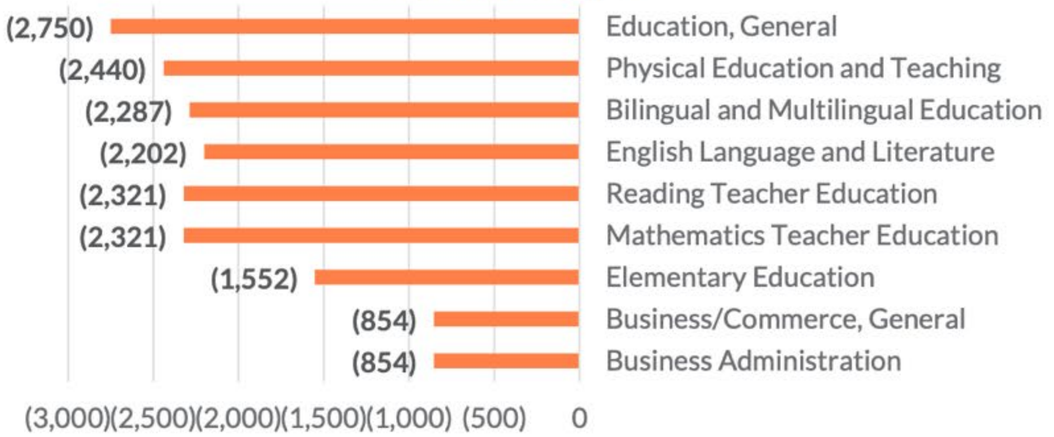
Program gaps that could be filled through new or expanded academic programs are concentrated in:

- **Education**
- **Business**
- **Medical services**

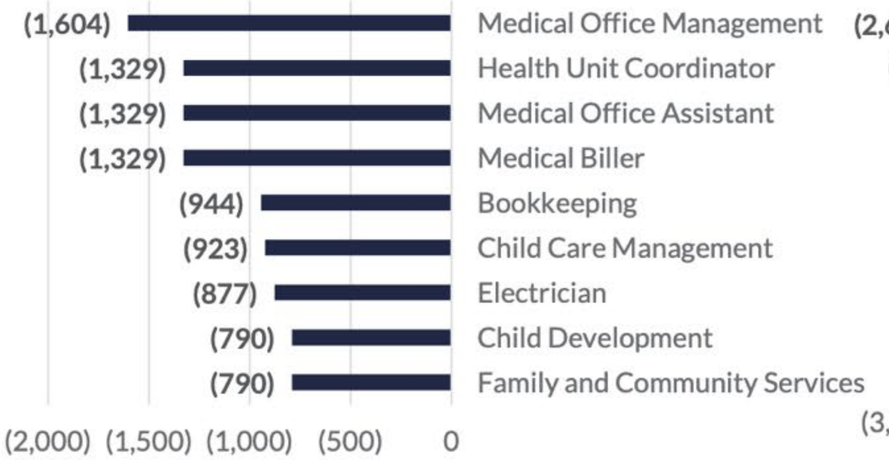
TOP FIELDS FOR ACADEMIC PROGRAM DEVELOPMENT

Based on student and employer demand trends

Bachelor's Gaps

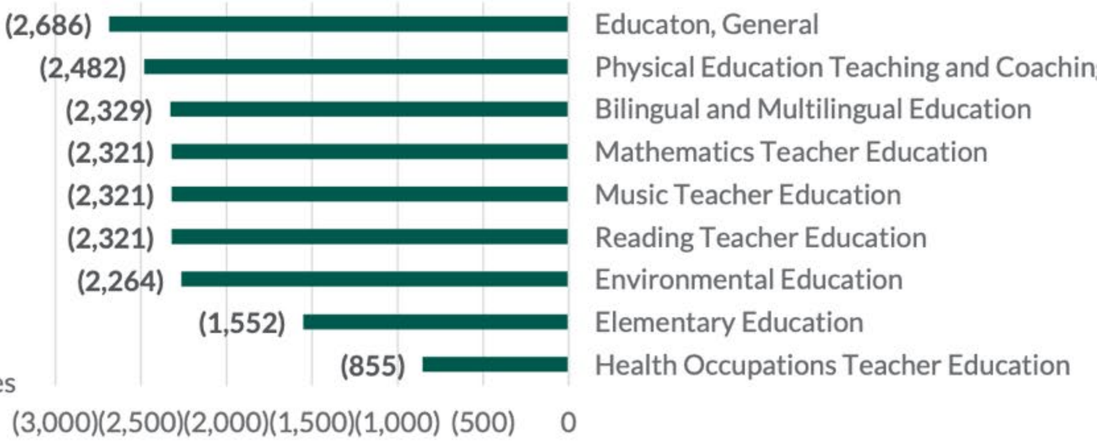


2 year or Less Award Gaps



■ Represents the difference between the number of post-secondary awards and associated occupation demand.

Master's Gaps



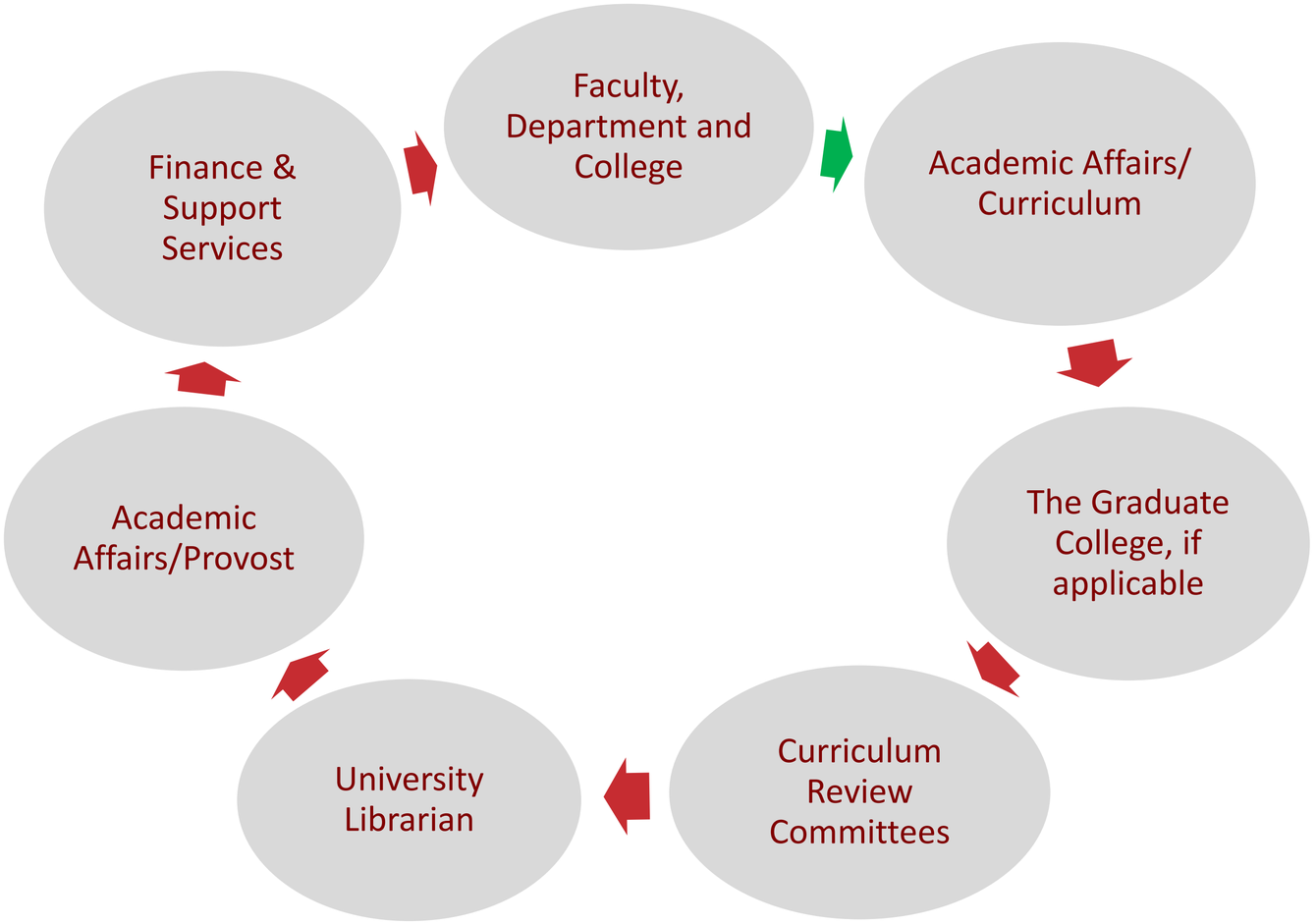
■ Represents the difference between the number of post-secondary awards and associated occupation demand.

Source: JobsEQ
Note: Selections made based on viability for academic program development.

I. NEW ACADEMIC PROGRAMS – PROPOSAL

- Strategic Intent + Planning
- Job Market Need + Existing Programs
- Enrollment Projections + Admissions Standards
- Curriculum + Degree Plan
- Marketable Skills + Higher Ed Board Mandates
- Readiness + Personnel Needs and Quality
- Facilities and Equipment
- Costs + Funding
- Assessment
- Program Development + Implementation Team

NEW PROGRAM TEAM AND ITERATIVE PROCESS



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IS BUDGET/FINANCE ON YOUR INSTITUTION'S PROGRAM DEVELOPMENT & IMPLEMENTATION TEAM?

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II. JOB MARKET ASSESSMENT AND ENROLLMENT PROJECTIONS

What is the gap in supply and demand? How many students will the new program accommodate? Simplistically, the number of enrolled students drives instructional needs, which drives faculty needs.

- Determine CIP code of proposed program
- Use CIP to SOC crosswalk to identify occupations associated with the CIP code
- Review occupations to determine the level of education typically required (bachelor's, master's, etc)
- Review state, regional and national workforce projections for occupations identified
- Assess job openings against program graduates in the state to identify a gap between supply and demand
- Texas Labor Analysis tool

CASE STUDY: DATA SCIENCE & ANALYTICS (DSA)

- DSA is an emerging field that combines mathematical and statistical modeling, data visualization and information systems.
- Faculty in McCoy College of Business were interested in developing a master's degree in DSA.
- There was no standard occupational classification for DSA.
- Thus, DSA positions were not being tracked by the Bureau of Labor Statistics (BLS) or state workforce commissions.
- DSA jobs were new, so workers were classified as statisticians, operations research analysts, or related occupations, depending on skills, responsibilities, and tasks.

MAKE THE CASE FOR EMERGING FIELDS AND OCCUPATIONS

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MAKE THE CASE FOR DSA JOB MARKET NEED (1)

- Job postings and advertisements
- Labor market analysis for similar occupations:
  - Statisticians
  - Operations Research Analysts
  - Information Systems Developers Computer and Information Research Scientists
  - Data Warehousing Specialists
  - Others

Organization	Job Title	Qualifications	Location	Website Source	Date Posted
Abbott	Data Scientist	Master's in Data Science	Irving, TX	Abbott.com	8/8/20xx
St. Jude Medical	Data Scientist	Master's in Data Science	Irving, TX	SJM.com	5/3/20xx
Southwest Airlines	NOC Big Data Senior Analyst	Master's in Analytics, Applied Math, Computer Science, Engineering, Information Systems, or Science is preferred	Dallas, TX	Southwest.com	11/7/20xx
IBM	Data Scientist	Master's in Math, Statistics, Data Science, Computer Science, Engineering or other technical discipline preferred	Dallas, TX	IBM.com	10/12/20xx
HEB	Data Scientist	Master's in Statistics, Math, Engineering, Computer Science, or a related field preferred	San Antonio, TX	HEB.com	8/7/20xx

MAKE THE CASE FOR DSA JOB MARKET NEED (2)

- Corporate Vice President, Samsung Austin:

"The need for data analysts and data scientists is expected to increase 28% by 2020, according to IBM. This means that there will be nearly 700,000 job openings in this field in the very near future. The supply of employees with data analytics and data science skill sets is not sufficient to meet the demands of the Manufacturing, Finance, Insurance, and IT industries."

- Labor market consultants and commissioned reports.

Buoyant Job Market for Data Analytics Specialists

Data Scientist: The most advanced analytics professional with sophisticated computer, statistical and mathematical skills.

$120K
Median Base Salary

293%
Job Posting Growth
(2013 H2-2016 H2)

Data Analyst: Similar combination of skills as the data scientist, but with less expertise in programming, modeling, and statistics.

$60K
Average Base Salary

24%
Job Posting Growth
(2013 H2-2016 H2)

burningglass
CAREERS IN FOCUS

STUDENT INTEREST & ENROLLMENTS

- Surveys of current students and alumni
- Size of existing programs and whether qualified applicants are turned down
- Gap analysis (number of jobs available vs. number of qualified applicants)
- Demand in similar fields
- Entry -level degree changes

EXAMPLE SURVEY RESULTS (DSA)

- *145 respondents (58%) indicated they would enroll or consider enrolling*
- 30 alumni respondents (73%) reported that they would enroll or consider enrolling
- 115 student respondents (56%) reported that they would enroll or consider enrolling
- Program delivery mode preference of *alumni respondents:*
  - *online* only was the top preference, 30%
  - *mix of online and in-person* was favored by about 27%
  - *face-to-face* was preferred by about 23%
  - 19% of the respondents preferred *other technology enhanced format*, such as GoToMeeting, Skype and Zoom
- Semester Credit Load
  - 71% of the alumni and 43% of the students would enroll in two classes (6 credit hours) per semester.
  - 18% of the alumni would enroll in one class (3 credit hours) per semester
  - 36% of the students would consider taking four or more classes (12 or more credit hours) per semester.

III. CURRICULUM DECISIONS AND OUTCOMES

- Job market assessment and labor forecasts
- Professional associations and industry groups
- Commissioned reports and surveys
- Marketable skills
- Accreditation and licensure
- Faculty expertise and research areas (caveat)

ENROLLMENT & CURRICULUM DRIVE RESOURCE NEEDS

- Number of students admitted to program
- Admissions cycles (times per year)
- Program -specific courses and total credit hours
- Number of required courses; number of elective courses
- Tracks, concentrations, and options
- Class sizes and number of sections needed
- Number and type of faculty needed in program/courses
- Number and type of faculty needed in supporting departments/courses
- Space, facilities, and labs needed
- Instructional support inside and outside of program
- Student services inside and outside of program

Thought question: How much confidence do you have in your institution's process of budget development for new academic programs?

Drivers of budget needs

Cost and revenue projections

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IV. RESOURCES AND BUDGET NEEDS

- Budget is a five-year summary of costs and funding:
  - ✓Faculty, Graduate Assistants, and Staff
  - ✓Equipment and Facilities
  - ✓Operating Costs and Library
  - ✓State Formula Funding
  - ✓Designated and Graduate Tuition
  - ✓Grants and Other Sources
- Budgets jointly developed with chairs, deans, AVPAA, Associate Provost, and Budget/Finance
- Provost and President approve final budgets
- Placeholder on university's future budget

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FIVE-YEAR COSTS & FUNDING BS, CIVIL ENGINEERING

Five-Year Costs		Five-Year Funding	
Personnel [a]	$11,687,028	Reallocated Funds	$6,726,174
Facilities and Equipment	$750,000	Anticipated New Formula Funding [c]	$3,610,250
Library, Supplies, and Materials	$517,338	Designated Tuition and Fees	$9,089,716
Other [b]	$4,000,000	Other	$0
Total Costs	$16,954,366	Total Funding	$19,426,140

a. Costs are shown for new faculty hires, graduate assistants, and technical support personnel. For new faculty, salaries are pro-rated as a percentage of the time assigned to the program. Costs are included which are necessary to maintain existing programs when existing faculty will contribute to program (e.g., cost of adjunct to cover courses previously taught by faculty who would teach in new program).

b. Other costs include faculty startup packages of $500,000 per tenure-track position.

c. Formula funding is shown for students new to the institution because of the program; formula funding is included only for years three through five of the program and reflects enrollment projections for years three through five.

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CURRICULUM & ENROLLMENT DRIVE COSTS

Curriculum Map:

1. Determine new program curriculum sequence
2. Determine student enrollments
3. Map instructors to course sections, including other units
4. Map existing academic programs in the same unit(s)

Hiring Plan and Budget:

1. Determine minimum number of new and replacement personnel to implement new program, including faculty, staff, and graduate assistants
2. Determine salaries and in what year to hire new and replacement personnel
3. Determine costs and when new facilities, equipment, and other resources are needed per hiring plan and curriculum map

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ENROLLMENTS BY YEAR: BS, CIVIL ENGINEERING

	Year 1 FY 2020	Year 2 FY 2021	Year 3 FY 2022	Year 4 FY 2023	Year 5 FY 2024
Fr	66	86	97	103	109
So	0	85	107	120	126
Jr	0	0	97	117	129
Sr	0	0	0	95	113
HC [a]	66	171	301	435	477
Attr	-3	-13	-22	-43	-33
HC [b]	63	158	279	392	444
Grad	0	0	0	-79	-95
HC [c]	63	158	279	313	349

Notes:
a. Year-start headcount, used to size section offerings.
b. Year-end headcount, less attrition.
c. Year-end headcount, less attrition and graduation.

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COURSE SEQUENCE MAP (YEAR 1 –FRESHMAN)

Year 1, Fiscal Year 2020, Freshman-Level Courses, HC = 66

Fall 2019				Spring 2020			
Course	Sec	Instructor	HC	Course	Sec	Instructor	HC
MATH 2471	1	C. Bandy	66	ENG 1310	1	Staff	66
PHYS 1430	1	W. Geerts	66	MATH 2473	1	E. Curtin	66
US 1100	1	Staff	66	CHEM 1335	1	J. Gray	66
				CHEM 1141	1	J. Gray	66
				CS 1342	1	H. Gholoom	66
CE 1210	1	J. Schemmel	17	ENGR 3375	1	Prof. Practice 1	17
	2	Structures Prof.	17		2	Prof. Practice 1	17
	3	F. Wang	16		3	Prof. Practice 1	16
	4	M. Abu-Farsakh	16		4	Prof. Practice 1	16
ENGR 1313	1	Prof. Practice 1	22				
	2	Prof. Practice 1	22				
	3	Prof. Practice 1	22				

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BS, CIVIL ENGINEERING HIRING PLAN

Type	Sub-discipline	PY:	-3	-2	-1	1	2	3	4	5	No.
		AY:	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	
		FY:	2017	2018	2019	2020	2021	2022	2023	2024	
Tenure-Track Faculty	Environmental					Associate	Assistant				2
	Geotechnical				Associate		Assistant				2
	Infrastr. Materials		Professor				Assistant				2
	Structures				Professor	Assistant					2
	Transportation				Associate			Assistant			2
	Water Resources						Professor	Assistant			2
Faculty of Practice	Professor					1					1
	Associate						1	1			2
	Assistant						1	1			2
Non-Tenure Track Faculty	Sr. Lecturer							2	1		3
	Lecturer								3	1	4
	Adjunct									3	3
DIA/GIA	DIA				3	2	1				6
	GIA				2	6	6	6			20
Staff	Admin II				1						1
	Lab Supervisor			1							1
	Environmental					1					1
	Geotechnical				1						1
	Infrastr. Materials				1						1
	Water Resources					1					1
	Information Tech.			1							1

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CURRICULUM & ENROLLMENT DRIVE REVENUE

- Review program hours and course schedule
- Consider how course level, discipline, and delivery affects revenue (formula funding, differential tuition, various fees)
- Integrate enrollment projections, including attrition and time-to-degree
- Estimate routine charges against revenue (mandated set-asides, discounts, exemptions)
- Add grants, contracts, reallocations, gifts, and other sources of revenue

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SOURCES OF FUNDING BS, CIVIL ENGINEERING

Funding Category	1st Year	2nd Year	3rd Year	4th Year	5th Year	TOTALS
I. Formula Funding[1]			$816,931	$1,021,481	$1,771,838	$3,610,250
II. Other State Funding	$0	$0	$0	$0	$0	$0
III. Reallocation of Existing Resources	$0	$0	$0	$0	$0	$0
IV. Federal Funding (In-hand only)	$0	$0	$0	$0	$0	$0
V. Tuition and Fees	$402,972	$1,111,029	$1,902,989	$2,708,736	$2,963,990	$9,089,716
VI. Other Funding[2]	$2,776,329	$2,996,692	$953,153	$0	$0	$6,726,174
TOTALS	$3,179,301	$4,107,721	$3,673,073	$3,730,217	$4,735,828	$19,426,140

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V. CONCLUSION & LESSONS LEARNED

- Analysis and budget include new program, existing programs in the unit, and other units affected by new program.
- Not all emphases of a proposed degree program are immediately viable; adding tracks/concentrations later may be easier.
- Employer, industry, and testimonials from other universities are convincing.
- Proposal is in a constant state of negotiation and editing until approved.
- Proposal for a new academic program is a business plan to reflect an economic wisdom for the university and key stakeholders.

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