Exploring the Benefits of a Women in Engineering preLUsion Program for Incoming First Year Students

Prof. Christina Viau Haden, Lehigh University

Dr. Haden is a professor of practice at Lehigh University. Her research involves the probabilistic analysis of additive manufactured metals. Besides her research and in addition to a passion for teaching, she has been interested in improving retention rates for women in STEM and as such, has become involved in a variety of activities around campus to that effect, including developing a preLUsion program for incoming women engineering students, establishing a hierarchical mentorship program for women within her department and more.

Dr. Marci J Levine, Lehigh University

Marci Levine, Ph.D. is co-Director of Lehigh University’s ADVANCE Center for Women STEM Faculty. She supports and develops mentoring, productivity, recruitment training, men allies and advocates, and leadership development programming from the frame of inclusive excellence. She is also a member of the University Council for Equity and Committee. Marci earned her Ph.D. in Nutritional Sciences from Purdue University.
We will describe how we are exploring the benefit of LWE
Lehigh was Named after Asa Packer, formed as a college for men to support the needs of the steel industry in our backyard.
Women first admitted as undergrads 49 years ago.
We are going to discuss what we’ve learned about creating and implementing a 3-day summer experience for newly admitted women first year engineering students. We will explain a little about what this program is at our campus and what we know about it, then we will share some of the context of the ecosystem related to supporting communities of diverse engineering scholars and why the program was launched. We will talk about the program components and logistics as well. Then we will share the assessment data and consider the measures we have to indicate the value and impact of the program. Finally, we will discuss with you the key things that might be important for transferability and aim to learn from each other ideas for enhancing or adapting the initiative for sustainability.
This is a clip from our website describing the Lehigh preLUision experience. Here we see a group of preLUision mentors and it reads “Can’t wait to get your Lehigh career started? Be a part of preLUision!”

A few key points are that 1. This is a pre-orientation, 3-day experience which occurs either in August or January for incoming first year students. 2. Students can select a topic of their choice among several options which we will go over in the next few slides, 3. preLUision mentors (peers) guide the students through most of their experience, and 4. The opportunity is for them to move-in early, gain access to campus early, and make connections ahead of time.

It’s marketed during campus visits and through the admissions cycle by the office of the first year experience team.
Lehigh’s flagship pre-college experience is an opt-in 3 day, move-in early program organized by the office of the first year experience called preLUsion. Each year there are about 10 unique programs run in conjunction with different offices or departments, ranging from academic themed to pure fun. Offerings change based on the needs of the hosting partner offices or they may not run if interest is low. On average, 20% of the first year class joins a preLUision and there are about 25 students per program. These are not inexpensive, averaging nearly $300 per program.

The OFYE coordinates and implements all of the programs with the campus partners. This means they are the centralized experts. OFYE manages the application, which includes asking preferred names and pronouns, if there are accommodations we need to meet for them to participate (related to ability, financial aid, dietary concerns). There have been at least 5 funding streams providing scholarships ranging from 25-100% of the need for the program (most get 75-100% of the cost covered by one or more of these sources). The other advantage of the centralization is OFYE provides support for individual program coordinators, training for preLUsion peer guides/mentors, assessment tools, and the students merge into the mandatory orientation and other year-long OFYE programming. The OFYE application asks students their Name, Gender, Preferred pronouns, Lehigh email, Cell number, Address, LIN #, T-Shirt size, Dietary restrictions, Allergies, Student status, Emergency contact Name, Emergency contact phone number, Emergency contact relationship to student. They also ask the students about any special needs / assistance they or a family member may need on move in day (which extends to us for preLUsion if a need is identified).
Lehigh Ecosystem: Looking at the landscape, the interim dean in 2014 thought we could capitalize on the momentum of several other initiatives and make other changes to deliberately improve the gender diversity of the student body. There was leadership change within the college, 2014 and 2015, RCEAS was led by an interim dean. The campus already had the ADVANCE grant and several other initiatives to support community building and academic success for students from marginalized populations, and while we have had a SWE chapter and have hosted a summer camp for middle school girls called CHOICES, the interim dean wished to help create a first year experience to attract and retain more gender diversity amongst the undergraduate engineers. RCEAS already had SWE club (Society for Women Engineers), CHOICES (Middle School Girls Engineering Experience- 2x 1 week summer day camp), Alpha Omega Epsilon Engineering Sorority, NSBE (National Society of Black Engineers), SHPE (Society of Hispanic Professional Engineers); SASE: (Society of Asian Scientists & Engineers), Greer scholars (a philanthropic alumnus funds minority students at Lehigh U. Launched in 2013, the Greer Scholars Program provides funding and a support network for African American and Hispanic students pursuing engineering studies at Lehigh.), 30 other STEM clubs and organizations, most with a heavy engineering focus, Lehigh already had LUSSI (Lehigh University Student Scholars Institute), PreLUsion, RARE (Rapidly Accelerated Research Experience) is a focused pre-admission-to-graduation STEM (Science, Technology, Engineering, and Mathematics) immersion program. The overarching goal of the program is to provide opportunities for students from backgrounds underrepresented in STEM fields to develop outstanding scientific skills in an environment that emphasizes preparation for leadership. ADVANCE IT Grant
Going into summer 2015, Lehigh had seen slow but steady increases in the total numbers of enrolled women engineering students, comprising about 30% of the Undergraduate students. Given the traction of ADVANCE and other programs, and the concern that some fields were experiencing a decrease in participation of women (like computer science and engineering), it was worth being intentional about methods to increase the diversity and retention of Lehigh students.
Gender Trends First Year Lehigh RCEAS 2011-2014

Looking specifically at the first year students, women were also hovering at 30% of the incoming class.
Thus, guided by Interim Dean, Assoc. Dean Undergrad Studies, RCEAS Faculty Women, SWE Rep, Student Affairs, OFYE, ADVANCE, and based on other recently reviewed climate needs, enrollments suggested good time to implement a Women Engineering program and we launched the first PreLUSion Lehigh Women Engineers (LWE) experience to start in August 2015.

So this graphic depicts the new program in the total ecosystem
LWE was and remains advertised amongst the other preLUsion opt-in programs. Some are purely fun (like OAP), some help people learn about issues they care about like the environment, and food on and near campus. Some encourage internal growth and reflection, and others are more academic minded, like Fabricate: LU and LWE. Each of these programs have core modules independent from one another; while at other times (for ex in the evenings) they reconnect together for social events hosted by the OFYE.
LWE PreLUision

When they select to read more about the LWE prelusion, students and families find that the goals are to

- Participate in hands-on experiences
- Get a head start on making lifetime friends with your classmates
- Meet the Dean and selected faculty members in the college of Engineering
- Mentors are current women engineering students

PreLUision LWE will run with a minimum of 10 students. The cost is $225, and financial aid is available
The agenda for the 3 days LWE PreLUsion has been similar since 2015. On the first day, after they say goodbye to their parents, the women immediately embark on an ice breaker event that stretches through lunch. Then LWE students do a cross-campus scavenger hunt (designed and led by Christina Haden). By the conclusion of their first day, students are already bonding in their small groups. A GroupMe is established for the women to communicate as a group, and it is immediately put to use as they travel in groups to events organized by OFYE. Thus far the coordinating faculty and OFYE staff are not part of the chat. The GroupMe includes the preLUsion mentors, and this tool ends up being a rather important one for the women for many years to come. The second day, after breakfast, the women have their first engineering lab module experience in Civil engineering where they create structures as a team that will survive a shake table test. The organizers for the LWE preLUsion meet with the faculty running the modules and get a demonstration and walk-through of the activity ahead of time. This allows for feedback on the goals of the program to be fully exchanged with the presenting faculty and students. Each year, new modules have been introduced, and mentor and student feedback helps faculty decide if they are offered again the following year.

Following the lab activity, the women have a lunch with the Dean, who welcomes them to engineering at Lehigh. Following lunch, a Lean-In exercise is the third bonding event for the women, and usually the most profound one. At the guidance of fellow women students, the incoming students are introduced to various topics such as Imposter Syndrome, and asked to share in small groups about times where they might have felt this personally.
DAY 3

LWE help with Campus-wide MOOV

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<th>Wednesday, August 21</th>
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<tr>
<td><strong>Time</strong></td>
<td><strong>Activity</strong></td>
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<tr>
<td>9:00 – 9:30 am</td>
<td>Breakfast</td>
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<tr>
<td>9:30 – 10:30 am</td>
<td>Study Abroad and Career Center Info Session</td>
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<tr>
<td>10:30 – 12:00 pm</td>
<td>“Float your Boat” Activity (CEE)</td>
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<td>12:00 – 1:00 pm</td>
<td>Bagged lunch</td>
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<tr>
<td>1:00 – 4:00 pm</td>
<td>Ropes Course Challenge</td>
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<tr>
<td>4:00 – 5:00 pm</td>
<td>Pick up Orientation Package</td>
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<td>5:00 – 6:00 pm</td>
<td>Dinner and Awards</td>
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<td>6:00 – 7:30 pm</td>
<td>Ice-cream social with mentors and LWE alums</td>
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<td>7:30 – 9:00 pm</td>
<td>Farrington Square Jam</td>
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<th>Thursday, August 22</th>
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<tr>
<td><strong>Time</strong></td>
<td><strong>Activity</strong></td>
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<tr>
<td>8:30 – 9:00 am</td>
<td>Breakfast</td>
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<tr>
<td>9:00 am</td>
<td>OFYE - MOOV</td>
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Following this event, there is a workshop about tips on how to succeed in engineering by a faculty member who has been doing this workshop since 2015. The women set goals, establish their priorities, and set daily and semester schedules, among others. The following event provides down time for the women to chat and craft. This was requested from students to have a slightly less packed schedule, which left them exhausted. They then eat dinner as a group in Bethlehem, followed by events sponsored by OFYE. On the third day, the women are greeted for a breakfast, and then have an info session on study abroad opportunities for engineering students. They are then brought to an Environmental Engineering activity where they learn about watershed research and perform several activities including designing a boat capable of carrying the largest payload in high waves. The women then have lunch together outside and participate in a ropes course challenge, which is equal parts fun and group bonding. By the time these events have unfolded, the women are generally quite close and have made lots of memories together. Our last dinner with the women is highlighted with an awards ceremony for each team being recognized for its particular strengths, and an appreciation activity whereby women write about their favorite instances with each other. For dessert, starting in the 2nd year, we’ve invited LWE alums to join and mingle with the incoming class. When PRELUSION is over, they then help with mOOV in for the rest of the arriving first year class.

Let’s look at Lehigh’s overall first year class demographics to understand who might sign up for PreLUSION LWE.
Indicators of LWE Value and Impact

- LWE Participation and Scholarship Rates
- OFYE surveys to participants shortly after preLUision experience
- Past participants become future LWE Peer Mentors or engage with other engineering organizations (SWE)
- Feedback during the various engagement points (formal during socials, etc., informal via GroupMe).
- Academic measures = Cumulative Average GPA (so far)
  - Enrollment, Retention, Graduation to be determined

What is the value and the impact of the LWE PreLUision, and how do we know?
For this presentation, we examined participation and scholarship/financial aid rates
We compiled feedback the OFYE collects from all prelusion participants and compared LWE to the average of the whole group
We asked and are starting to track what engagement-rengagement looks like in terms of LWE participants becoming future peer leaders or their contact with other LWE members or even other engineering organizations
We hope to explore social engagement points and other measures of contact and connection and engineering identity...
And we have begun to collect academic measures (so far we have cumulative average GPA), and we will continue to examine other academic indicators and 6 year graduation rates and other
So let’s start.

First, LWE is advertised to accommodate up to 100 students, however we have not yet exceeded 29, and we are on par with other preLUsion programs in terms of size. A different size would pose some challenges for the modules as they currently are structured in the agenda parts organized by Christina’s team.

LWE does seem to have a slightly higher than the average need for scholarships. Several students funding is from RARE and LUSSI sources, and over the last two years, changes to their onboarding procedures took place which means the funding is for them and they are also busy during LWE days, so they can no longer participate. This may explain the decrease in scholarship recipients to the most recent cohort, and we will discuss this with the new director of Student Access and Success.

All told, LWE has reached 20% of first year engineering women, a similar reach of all prelusion programs across the entire first year body.
When LWE participants are surveyed about why they joined, on average over the last 5 years, 87% say it is to make new friends and meet people, 76% say it was because of their interest in the program or topic, 60.7% say it was to move in early, 40% answer it was to learn something new, and 20% say because the content may apply to class topics.

On average each year, over 96% of the students agree they formed moderate to strong peer connections...and these are mostly strong peer connections. Additionally, the interest and bonds may be carried forward by their desire to remain connected to the host office / department.

For example, 66% say they'll join an organization linked to the topic, 75% say they will attend programs offered by the host, and 31% say they would have interest in volunteer or work for the office.

Additionally, in each year, LWE asks if the students desire to be LWE preLUsion leaders the next year...and so far 15 women have indeed returned in a subsequent year as mentors, and of those 15, 5 returned for a second year as a mentor. Of those 5, one woman came back for a third year as a mentor.
**LWE meets or exceeds expectations, recommend to new students**

<table>
<thead>
<tr>
<th>Year</th>
<th>Did this program meet your expectations?</th>
<th>Would you recommend this program?</th>
<th>Would you like to return as a peer leader (mentor)?</th>
<th>Post LWE Engagement Points</th>
</tr>
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<tbody>
<tr>
<td>2015</td>
<td>33% “Fully met” 66% “Met most”</td>
<td>80% yes definitely</td>
<td>question n/a</td>
<td>Welcome, Dr. Grant, Spring BBQ</td>
</tr>
<tr>
<td>2016</td>
<td>90% “Fully met” 10% “Met most”</td>
<td>95% yes definitely 5% yes probably</td>
<td>55% (11) yes</td>
<td>Ice Cream Social (15 attended)</td>
</tr>
<tr>
<td>2017</td>
<td>58% “Exceeded” 33% “Met” 8% “Not quite met”</td>
<td>92% yes, definitely 8% yes probably</td>
<td>67% (8) yes</td>
<td>Spring Social (n/a) Spring Social (n/a) Reunion all cohorts</td>
</tr>
<tr>
<td>2018</td>
<td>66% “Exceeded” 33% “Met”</td>
<td>100% yes definitely</td>
<td>62% (8) yes</td>
<td>Fall Social (15) Spring ’20 Social</td>
</tr>
<tr>
<td>2019</td>
<td>40% “Exceeded” 60% “Met”</td>
<td>87% yes definitely 13% yes probably</td>
<td>67% (8) yes</td>
<td>Fall Social (15) Multi-cohort 16 Reunion</td>
</tr>
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We see that those who give feedback report the program met most or all of their expectations. Additionally, students consistently respond “yes definitely” on a 5 point scale (yes def, yes probably, not sure, no probably not, no definitely not) about recommending LWE to future first year students.

Additionally, in the second year, the idea of inviting past participants (who would then be sophomores) to be mentors for the incoming first-year class began and was tested via the survey, such that each year thereafter, approximately 4 of the student mentors were past participants (and then say what % of the mentors were returnees?)

- Fall Social, (of 15 who RSVP’d to come, only 2 attended)
- Spring social planned, along with multi-Cohort Reunion event
We have approximately a 1:3 to 1:4 peer mentor to participant ratio, with approximately 8 peer mentors each year, for cohort size on average of 22.
Women returning as mentors for LWE preLUision

With 15/90 (16.6%) having returned as mentors one time (and several have already expressed wanting to return from the 2019 cohort for next summer)
Women returning as mentors for LWE preLUsion

Of the 4 returning LWE participants as peer mentors in 2016, one came back again in 2017 for a second year as a mentor.
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Of the 90 participants (with a chance to have returned), 15 returned one time as preLUsion peer leader/mentors, which is 16.6% of our participants.

Of these 90 participants again, 5.6% (5 total) have returned twice as peer mentors.
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Of those 5, one came back again for a third time as a peer mentor (1% of participants).
Women in the preLUision each year form a GroupMe with our guidance (group text app that is very popular with students), to which we also insert their preLUision peer mentors. 100% of the LWE participants are added to these group texts.

These groupMe circles have persisted for years after the PreLUision from anecdotal knowledge. Mentors share events on campus, someone will ask about recommendations for courses to take, they will invite others to join for outings, etc. This social app has allowed the women to interact with each other beyond the preLUision events, and is consistently a tool for their sustained interactions.

Every year since 2015 (including this past fall 2019), these GroupMe chats have been privately shared between the students and their peer mentors. Consequently, any events we wish to share with the students must be relayed via a group mentor. We now realize the need to be adding ourselves as program leaders to the chats as well, for several reasons. Firstly, we can assist any needs discussed in these groups, and monitor the well-being of the students. Secondly, it would allow us to assess social interactions, possibly gathering data on frequency of social interactions or quality of relationships developed. This is a new direction to be implemented for the upcoming preLUision summer of 2020.
Main Take-aways:

“Engineering is awesome. Engineers are awesome. The program is awesome. Lehigh is awesome.”
- 2015 LWE preLUsion attendee

“I feel comfortable with the campus layout now. I know my way around. I have a lot of friends. I’m ahead of the game compared to the kids who just came for orientation.”
- 2016 LWE preLUsion attendee

“The student leaders made [me] feel comfortable and welcomed during my first few days at Lehigh. I will not hesitate to reach out to them if I have questions or need guidance in the future.”
- 2017 LWE preLUsion attendee

“I learned about the resources I can use for help as I go through my first year at Lehigh. I also enjoyed discovering buildings on the Scavenger Hunt and I gained a better sense of direction on campus.”
- 2018 LWE preLUsion attendee

“I already feel connected to a group of female engineering students, and I know so much more [now] about the opportunities that exist for me as a Lehigh student and a woman in STEM.”
- 2019 LWE preLUsion attendee

Asked “what is your main takeaway from the program?”, students responded…
LWE Student Engagement with SWE

From 2016 LWE year: 8 other participants are somewhat active in SWE in 2020.

We also inquired amongst the Lehigh section of Society for Women Engineers how many LWE students have been active in the club. We learned that there has been increasing representation of LWE participants amongst the SWE executive committee and at least from one LWE cohort, 8 are somewhat active in SWE in 2020. We aim to continue to explore ties to these and other organizations which play a role in engineering identity, retention, and success.
Friendships beyond LWE

- 4 women who met in LWE 2016 live together in off campus housing (3y later)
- Women from a cohort all sit together and save seats for each other in common core courses in first year
- Students returning as mentors often do so because they are returning with their friends
- Friend groups made during the preLUsion event are seen to persist months and years beyond the event, as reported by past participants and mentors.

Image: LWE students doing “Float Your Boat” lab
Does LWE improve academic outcomes for women in engineering?

*111 of the 112 LWE students are RCEAS majors

What is the value added to their experience? How do they perceive the program? Are there any educational outcomes correlated to their participation in LWE?
Are graduation rates impacted by preLUsion participation?

- Lehigh OFYE began examining that question Spring 2019 by race/ethnicity, Pell Grant status
- Missing from analysis: Gender, College/Major, specific preLUsion program

First, we wondered what the impact of preLUsion was on graduation,
The OFYE assessment office has just begun examining this question, and performed analyses by race/ethnicity, and pell grant status
They have not yet analyzed Gender, College, or Major, or by a particular preLUsion program.
Though to give you an idea, we learned from OFYE that the overall graduation rate is higher for those who participated in prelusion than those who didn't by about 2-3 percent.
Among URM students, preLUision participants average ~12% higher 6-year graduation rate than non-participants across 2010-2012.

However, among students identifying as an underrepresented race or ethnicity, those who participate in preLUision have a 12% higher graduation rate than non-participants of those who entered Lehigh as first year students between 2010-2012.

This is true, they looked at it multiple times.

However we only got this data before the slide submission deadlines- and we don’t know yet about the interplay, and indeed, intersectionality of gender as associated with any of the preLUision programs; further, we don’t have 6 yr grad rates for RCEAS at this point, or even what proportion of Lehigh’s relatively low students of color do a preLUision. Additionally, in the future, some of the students might not be eligible for doing A PreLUision at all, becuase students in other cohort programs related to SES status, LUSSI, RARE, etc, are busy with those programmatic orientation programs.

Other explanatory variables should be explored (gender, PreLUision program, discipline, etc.), though the connection-building outcome may be key at our campus.

First Year Experience, Assessment office
To understand how Total Undergraduate Enrollment has evolved during the time period of LWE, we can see there has been a marked decline in total undergraduate enrollment in the engineering college, though the overall women student enrollment has stayed about 32% for the last few years.
Lehigh has a large margin above the national average of % women enrolled -

Although a dip occurred in 2016 for women enrollment across the nation and at Lehigh, Lehigh recovered more sharply than the nation in 2017.
Among first year students, since the inception of the LWE, this graph continues on from the first year data shown before, and depicts the drop in engineering enrollments at the first year student, the start of an increase in the % of women through 2018 entering class, however there seems to have been another decrease in this past fall’s enrollment data for women and not for men, and so this is something the college is paying attention to. There are numerous and complicated other factors impacting admissions and enrollments; here at Lehigh there are other new admissions priorities which may have influenced first year college enrollments.

Further, it becomes important to support these students through retention, and so the other college initiatives and future directions for keeping the cohort of 2019 LWE participants connected in community may be more important.
## Oct. 2019 Rounded GPA of RCEAS Students: Gender x LWE Participation

- Women > Men
- LWE participants > non-LWE participants for current soph, junior, senior

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<tr>
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<th>Incoming 2015</th>
<th>Incoming 2016</th>
<th>Incoming 2017</th>
<th>Incoming 2018</th>
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<tbody>
<tr>
<td>Number of RCEAS Men</td>
<td>295</td>
<td>266</td>
<td>227</td>
<td>229</td>
</tr>
<tr>
<td>Number of RCEAS Women</td>
<td>117</td>
<td>96</td>
<td>114</td>
<td>122</td>
</tr>
<tr>
<td>Number Women in LWE</td>
<td>21</td>
<td>29</td>
<td>21</td>
<td>19</td>
</tr>
<tr>
<td>Av. Cum. GPA RCEAS Men</td>
<td>3.1</td>
<td>3.13</td>
<td>3.05</td>
<td>3.12</td>
</tr>
<tr>
<td>Av. Cum. GPA RCEAS Women</td>
<td><strong>3.34</strong></td>
<td><strong>3.2</strong></td>
<td><strong>3.15</strong></td>
<td><strong>3.25</strong></td>
</tr>
<tr>
<td>Av. Cum. GPA LWE</td>
<td><strong>3.26</strong></td>
<td><strong>3.25</strong></td>
<td><strong>3.16</strong></td>
<td><strong>3.36</strong></td>
</tr>
<tr>
<td>Av. Cum. GPA of non-LWE</td>
<td><strong>3.36</strong></td>
<td>3.18</td>
<td>3.15</td>
<td>3.23</td>
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We collected one indicator of academic outcomes for LWE participants and non-participants: The cumulative GPA.

Points: Women’s RCEAS GPAs for each class (across the college) are higher than the men's current cumulative GPA.

(3.34>3.1; 3.2>3.12; 3.15>3.05; 3.25 >3.12)

For Juniors, Sophomores and Freshmen who took PreLUSION, their current GPA in the middle of Fall 2019 is the same or better than the GPA of women without PreLUsion.

We pulled the GPAs of the 112 women out of the cumulated gpa snapshot to calculate the average GPA of the majority of women RCEAS who did not do a prelusion.

We lack major GPAs or the ability to see at this time if people are changing majors.

There are likely better indicators to assess any academic impacts of being affiliated with LWE, even though thus far LWE hadn’t been designed with this in mind.

[The cumm GPA from the enrolled 2015 folks graduated within 4 yrs]
What if this program didn’t exist?

Maybe the question is not how much better did the women succeed...

But where would these women be if the program didn’t exist.

Say they came from programs that prepared them well, where they were groomed to succeed, and yet… they arrive at our university and find there are no such programs that support them. How would that influence their outcome?

Maybe looking only at GPAs is not the answer. Success might be measured in other ways...
Summary of impacts, value

- New students enroll at expected proportion (20%) of incoming class
- Significant interest in “working with office” matched with real return as Peer Mentor to new cohort
- LWE meets or exceeds expectations, peer connections seem strong (via socials, other organized events, informal or groupme interactions)
- LWE participation may spark SWE engagement
- PreLUssion LWE participation may be related to higher cumulative GPA
- Engineering modules are valuable opportunities for departments to recruit women

We hope to add more data about the demographics and admissions attributes of the students who opt to take the preLUssion LWE. Different SAT?

Is it advisable to do a pre-program assessment about their engineering identity, self efficacy? Or is this time before the semester of their first year begins not the time to ask? Would it undermine their success?

What else can be done?

A gauge for the success of the program might be inherently in the fact that women keep signing up for this preLUssion.

- Is this simply a self-selecting group of excellent students? We don’t know.
- Want to normalize our data, to determine if preLUssion women doing better than the average in engineering did so because the program helped them improve their experience at Lehigh, or if they were simply exceptional students to begin with
Successes

● Students keep signing up!

● Reviews continue to be amongst most positive of all preLUisions for the purpose OFYE says is key to retention: CONNECTION

● Instinctive community building and informal supports are sparked

● Funds to support scholarship changed, but still exist and are robust, thus not impacting attendance rate (not had to turn someone away)

● Dr. Haden is faculty in ME department; we are watching for shifts in interest to diversify the ME degree

● Organizationally structured to swiftly and strategically identify colleagues to deliver and collect programmatic feedback, and provide the evidence to build in a more sustainable infrastructure, operating norms and expectations
Challenges

- Immature college office ties, limiting visibility to colleagues and assessment capacity
- Do not yet know race and other demographic information of LWE students
- Unclear what motivates students to sign up
- Inconsistent follow-on activities hosted for LWE, no tracking of LWE in other spaces
- LUSSI & F1RST+ students cannot attend LWE because doing own program; unclear what this means for diversifying RCEAS overall
- Hands On Engineering modules during LWE come from 3 of 8 departments and are difficult to organize as faculty participation is voluntary and intensive

Despite funding from the Dean and the Dean meeting with LWE, the program’s visibility across the college is still immature, and this relates to the number of departments involved in creating modules, and demographic impact and assessment data were difficult to collect.

OFYE could not discern for us certain other useful parameters for assessment- are LWE students predominantly white if other pre-orientation programs are running at the same time? Where should students go? Yet, we aim for the experience of LWE and all follow-on activities to be open to students of all backgrounds, race, sexual orientation, physical or learning or mental health differences, etc.

LWE was not focused on linking to other programs throughout the year and with some staffing changes and use of technology “swiping for attendance”, we can hopefully now do a better job tracking LWE in other events, courses, etc. There was reluctance to do this level of cohort tracking.

(LUSSI and F1RST are not RCEAS or STEM focused- Metrics are just now being collected)
Future plans for LWE preLUsion

- Embed within RCEAS Diversity & Inclusion Plan
- Secure and continue regularized collection and analysis of robust retention data including:
  - major and change-major data
  - GPA in-major by semester and cumulative
  - student climate and other surveys within RCEAS specifically for LWE participants (RCEAS, Registrar, and OIRSA)
- Gain insights about inclusion, confidence, engineering identity and other psycho-social-professional indicators
- Improve structured engagement and feedback throughout the year with new coordinator, ties to OFYE team, students in other engineering clubs

Looking forward, the LWE should be embedded as part of the recruitment/retention capacity of the college in the emerging D&I plan.

Evaluation and Assessment indicators need to be better determined, collected, and analyzed.
We hope to look at 1-2-3 year retention for LWE within the context of the college; current 1-2-3 year retention data was available only on an overall university data set. We also aim to look at within major, semester-semester GPA data. And we can link these with existing and upcoming student climate surveys (though it is unlikely to be linked to LWE because individual students are not knowable…

We aim to learn more and partner with others on and off campus, to better understand student factors for inclusion, confidence, engineering identity, etc to continue to improve this program and build the retention infrastructure across the whole college.

And we hope to build in to the future events how coordinator etc…other clubs.
Future plans for LWE preLUsion

- (re)Establish GroupMe as means of connectivity AND assessment
- NEW Opportunities with other high impact campus offices:
  - Career Services to interface with LWE
    - introduce during preLUsion period
    - implement network & career supports undergrad experience
    - establish follow-up face-face events co-lead by career services for the cohort
    - planned assessment

We are looking into how GroupMe can be better leveraged as a connection resource and also a form of assessment
ANd two new exciting things for next year:
LWE will be in deliberate partnership with Career Services and the Lehigh United Nations Partnership, attending the Annual Int'l Day for Women and Girls in Science at the United Nations.
Ecosystem is now more robust at Lehigh:

Would also like to point out that at this point, the D&I ecosystem within and around the college of engineering is more robust- and in addition to some reorganization, has added new programs and their affiliated resources and infrastructure to be more creative and have better assessment of impacts going forward. We are also a new member of GEM and have just been approved as a member of NACME.
Transferability:

Some salient elements of the program to replicate elsewhere

- Dean of Engineering support for program
  - Provides scholarships for financial aid and personnel resources to support program in background
  - Meets with LWE students
- Leveraged well-established first year programmatic capacity
- Women faculty actively involved in design and activity implementation
- Combination of social and formal engineering specific activities

Several key elements helped this program gain traction and are worth establishing for starting own programs:

1. The Dean of Engineering provided initial request and funding for the program, provides scholarships, and meets with the LWE students.
2. This was built by working with existing successful first year program infrastructure and capacities- they train the peer mentors, handle sign-ups, distribution of scholarships, arrange housing, and assess
3. Women faculty were involved in and invested in the program from inception, interface with the young women at various points throughout the three day event and beyond during the year.
Questions for discussion with you

- What enhancements and adaptations would strengthen the design and implementation of this program?

- How else can we assess the success of this program?

- Can/should/how could we control for preparation or motivation (self-selection bias) for opting in to LWE?

- Is it worthwhile to strive to sustain such a program?

- What do you do that supports student engagement with your programs?

- How do you demonstrate its impact on student outcomes?
Slide shows group shot of a PreLUision LWE doing marble track experiment, scavenger hunt group, and Last year’s UN visit showing just 3 of the Lehigh students in attendance.
"When female engineers stick together and support each other, they can achieve great things."

As a final note, we would like to leave you with a comment a student left on the survey for the LWE PreLUision from this past August, 2019. When asked “What was the main take-away from this program?”, a student said...
Questions?