Perceptions of low-income and academically talented students and mentors of the PEARLS program – an S-STEM program at UPRM

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University of Puerto Rico
Mayagüez Campus
Introduction
Abbreviations

• UPRM: University of Puerto Rico, Mayagüez Campus
• CoE: College of Engineering
• PEARLS: Program for Engineering Access, Retention, and LIATS Success
• LIATS: Low Income Academically Talented Students
• L-CAS: LIAT College Access and Success
Increase the retention and success of LIATS in engineering programs at a UPRM.

### Goals of the project

<table>
<thead>
<tr>
<th>Goal</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>85% of the participants remain in their CoE program until graduation</td>
<td></td>
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<tr>
<td>85% of the participants maintain their status as scholars for the award extension</td>
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<tr>
<td>80% of participants complete their degrees in less than 6.5 years</td>
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<tr>
<td>85% of participants will enter the workforce or continue into graduate school within a year after graduation</td>
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</table>
L-CAS Model

LIATS Background Experiences

Outcome Expectations

Self-efficacy Beliefs

Belonging

Formation

Growth

Institutional Experiences & Interventions

Interest

Action

Graduation Goal & Performance Achievements

ASEE 2022 Annual Conference | Excellence Through Diversity
Evaluation Design
Evaluation Design

• Descriptive Design
  • Dr. Janet Bonilla, external evaluator

• Students’ and mentors’ perspectives of the mentoring plan established for the PEARLS program.

• Guiding Questions
  • What activities impacted students and mentors?
  • What were the strengths and weaknesses of the mentoring program?
Data Collection

- Electronic Self-Report Questionnaires
  - Annual Assessment Questionnaire for Students
  - Annual Assessment Questionnaire for Mentors
- Direct Observation
- Official Documents
Student Demographics – Year 1

Students by Academic Year

- First Year: 21 Scholars, 15 Participants
- Second Year: 13 Scholars, 13 Participants
- Third Year: 13 Scholars, 15 Participants
- Graduate: 2 Scholars, 2 Participants

TOTAL

- Scholars: 41
- Participants: 51

Study Program Distribution

- Materials Sci. & Engineering: 1 Scholar, 1 Participant
- Computer Inf. Sci. & Egr: 1 Scholar, 2 Participants
- Surveying & Topography: 1 Scholar, 1 Participant
- Software Engineering: 6 Scholars, 3 Participants
- Civil Engineering: 4 Scholars, 4 Participants
- Industrial Engineering: 5 Scholars, 7 Participants
- Computer Engineering: 8 Scholars, 5 Participants
- Electrical Engineering: 8 Scholars, 5 Participants
- Chemical Engineering: 8 Scholars, 7 Participants
- Mechanical Engineering: 10 Scholars, 6 Participants
- Total: 92

Participants by Gender

- Female: 71%, 57%
- Male: 29%, 43%

Scholars by Gender

- Female: 43%, 59%
- Male: 57%, 41%

Total

- Female: 30%, 59%
- Male: 70%, 41%

Family Background – Year 1

<table>
<thead>
<tr>
<th></th>
<th>Scholars</th>
<th>Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mothers'</td>
<td>20%</td>
<td>80%</td>
</tr>
<tr>
<td>Fathers'</td>
<td>33%</td>
<td>67%</td>
</tr>
<tr>
<td>1st Generation Students</td>
<td>21.7%</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>TOTAL</th>
<th>92</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scholars</td>
<td>41</td>
</tr>
<tr>
<td>Participants</td>
<td>51</td>
</tr>
</tbody>
</table>

1st Generation Students: 21.7%
Geographic Student Distribution
Year 1 Participants Loss

- One (1) student from the Mechanical Engineering Department joined the program as a Participant with the expectation of receiving a scholarship.
  - He decided to drop the program because the multiple activities took time away from other academic activities.
- A second female Participant transferred from Civil Engineering to the Psychology program.
- A third male Participant moved from Surveying & Topography to Mechanical Engineering.
  - He showed a low academic performance starting from the first year in the program. Then he decided to stop participating in activities and left the program.
- A graduate student lost scholarship eligibility as she accepted a full-time job offer.
# Students

<table>
<thead>
<tr>
<th>Classification</th>
<th>Year 1</th>
<th>Year 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>40</td>
<td>39</td>
</tr>
<tr>
<td>Male</td>
<td>52</td>
<td>49</td>
</tr>
<tr>
<td>Scholars</td>
<td>41</td>
<td>41</td>
</tr>
<tr>
<td>Participants</td>
<td>51</td>
<td>47</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>92</strong></td>
<td><strong>88</strong></td>
</tr>
</tbody>
</table>

- Civil Engineering and Surveying
- Chemical Engineering
- Computer Engineering
- Electrical Engineering
- Industrial Engineering
- Mechanical Engineering
- Software Engineering
- Computer Science and Engineering
- Material Science Engineering
Student Participation

- Annual Assessment Questionnaire for Students
  - Year 1 (2019-20):
    - Response rate: 78% (72/93)
    - Scholars: 57% (n = 23)
    - Participants: 43% (n = 22)
  - Year 2 (2020-21):
    - Response rate: 95% (84/88)
    - Scholars: 98% (n = 46 out of 47)
    - Participants: 93% (n = 38 out of 41)
<table>
<thead>
<tr>
<th>Mentor</th>
<th>Gender</th>
<th>Department</th>
<th>Year 1</th>
<th>Year 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Male</td>
<td>Graduate Students</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>Male</td>
<td>Mechanical Engineering</td>
<td>16</td>
<td>15</td>
</tr>
<tr>
<td>3</td>
<td>Male</td>
<td>Electrical Engineering</td>
<td>19</td>
<td>12</td>
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<tr>
<td>4</td>
<td>Male</td>
<td>Chemical Engineering</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>5</td>
<td>Female</td>
<td>Computer Engineering</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Male</td>
<td>Software Engineering and Computer Science</td>
<td>19</td>
<td>11</td>
</tr>
<tr>
<td>7</td>
<td>Female</td>
<td>Industrial Engineering</td>
<td>12</td>
<td>11</td>
</tr>
<tr>
<td>8</td>
<td>Female</td>
<td>Civil Engineering And Surveying</td>
<td>9</td>
<td>8</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td>92</td>
<td>88</td>
</tr>
</tbody>
</table>
Mentoring Program

The goal is to promote a sense of belonging.

Meet individually at least twice per semester (In-person, Online).

Provided mentoring workshops.

Years 1 & 2: Mentoring process (4/2)
Year 3: Deal with crisis (1)
Mentoring Program

We asked students to:

• Evaluate the mentoring process and their mentors.
• Indicate the level of satisfaction with their mentoring experiences.
• Express the strengths and weaknesses of their mentors.

We asked mentors to:

• Describe their tasks and responsibilities in the program.
• Indicate the program’s impact on their academic and research careers.
• Express how they benefited from their participation in the program.
Results
Students’ Perspective

• Reported an overall excellent opinion about their mentors and the mentoring process provided through the program.

• Strengths:
  • Communication
  • Connection
  • Professionalism
  • Encouragement

• Weaknesses:
  • Poor accessibility due to lack of time
  • Felt intimidated by the mentor
  • Inadequate counseling
Mentors’ Perspective

- Their tasks and responsibilities align with what students expected.
- Relationship between what mentors perceived as their duties and what mentees identified as strengths of the mentoring program.
  - Offer academic counseling
  - Encouragement
  - Recommendations for COOP and research experiences
  - Setting career goals
- Positive to establish a good relationship with the mentee.
Conclusions and Implications
In summary...

- Both students and mentors felt satisfied with their involvement in the program.

- Mentors agreed that the time and commitment required to fulfill the responsibilities in the program are limited:
  - Other obligations, such as teaching, research, and service commitments.
  - Mentees expressed concerns about the time availability of their mentors due to other professional obligations.

- The goal of the mentoring program to promote a sense of belonging in mentees during their years of study was accomplished.
Questions?