Assessing the Effectiveness of The LIAT College Access and Success Model (L-CAS) on Low-income Hispanic Engineering Students (Experience)

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Outline

- Introduction

- The L-CAS Model

- Implementing the L-CAS Model

- L-CAS Model Application Impact

- Reflections and Projections

Introduction

- After 50 years of efforts, the Socio-economic Status (SES) gap prevails

- Program for Engineering Access, Retention, and LIATS Success (PEARLS)
  - College-wide initiative in the UPRM (HSI)
  - Focus on Low-Income Academically Talented Students (LIATS)
  - Ninety-two undergrad students
  - Nine BS and two MS degree programs

- Interventions via LIAT-College Access & Success (L-CAS) Model

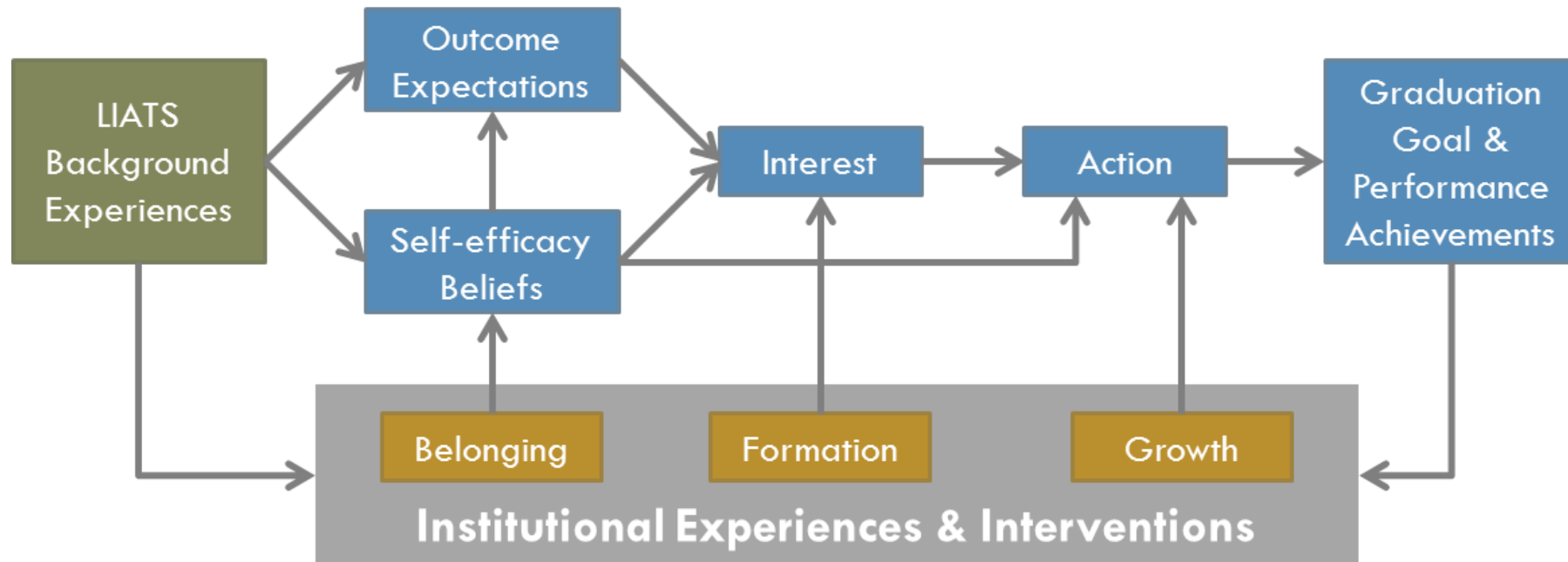- Results of three years of L-CAS application

Research Question

How does the application of the L-CAS model impact actions of engineering LIATS in an HSI in their path to graduation and professional preparation?

The L-CAS Model [9]

- A hybrid model aimed at boosting success metrics among LIATS
  - Lent's Social Cognitive Career Theory (SCCT)
  - Tinto's Departure model

Academic Setting: The UPRM

The University of Puerto Rico Mayaguez (UPRM)

- A Hispanic Serving Institution with ~12,703 students
- Part of the 11-campus UPR System
- 99.8% are Hispanic Students

Four Major Colleges

- Agriculture, Arts & Sciences, Business, and Engineering

The College of Engineering

- Fourth largest provider of US Hispanic engineers
- 5,270 students in degree programs
- Nine (9) five-year-long BS programs
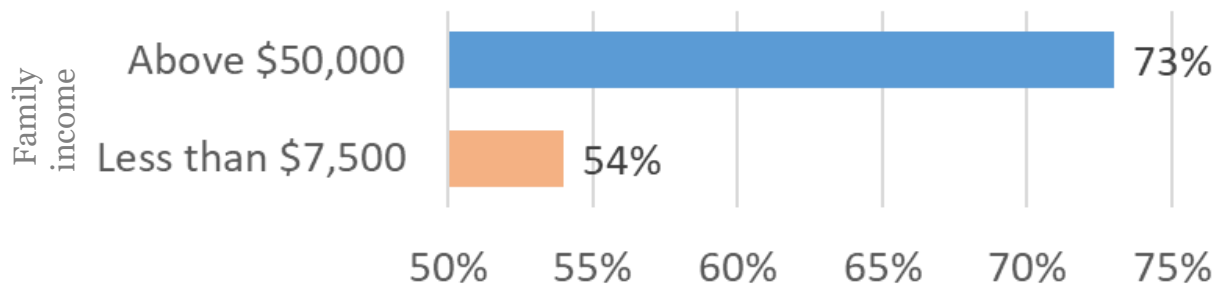- 15 Graduate Programs (9 MS + 6 Ph.D.)

Participant's Profiles

Served Population

- Public schools in PR serve 71.8% of all high school students
- 91.9% of public school students come from low-income families
- 70% UPRM students qualify to receive Pell grants

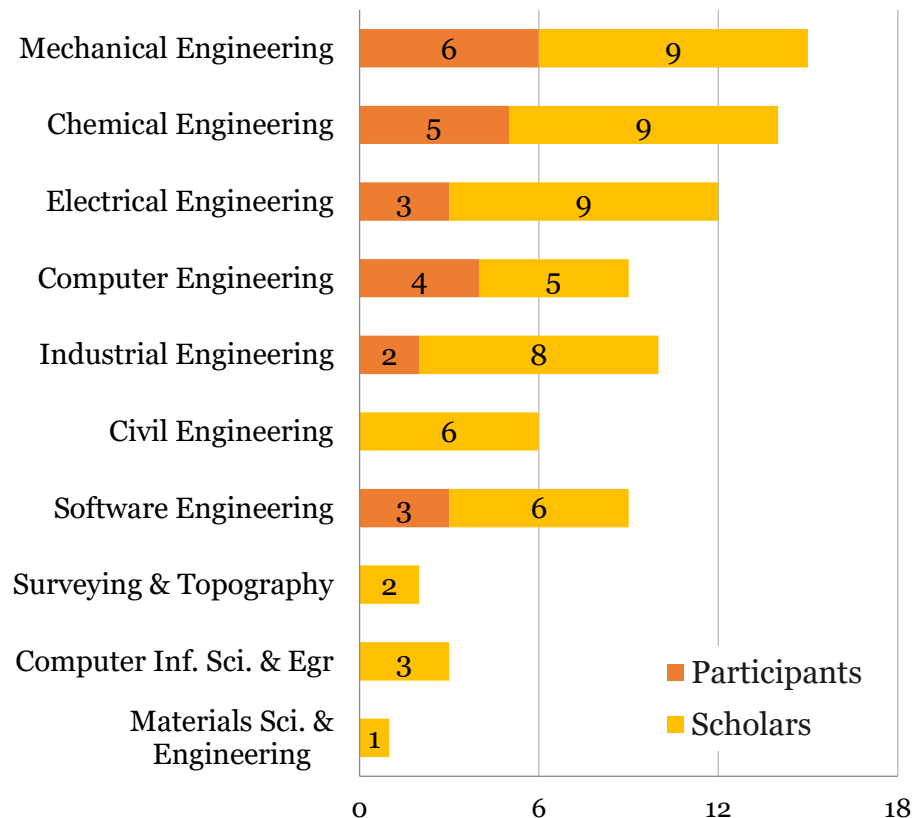## CoE Graduation Rate @ 150% time: 51.5%

- On-time Graduation 6.5%

Graduation Rates vs. Family Income Gap
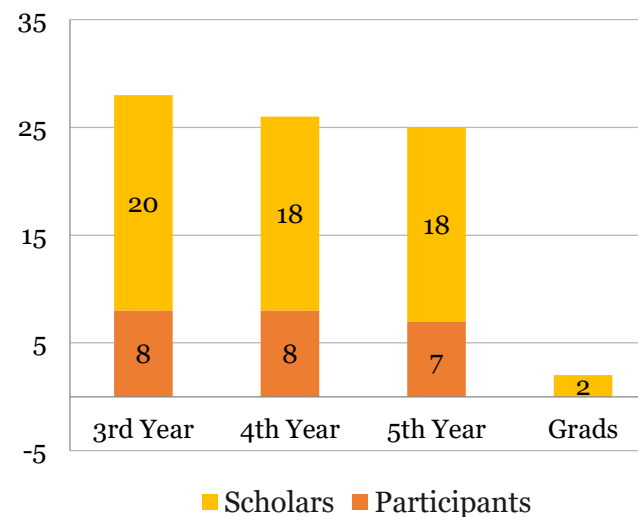
PEARLS Students' Distribution
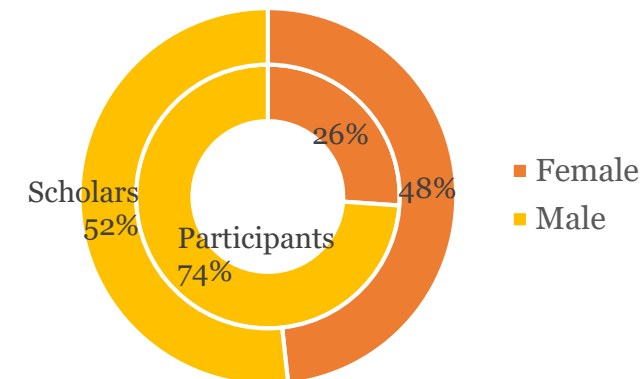
Study Program Distribution

Program	Participants	Scholars
Mechanical Engineering	6	9
Chemical Engineering	5	9
Electrical Engineering	3	9
Computer Engineering	4	5
Industrial Engineering	2	8
Civil Engineering		6
Software Engineering	3	6
Surveying & Topography		2
Computer Inf. Sci. & Egr		3
Materials Sci. & Engineering		1

Legend: Participants, Scholars

Scholars	58
Participants	23
TOTAL	**81***

*Initially 92 students

Students by Level

Level	Scholars	Participants
3rd Year	20	8
4th Year	18	8
5th Year	18	7
Grads	2	

Gender Distribution

Scholars: Female 48%, Male 52%
Participants: Female 26%, Male 74%

Legend: Female, Male

Origin School Type

Scholars: Public 83%, Private 17%
Participants: Public 58%, Private 42%

Legend: Public, Private
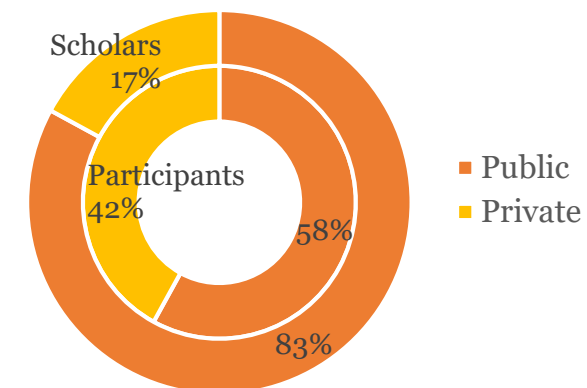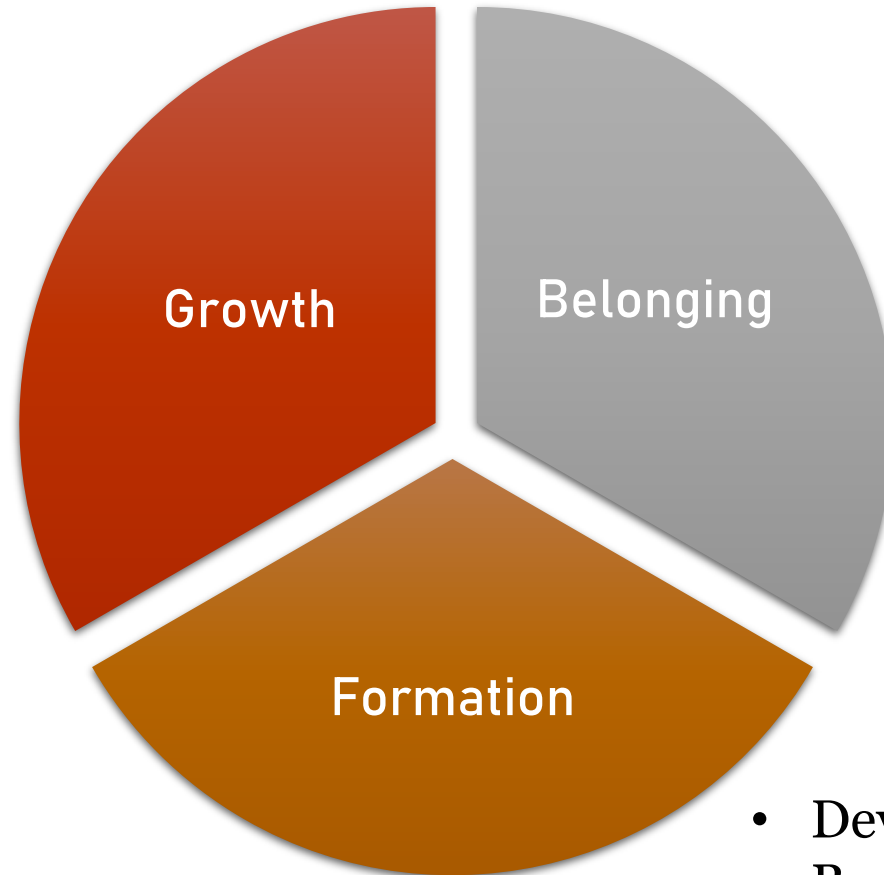
Implementing the L-CAS Model

- Ideas into actions
- Industry, academia, leadership

- Create career awareness
- Study program identity

Growth

Belonging

Formation

- Develop know-how
- Boost interest

L-CAS Belonging Stage

Faculty & Peer Mentoring

Curricular Activities

Co-curricular Activities

INGE-3001: Introduction to Engineering

INGE-3002: Engineering Learning Communities

Lectures & Talks: 3 – 4 per term

Recognition Activities

L-CAS Formative Stage

Faculty & Peer Mentoring

Curricular Activities

Co-curricular Activities

INGE-3003: Undergraduate Seminar

INTD-3355: Information Literacy

Workshops and Panels

Recognition Activities

L-CAS Growth Stage

Faculty & Peer Mentoring

Industry Experiences	Research Experiences	Special Projects	Leadership Opportunities

XXXX-4995: Cooperative Education	Summer Internships	XXXX-4998: Undergraduate Research & REUs	Graduate Research	National Competitions	Team Projects	PEARLS Peer Mentor Program	Student Associations

Co-Curricular Activity Record

Year 2018 – 2019	Year 2019–2020	Year 2020–2021
Fall 2018	**Fall 2019**	**Fall 2020**
Pearls Info Session	How to Manage a Budget	Resume writing, e-portfolio & LinkedIn *
Scholarship Awards Ceremony	National Fellowship Workshop	PEARLS Scholarships: Seeds for Transforming Lives*
First Meeting: Work Plan and Rules	Undergraduate Research Experiences Report	Mentors and Mentees, Resume, e-portfolios, LinkedIn*
IDP Preparation*	From Business Idea to Business Plan	A New Perspective on Leadership*
	Thanksgiving Pearls Dinner (Social)	Building Resilience for a Better Life*
		Tools for Handling Stressful and Difficult Situations*
		Semester Closing & Student Recognitions (Social)*
Spring 2019	**Spring 2020**	**Spring 2021**
Creating Your Career Path	Anxiety Management in the Midst of Adversity	Academic Honesty in Times of Crisis - Panel*
Introduction to Research	The Business Model Canvas	Responsible and Appropriate Conduct of Research*
Creating an ePortfolio	Undergraduate Research: A Necessity in Cross-Disciplinary Engineering Education*	Ethics in the Engineering Profession*
Plagiarism and Academic Honesty	Social activity canceled due to Covid-19 pandemic	How to Write Compelling Research & Personal Statements for Grad School Applications*
Semester Closing & student recognitions		Benefits & tools to carry out undergraduate research: Mentoring, research networks, & professional development plan*
		Data Presentation: Dos and Don'ts of Figures, Plots, & Images*
		PEARLS Semester Closing Activity (Social)*

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Results: Student Participation in Activities

- Curricular

Course Code	Year 1		Year 2		Year 3	
	NPS	PS	NPS	PS	NPS	PS
INGE-3001	62	28	13	1	47	-
INGE-3002	3	20	10	12	-	-
INGE-3003	-	23	-	37	6	8
INTD-3355	42	6	10	4	16	16
Totals	107	77	33	54	69	24

- Co-curricular

Activity Sequence	Year 1		Year 2		Year 3	
	Fall	Spring	Fall	Spring	Fall	Spring
Talk/Workshop 1	628*	78	56	40	51	50
Talk/Workshop 2	78	66	NR	32	48	31
Talk/Workshop 3	79	71	NR	NR	49	35
Talk/Workshop 4		71	51	-	47	NR
Talk/Workshop 5		56	45		49	NR
Talk/Workshop 6					46	NR
Talk/Workshop 7					65	38

L-CAS Application Results

- Retention, Persistence, and Graduation

Observation Year	Student Level				
	1st year	2nd year	3rd Year	4th Year	5th Year
PEARLS Yr. 1	97.1%	100.0%	100.0%		
PEARLS Yr. 2		96.4%	100.0%	96.4%	
PEARLS Yr. 3			96.3%	96.0%	12.0%
CoE 10Yr Avg.	91.9%	84.4%	77.9%	75.0%	6.5%

- Academic Performance

GPA	Year 1	Year 2	Year 3
Above 3.00	85.9%	85.2%	91.4%
Above 3.50	58.2%	54.7%	53.1%
Above CoE Avg.	97.9%	96.5%	100%
CoE AvG	2.66	2.66*	2.66*

Group	Achievement Rate*		
	Yr. 1	Yr.2	Yr. 3
Scholars	90%	76%	78%
Participants	94%	81%	86%

* GPA & Progress towards graduation

Resulting Student Engagements
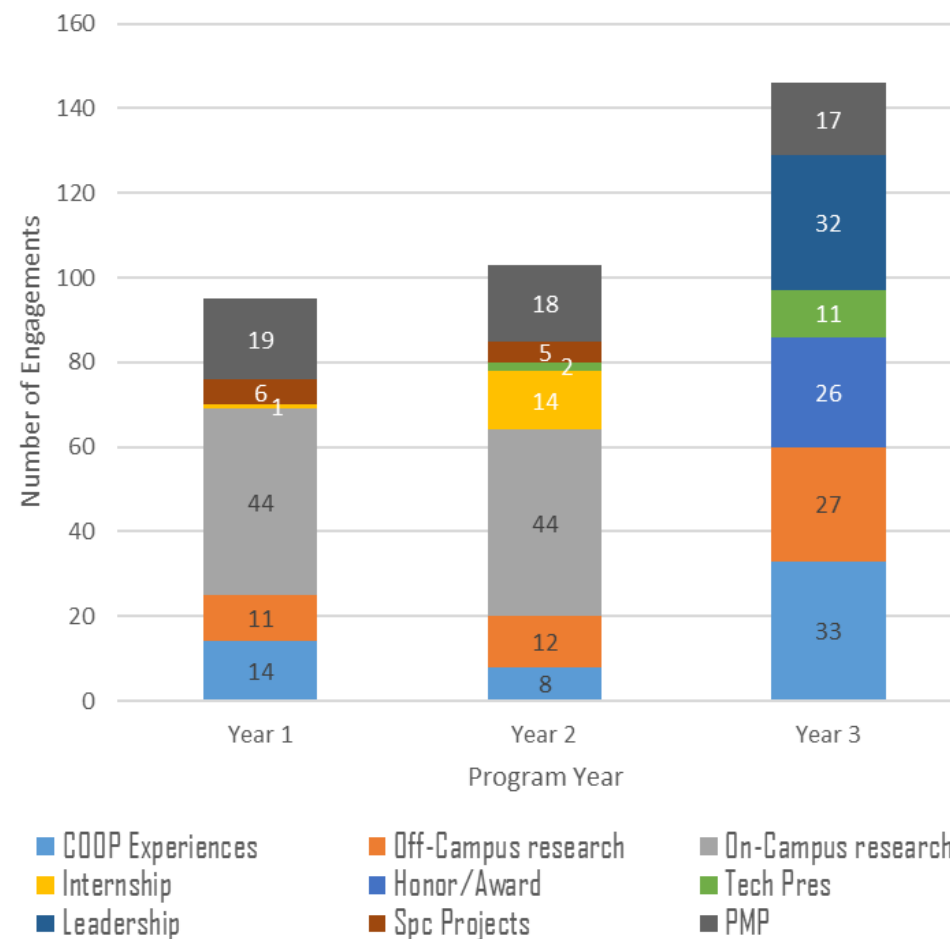
Reflections and Projections

- Academic performance indicators have remained high
  - Retention, persistence, GPA, and progress towards graduation
- Limited graduate student participation
  - Grad. PEARLS Scholarship Vs. Graduate Assistantships
- Challenges for Scaling-up the L-CAS Model Success
  - Faculty & peer mentoring
  - Economic Aid
  - Curricular course offer
    - Course allocation (faculty, schedule, space)
    - Study program insertion (credit count)
  - Co-curricular Activities
    - Lecturers & Schedules

Q&A

Web Site: **www.uprm.edu/engineering/pearls**
email: **engineering_pearls@uprm.edu**
office: **Stefani Building S-118**

Engineering
PEARLS
Program for Engineering Access, Retention, and LIATS Success