

Epicenter University Innovation Fellows Program Annual Survey Spring 2016

BACKGROUND

Since 2012, the University Innovation Fellows (UIF) program (formerly Student Ambassadors) has been activating students as change agents in the United States. Cultivated as an initiative of the NSF-funded National Center for Engineering Pathways to Innovation (Epicenter), which is managed by Stanford University and the VentureWell, the program has developed an immersive training and a multi-campus community of practice that equips students with the knowledge, skills, and mindsets to act as strategic thinkers and change agents. The UIF program trains students to become as conversant about the campus innovation and entrepreneurship ecosystem as their faculty and administrative counterparts. Leveraging a custom, hybrid model that combines experiential online training with in-person events, the program exposes students to design thinking and lean startup techniques, as well as a campus asset mapping tool called the “landscape canvas” and knowledge of program models and assets that support innovation in academia. The program also offers a nation-wide community of participants.

The UIF program taps students’ intrinsic motivation to learn, draws on their unique interests/ passions, and exposes them to a broad set of global resources, as well as skillsets and mindsets. In doing so, the UIF program has systematically empowered teams of students to create new learning opportunities that have exposed thousands of their peers to innovation and entrepreneurship. What began in engineering departments (because of Epicenter’s focus on undergraduate engineers) spread to Business, Computer Science (CS), and many other disciplines and majors. The program has appealed to a diverse set of schools (i.e. public/private, size etc.) and regions across the US, and as a result, Fellows have reached an equally diverse population of peers to equip them with the skills and mindsets needed to enter the workforce of the 21st century.

Students apply to become University Innovation Fellows either individually or in teams of up to five members (called “Leadership Circles”). They must have a faculty Sponsor and their institution pays a fee towards the 6-weeks online training and registration for participation in the Silicon Valley in-person training. Leadership Circles additionally require a letter of support from the institution’s president or provost. Two cohorts of candidates (Fall and Spring) go through the online training each year, and upon completion of the training deliverables, they are launched as Fellows. Once each academic year, Fellows from the Fall and Spring come together for a three-day Meetup in Silicon Valley, which includes full days of activities at Google, Microsoft and Stanford’s own Hasso Plattner Institute of Design (known colloquially as the d.school).

As of February 2016, 607 students from 143 institutions have gone through the UIF training. These students, known as “Fellows,” acquire knowledge of tools, frameworks, program models, and leadership skills to help them develop an entrepreneurial mindset and creative confidence. Fellows apply these skills systematically as they work with students, faculty, and other stakeholders to expand their campuses’ ecosystems for innovation and entrepreneurship. Fellows organize events, secure and develop physical space, contribute to course development, and engage administrators. Many of the Fellows go on to influence the national conversation on I&E by organizing regional events, presenting at

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conferences (including Open and ASEE), and participating in national forums such as the fifth-annual White House Science Fair and first-ever White House Demo Day.

About the Study

The Epicenter evaluation contains three elements to align with the three arms of Epicenter (research, Pathways and UIF). In the fall of 2014, the evaluation team and UIF program team sat down to refine the UIF program logic model. Based on that model, the following evaluation questions emerged:

Objective 1: Equip students with the knowledge and skills to advocate for I&E (Individual)

- F1a. Do UIFs understand the current I&E landscape on their campus?
- F1b. Do UIFs understand and embrace their mission as change agents and influences for Fellow students?
- F1c. UIFs as champions of I&E become future engineering leaders

Objective 1.1 Provide opportunities for engineering students to experience I&E (Peers)

- F1.1a. Do UIFs generate interest in students being engaged in I&E through marketing and communication?
- F1.1b. Do UIFs host events designed to build I&E skills and mindsets?
- F1.1c. Do engineering students on UIF's campuses understand the importance of I&E in the educational experience
- F1.1d. Do engineering students demonstrate the adoption of an entrepreneurial and innovative mindset through engagement in projects and venture activities?
- F1.1e. Do UIF engage students to become champions of I&E?

Objective 2: Support student/Fellows to create sustained change in their schools regarding I&E (exposing faculty, staff and institutional leaders)

- F2.1 Do UIFs demonstrate to faculty and leaders interest for I&E learning opportunities in the curriculum?
- F2.2 Do UIFs influence faculty adoption of I&E into curricular and co-curricular offerings?
- F2.3 Do UIFs catalyze institutional investment in I&E offerings?
- F2.4 Do UIFs attract outside investment, Sponsorship and resources that expand I&E offerings?
- F2.5 Do faculty and leaders from UIF schools participate in Epicenter and other I&E events and use the resources?
- F2.6 Do UIFs teach other UIFs how to plan and execute effective change strategies?
- F2.7 Do UIFs become future engineering leaders?

Objective 3. Create a national movement that is student-driven and supporting of I&E in higher education (national)

- F3.1 Are UIFs invited to attend national convenings?
- F3.2 Are UIFs engaging with strategic resources?
- F3.3 Has Epicenter created a tipping point of I&E inclusion in engineering?
- F3.4 Have strategic resources been aggregated to focus on I&E in engineering alongside Epicenter?
- F3.5 Are there student leaders and voices advocating for I&E at all engineering schools?

In addition to collecting data to answer these outcome-based questions, the evaluation team has also collected data about the *process* of the UIF training to understand what elements of the model affect outcomes. The evaluation of the program typically engages students through three surveys in their first year: one following their online training, one following the Meetup, and a year-end survey. Fellows are subsequently surveyed on an annual basis. These data are used to improve program offerings and to assess the impact of the UIF program on the participants and their campuses.

This report focuses on the findings from the UIF evaluation’s Spring 2016 annual survey.

DATA SOURCES

All participants in the UIF program were sent a link by the program leadership to complete an online survey that asked about their experiences in the program, accomplishments, and perceived value. The evaluation relies on data provided by Fellows, Sponsors, the program’s internal records, and institutional data culled from ASEE, the Carnegie Foundation, and IPEDS. The survey instruments used are discussed below.

Fellow Survey

The spring 2016 annual survey was administered to all current and past participants, comprising nine cohorts, with Cohorts 8 and 9 being those trained in the academic year 2015-16 of participants during the month of April. The survey was comprised of eight modules that were offered to Fellows based on their year in the program. Table 1 provides the information on the modules and population to respond.

Module	Purpose	Population
Background	Collect demographic information about participants	All
EMS	Questions from the Epicenter designed and launched Engineering Major’s Survey to compare UIFs to a national sample of undergraduate engineers for the constructs “innovation self-efficacy” and “Career goals: Innovation work”	All cohorts except C8
Program Experience	To assess the experiences of Cohorts 8 and 9 and any Fellows from prior cohorts who are still undergraduate students.	Undergrads; C8 - C9
LC/multi-Fellows	To assess the value of a leadership circle in making campus based change; to understand the team dynamics of leadership circles.	C6 – C9
Accomplishments	To document the accomplishments of UIFs on their campuses to expand the opportunities for students to engage in I&E through academic and extra and co-curricular activities and to document new resources developed.	C6 – C9
Post-training	To evaluate the online component of the UIF training. Prior cohorts completed this module after training.	C9
Meetup	To evaluate the Meetup component of the UIF training	C8 & C9 that attended the Meetup
Value of program	To capture the perceived value and satisfaction of the UIF program.	All

A total of 246 Fellows responded to the survey, yielding a response rate of 40%. There were 89 unique institutions represented in the student respondent population representing 63% of the institutions that have been involved with the UIF program.

Sponsor Survey

The Spring 2016 Sponsor survey was administered to all Sponsors during the same timeframe as the Fellows’ survey. Sponsors who were identified as being part of a Pathways team were administered the survey through a module as part of the Pathways spring 2016 survey. The survey was designed to capture:

- The perceived value of the UIF program for student development
- The perceived value of the UIF program for engaging students as change agents
- The accomplishments of Fellows and the consequence on the campus
- Satisfaction with the UIF program

There were 90 of Sponsors responding to the survey representing 61 institutions. Sponsors were not asked about any specific Fellow; all Sponsors had at least one Fellow in C1-C9, and many had multiple Fellows and/or Fellows from multiple cohorts.

Institutional Data

Understanding the institutional context is a critical element of the Epicenter evaluation model. It allows for correlations to be drawn between types of institutions and activities and the participants. Table 2 presents the data used to develop institutional profiles:

Table 2: Institutional profile data		
Data Source	Type	Method
IPEDS	Standardized data about the type of institution (i.e. size, degrees offered, urbanicity, cost of attendance etc.)	Download
ASEE profiles	Undergraduate enrollment in engineering degrees; degrees awarded	Download
Fellow survey	Fellows’ self- report of accomplishment to change the I&E ecosystem	Condensed survey responses
Sponsor Survey	Sponsors’ report on the change in the I&E ecosystem	Condensed survey responses
Program data	Document the degree of involvement in Epicenter related activities	Epicenter program records

For each participating institution, a unique set of Institutional-level variables was created through Fellow and Sponsor survey data. Variables were created from the student data by averaging the Fellows’ responses, accepting any “yes” response to establishing space, infrastructure or resource and influence, and including all open-end comments. Accomplishments from Fellows in Cohort 9 who were the first and only Fellow on their campus were excluded from the institutional profiles because these Fellows were only a few weeks out of training and did not have enough time to deeply affect their campuses. Their responses *are* included in the individual-level results.

For the Sponsor perspective, institutional-level variables were created by taking the most “positive” response to accomplishment items; by taking the data from the most knowledgeable Sponsor for Fellow success questions (Sponsor with the most Fellows) or student engagement questions (questions are specific to engineering- Sponsors who are in engineering departments were given preference). In the case when there was no “best” respondent, the most positive responses were accepted for each item. This was done in consultation with the Pathways evaluation team to ensure Sponsor and faculty data were treated consistently.

All data is appended to this report.

ANALYSIS

Results from the surveys were entered into a data visualization software, Tableau. Three sets of data allowed for an exploration of the Fellows’ and Sponsors’ data and information about the institutions. The evaluation team used this software to understand the trends and relationships between data. A link to this data was provided to the UIF and Epicenter leadership teams to facilitate discussion of the findings. Further statistical analysis relied on SPSS.

Interpreting p-value

The level of statistical significance of the paired-samples t-test comparing responses on pre and post questions, as well as the independent t-test comparing independent samples (male vs female, Pathways vs Non pathways, etc.), as well as the sample t-tests comparing UIF EMS scores to the National sample. Color coding is used to indicate the degree to which the difference is significant, as follows:

Meaning	Not significant	Significant	Very significant	Extremely significant
p value range	$p > 0.05$	$0.05 \geq p \geq 0.01$	$0.01 > p \geq 0.001$	$p < 0.001$

Interpreting Effect size

The effect size of the difference, calculated by dividing the difference between the means by the pooled standard deviation. Color coding is used to indicate the level of the effect size as follows:

Meaning	Minimal effect	Small effect	Medium effect	Large effect
Effect size range	$ES < 0.2$	$0.2 \leq ES < 0.4$	$0.4 \leq ES < 0.8$	$ES \geq 0.8$

ABOUT THE UIF RESPONDENTS

Fellows

The UIF program attracts a diverse group of participants. Table 3 provides an overview of the demographics of the Fellows based on survey respondents and/or administrative records:

Table 3: Fellow demographics* 2016 survey responses			n=246	
Cohort	Cohort size n	Survey response n	% of cohort	% of survey response
Cohort 1	19	4	21%	2%
Cohort 2	9	1	11%	0%
Cohort 3	9	3	33%	1%
Cohort 4	21	4	19%	2%
Cohort 5	67	14	21%	6%
Cohort 6	59	14	24%	6%
Cohort 7	122	31	25%	13%
Cohort 8	151	72	48%	29%
Cohort 9 ^{***}	161	103	64%	42%
Gender identity				
Male				68%
Female				32%
Ethnic/Racial identity (Percentages add up to more than 100% as respondents were allowed to check all that apply)				
White				65%
Asian				14%
Hispanic / Latino				8%
African American/African/Black/Caribbean				6%
Native American/Alaska Native & Native Hawaiian or Pacific Islander				2%
Family Socioeconomic				
Low/Low-middle income				26%
Middle income				37%
High-middle/High income				37%
Major				
Engineering & Computer Science				58%
Natural Science & other STEM				13%
Business/Management and Economics				20%
Liberal Arts				2%
Other (Entrepreneurship, Political Science, History)				1%
Academic status				
Undergraduate				83%**
Graduate				17%

* Percentages reflect some rounding error.

** Over 70% of undergraduate respondents were juniors or seniors.

*** When interpreting this report, it is important to recognize the overrepresentation of Cohort 9 (which is the largest cohort and the cohort with the highest response rate).

Sponsors

Sponsors are a diverse group in terms of department and position. Table 4 provides an overview of the Sponsor demographics based on survey and/or administrative records.

Table 4: Sponsor demographics	N	%
Department		
Engineering & Comp. Science	42	52%
Natural Science/other STEM	6	7%
Entrepreneurship & Innovation	17	21%
Business/management and Economics	7	9%
Liberal Arts	5	6%
Other	4	5%
Position		
Professor	37	46%
Director	12	15%
Professor and Director	11	14%
Administrator (Dean, Chair)	8	10%
Professor and Administrator	11	14%
Other	2	2%

* Percentages reflect some rounding error

Nearly 50% of the responses come from institutions involved in the Pathways program, and 42% of Sponsors are personally involved in that program. This could skew results as nearly half of the respondents are from institutions that are already making a significant investment in developing a strategy for improving I&E opportunities on campus.

Institutions

There are 143 unique institutions in the evaluation team's Epicenter database. Fellows responding to the spring 2016 surveys come from 89 unique institutions. Sponsors responding to the spring 2016 survey represent 61 of institutions. Table 5 summarizes the characteristics of these institutions.

Table 5: Institutional Characteristics*	Database n=143	Fellow Survey n=89	Sponsor Survey n=61
Pathways involvement			
Pathways	51	23	23
<i>Pathways '14</i>	12	7	9
<i>Pathways '15</i>	25	13	11
<i>Pathways '16</i>	14	3	3
Non-pathways	92	66	38
Admission Rate (college selectivity)			
0-25%	13	4	1
26-50%	32	17	3
51-75%	64	41	10
76-100%	29	24	9
Public/Private			
Public	81	55	36
Private	62	34	25
Highest Degree Offered			
Associate's degree	1	1	1

Table 5: Institutional Characteristics*	Database n=143	Fellow Survey n=89	Sponsor Survey n=61
Bachelor's degree	6	3	2
Master's degree	10	7	5
Post-master's certificate	4	4	3
Doctor's degree	122	74	50

*Percentages reflect some rounding error

The responding Sponsors and non-responding Sponsors come from institutions with different involvement in the UIF program. Table 6 shows the characteristics of institutions from which responding Sponsors come and those that are not represented in the Sponsor data.

Table 6: Institutions represented in survey data versus those not represented	Institutions with Survey respondents	Institutions w/o survey respondents
Percent who sponsored Fellows in only one cohort	33%	52%
Percent with only one Fellow	11%	31%
Institutions with at least one cohort with multiple Fellows	80%	52%
Percent that have participated in OPEN	75%	61%
Percent in #UIFresh	26%	15%

FINDINGS

Background

Motivation

Fellows join the program for a variety of reasons, but the recent cohorts of Fellows are primarily excited to make change on campus. Fellows, especially those from business majors, are also looking to gain skills and knowledge they can use in their careers. The third most common reason students join the UIF program is to expand their academic and professional networks.

Champions on campus

Sixty-percent of UIFs consider themselves as champions of I&E on campus, which is slightly higher than the 55% reported on the 2015 annual survey. Sponsors agree, with 74% reporting their Fellow is a champion on campus. Nearly 90% of Sponsors consider themselves to be champions of I&E.

Engineering Majors' Survey

Fellows who are engineering majors in their junior or senior year can be compared to a similar set of junior/senior engineering majors that were part of the EMS study (paper forthcoming). The UIF Fellows enter the UIF program with the same sense of innovation self-efficacy (ISE) than the general population and but have career goals that are more focused on innovation (See Table 7).

Table 7: UIFs compared to national sample: ISE and Career Goals				
		UIF Jr. and Sr. Engineering majors	National sample	p-value
Innovation self-efficacy- pre (N=84)	Mean	65.6	64.3	0.414
	SD	14.8	18.7	
Career goals- pre (N=82)	Mean	75.8	63.1	<0.001
	SD	16.1	19.7	

Students who go through the UIF program, i.e., Fellows, develop a stronger innovation self-efficacy. Table 8 shows the ISE scores of UIF participants as compared to a national sample. The students are not statistically different upon entry into the program, but after training and some time on campus implementing their ideas, they have made an enormous leap ($p < 0.001$), demonstrating that it is the program that is responsible for this growth (see Table 8).

Table 8: UIFs compared to national sample - Innovation self-efficacy-				
		C8&9 UIF Jr. and Sr. Engineering majors	National sample	p-value
Pre (N=84)	Mean	65.6	64.3	0.414
	SD	14.8		
Post (N=50)	Mean	80.0		<0.001
	SD	13.9		

Over the course of the program, the students do have a statistically significant increase in their Innovation Self Efficacy. Table 9 shows the ISE score using a true pre-post test for cohorts 8 and 9.

Table 9: ISE Pre/Post C8&9		
N=137	PRE	POST
Mean	67	79.4
SD	15.4	14
p-value	<.001	
Effect Size (Cohen's <i>d</i>)	0.841166	

Though the UIF program does not explicitly prepare students for the workforce, Fellows also show growth in their career goals for innovative work (see Table 10).

Table 10: UIFs compared to national sample - Career Goals				
		C8&9 UIF Jr. and Sr. Engineering majors	National Sample	p-value
Pre (N=82)	Mean	75.8	61.3	<0.001
	SD	16.1		
Post (N=49)	Mean	79.1		<0.001
	SD	14.4		

The Career Goals construct results suggest that the Fellows both start out with a plan to go into innovative work, and then slightly increase their commitment to innovative work over the course of the program. When looking at a comparable sample (junior and senior engineers) we see that the Fellows enter the program with a much higher orientation to innovative work than the national sample (See Table 10). Over the course of the program, the students do have a statistically significant increase in their career goals for innovative work (see Table 11).

Table 11: Career Goals PRE/Post C8&9		
<i>N=133</i>	<i>PRE</i>	<i>POST</i>
Mean	75.9	79.9
SD	16.5	15.1
p-value	0.002	
Effect Size (Cohen's <i>d</i>)	0.256	

Experience in the UIF program

The UIF model of success requires Fellows to develop knowledge and skills, to increase their own commitment to making change on campus, and to influence the students and faculty/administrators on their campuses in an effort to expand I&E offerings. Survey questions around these three items are used to better understand the Fellows’ experience in the program. In the Spring 2015 evaluation we were able to create a “success” construct by using the average response across questions for a fellow; in the 2016 year, however, the variation between Fellows was minimal (most were in a narrow band of success) and thus the construct provided less value for analysis.

Knowledge and skills

Fellows showed gains in their understanding of the current I&E landscape on their campus. Figure 1 shows the change in understanding between starting the program, after the training, and currently. A matched-pair t-test shows that students demonstrate a statistically significant change in knowledge ($p > 0.001$) between the start of the program and the online training, and again between the training and now. We do not, however, see a statistically significant increase for C6 & C7 between spring 2015 and spring 2016. (See Table 12)

Figure 1: Fellow change in **understanding** the current I&E landscape on their campus (N=192)

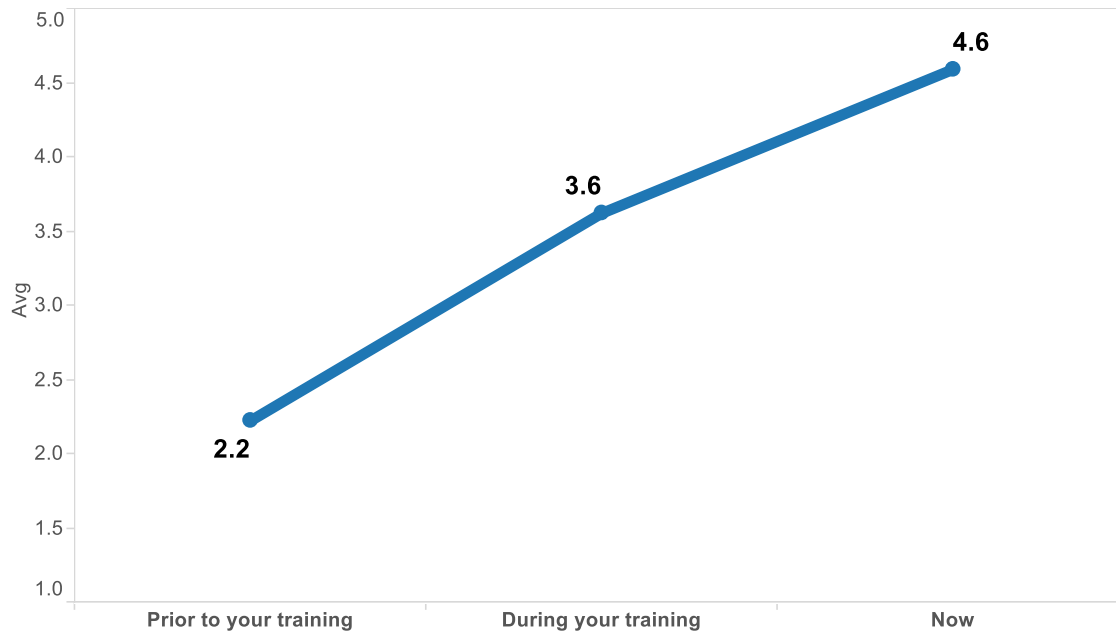


Table 12: Growth in Knowledge and skills					
<i>Likert Scale level of understanding of the landscape on campus: 1= Not at all-5= very well</i>					
Cohort (s)	Number	Time point A	Time point B	Numeric Difference	p-value
C9	99	Prior to training	During training	1.40	<0.001
		During Training	Now	0.89	<0.001
		Prior to training	Now	2.25	<0.001
C8	68	Prior to training	During training	1.31	<0.001
		During Training	Now	1.00	<0.001
		Prior to training	Now	2.31	<0.001
C7*	84	Prior to training	During training	1.48	<0.001
		During Training	Now	0.76	<0.001
		Prior to training	Now	2.26	<0.001
C6*	41	Prior to training	During training	1.34	<0.001
		During Training	Now	0.90	<0.001
		Prior to training	Now	2.24	<0.001
C7& C6	125	Now (2016)	Now (2015)	0.04	0.123

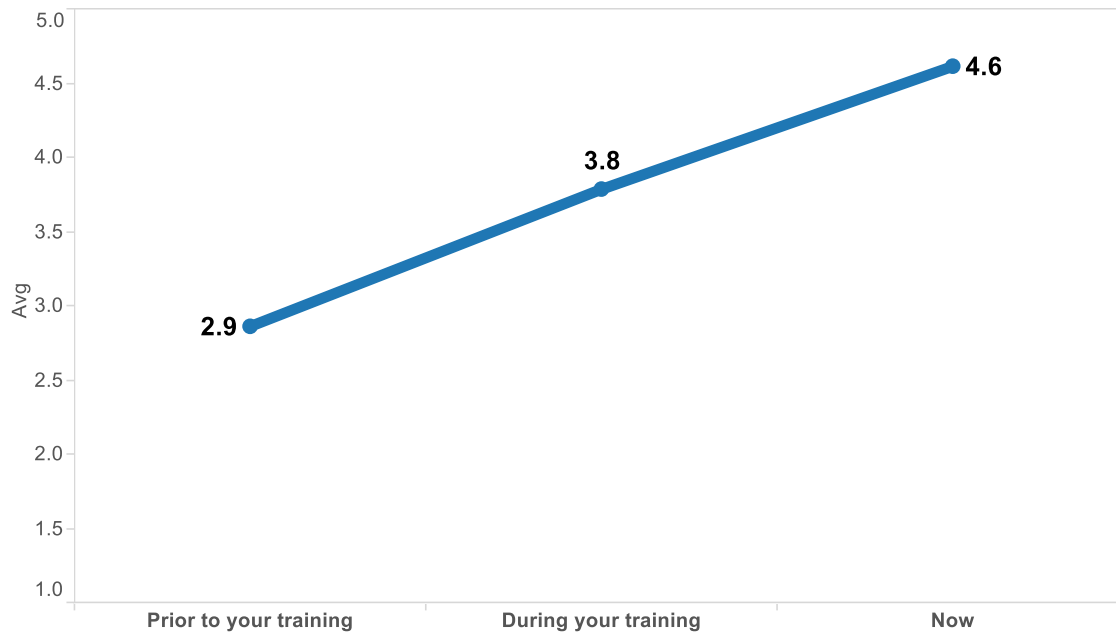
* Data taken from 2015 annual survey

Sponsors corroborate this finding with two thirds agreeing that Fellows understand the current landscape either very well or extremely well.

Commitment

Fellows increased their commitment to serving as change agents on campus through this program. Excitement to make change on campus was the most common reason Fellows decided to join the program (43% listed it as the most important reason and 83% had it as a top-three choice). Though 12% were “very committed” at the start of the program, 63% report being very committed now. Figure 2 shows the change in commitment over the course of the training.

Figure 2: Fellow change in **commitment** to making change on their campus (N=192)



A matched-pair t-test shows that students demonstrate a statistically significant change in commitment ($p > 0.001$) between the start of the program and the online training, and again between the training and now. We do not, however, see a statistically significant increase for C6 & C7 between spring 2015 and spring 2016 (See Table 13).

Table 13: Commitment					
<i>Likert Scale level of commitment to making change on campus: 1= Not at all-5= very committed</i>					
Cohort (s)	N	Time point A	Time point B	Numeric Difference	p-value
C9	99	Prior to training	During training	0.85	<0.001
		During Training	Now	0.92	<0.001
		Prior to training	Now	1.77	<0.001
C8	68	Prior to training	During training	0.88	<0.001
		During Training	Now	0.85	<0.001
		Prior to training	Now	1.74	<0.001
C7*	84	Prior to training	During training	1.14	<0.001
		During Training	Now	0.44	<0.001
		Prior to training	Now	1.57	<0.001
C6*	41	Prior to training	During training	0.95	<0.001
		During Training	Now	0.71	<0.001

Table 13: Commitment					
<i>Likert Scale level of commitment to making change on campus: 1= Not at all-5= very committed</i>					
Cohort (s)	N	Time point A	Time point B	Numeric Difference	p-value
		Prior to training	Now	1.66	<0.001
C7& C6	125	Now (2016)	Now (2015)	0.01	0.584

* Data taken from 2015 annual survey

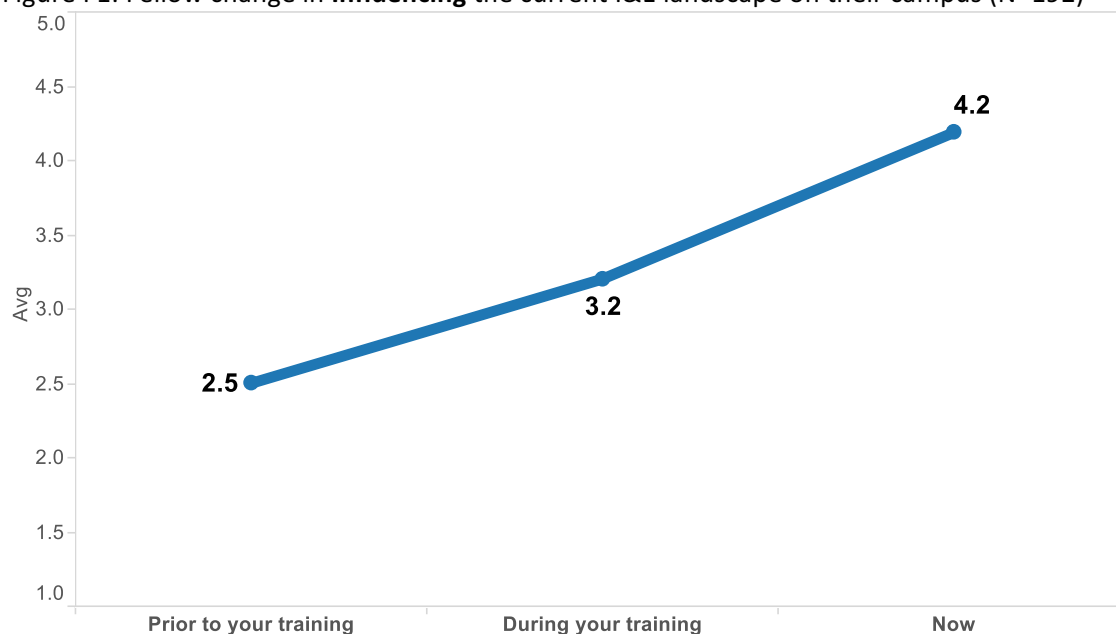
Sponsors corroborate this finding with 76% agreeing that Fellows are either very or extremely committed to making change on campus.

Of note, 86% of Sponsors also self-identify as champions of I&E on their campuses, which is an asset to the students trying to make change.

Influence

Fellows work to engage their peers in I&E. Over the course of the program, Fellows become more influential on other students. Figure 1.1a illustrates this change over time.

Figure F1: Fellow change in **Influencing** the current I&E landscape on their campus (N=192)



A matched-pair t-test shows that students demonstrate a statistically significant change in influence ($p > 0.01$) between the start of the program and the online training, and again between the training and now. We do not, however, see a statistically significant increase for C6 & C7 between spring 2015 and spring 2016 (See Table 14), suggesting that Fellows become and stay influential on campus.

Table 14: Influence					
<i>Likert Scale level of influence on campus: 1= Not at all-5= very influential</i>					
Cohort (s)	N	Time point A	Time point B	Numeric Difference	p-value
C9	99	Prior to training	During training	0.70	<0.001
		During Training	Now	0.98	<0.001
		Prior to training	Now	1.68	<0.001
C8	68	Prior to training	During training	0.59	<0.001
		During Training	Now	0.94	<0.001
		Prior to training	Now	1.53	<0.001
C7*	84	Prior to training	During training	0.86	<0.001
		During Training	Now	0.80	<0.001
		Prior to training	Now	1.67	<0.001
C6*	41	Prior to training	During training	0.85	<0.001
		During Training	Now	1.15	<0.001
		Prior to training	Now	2.00	<0.001
C7& C6	125	Now (2016)	Now (2015)	0.35	.158
* Data taken from 2015 annual survey					

Though Fellows report being influential, just under 50% of Sponsors agree that the Fellow is very or extremely influential on campus. One faculty Sponsor noted that

- UIFs provide valuable insight and traction for many of the I/E initiatives that are used to engage undergraduates. They play a role as a sounding board and collaborators for our I/E goals.

Yet, as the data in Table 13 illustrates, Fellows, in particular C6&7, report not only increasing their level of influence on campus, but also remaining just as influential in the year following their launches.

Time committed

Across cohorts, almost half of the Fellows spend approximately 2-5 hours per week on campus, with another 26% spending 6-8 hours working as a Fellow. Most Fellows report that this is either just the right amount of time or too little, which is consistent with the 2015 data. Nearly 70% of Sponsors agree that the time students spend on UIF was just right.

Leadership Circles, Multiple Fellows and Collaboration- Fellows

Fellows responding to the annual survey are primarily working in partnership with other Fellows. Table 15 shows the percentage of Fellows who are working concurrently, subsequently or precede other Fellows on their campuses.

Table 15: Are / were there other Fellows on your campus? N=234	
Yes, I trained with other Fellows	74%
Yes, there were Fellows on my campus that were trained before me	37%
Yes, there were new Fellows on my campus that trained after me	11%
No	6%

Fellows work together on campus and as part of a national community. The UIF program has a track for “leadership circles” in which up to five Fellows go through training as a group. Additionally, many Fellows work on campuses with Fellows from other cohorts, both prior and subsequent. The Spring 2016 survey included a battery of questions around collaboration with other Fellows on campus (See Table 16). This battery suggests that the Fellows are highly collaborative on a campus, with a sense of mutual respect, a shared commitment, and a clear understanding of their shared goals. Eighty-nine percent of Fellows agreed or strongly agreed that they collaborated with other students on their campus.

Table 16: Fellow collaboration	n=180				
	All	Female	Male	p-value	ES (d)
Fellows on my campus trust one another enough to openly share knowledge, resources, and/or ideas	4.3	4.5	4.3	0.133	0.228
I have a lot of respect for other Fellows on my campus	4.5	4.7	4.4	0.009	0.385
The Fellows on my campus communicate open with one another	4.1	4.3	4.1	0.206	0.195
I have a clear understanding of what our Fellows are trying to accomplish	4.1	4.4	4.0	0.012	0.383
The Fellows on campus are dedicated to the idea that we can create more and better opportunities in I&E for undergraduate students	4.4	4.6	4.4	0.078	0.264
My ideas about what we want to accomplish as a Fellow seem to be the same as the ideas of other Fellows on my campus	4.0	4.2	4.0	0.123	0.243
The Fellows on our campus are able to adapt to campus conditions, such as fewer funds than expected, changing political climate, or change in leadership	4.1	4.2	4.1	0.915	0.017

Table 16 shows that there is some variation between the average rating of men and women who have been trained. In general, the women report higher levels of agreement than men to each of the items, which is common on this type of survey question.

Collaboration- Sponsors

Fellows are “sponsored” by a faculty member or administrator on campus. The program has evolved in how inclusive it is to faculty, which is evident in the survey responses. Nearly 80% of Fellows report that they collaborated with their UIF Sponsor on the initiatives for which they dedicated the most effort. Table 17 presents the findings from all Sponsors concerning their agreement with the level of collaboration they have with the Fellows. When this data is parsed into those that came from Cohort 5 or earlier versus Cohort 6 and later, the Sponsors are in greater agreement, on average, with the degree

of collaboration. This aligns with the program making more of a concerted effort to engage Sponsors in the more recent cohorts.

	C1-C9	C1-C5	C6-C9	p-value	ES (<i>d</i>)
Fellow(s) and I trust one another enough to openly share knowledge, resources, and/or ideas	4.5	4.3	4.7	0.049	0.445
I have a lot of respect for Fellow(s)	4.5	4.4	4.7	0.17	0.310
I am informed as often as I should be about what the Fellow(s) is/are doing	3.6	3.5	3.9	0.115	0.363
Fellows communicate openly with me	4.1	4.0	4.3	0.263	0.261
Fellow communicate well with each other	4.1	4.3	4.0	0.209	-0.307
I have a clear understanding of what the Fellow(s) is/are trying to accomplish	4.0	3.8	4.2	0.034	0.482
I know and understand the Fellow(s)' goals	3.9	3.8	4.2	0.08	0.397
I have a clear sense of the Fellow(s)' roles and responsibilities	3.8	3.7	3.9	0.391	0.197
Fellow(s) is/are able to adapt to campus conditions, such as fewer funds than expected, changing political climate, or change in leadership	3.9	3.8	4.1	0.111	0.371

There is also variation in collaboration when we look at institutions in which there is only one Fellow, versus those where there are multiple Fellows. In particular, 53% of Sponsors strongly agree that their Fellow can easily adapt to campus conditions when there is a single Fellow, while only 32% strongly agree when there are multiple Fellows on campus.

Overall, Sponsors who are also Pathways members are less favorable around collaboration than those not in Pathways (Table 18). Further exploration is needed to understand this difference, but it is possible that Pathways members are more involved with the campus I&E environment, and thus more informed about the needs and opportunities on campus, and may therefore have higher standards for their Fellows.

	Overall n=81	Pathways n=45	Non- Pathways n=36	p-value	Effect Size (Cohen's <i>d</i>)
Fellow(s) and I trust one another enough to openly share knowledge, resources, and/or ideas	4.5	4.3	4.6	0.080	-0.392
I have a lot of respect for Fellow(s)	4.5	4.4	4.6	0.289	-0.233
I am informed as often as I should be about what the Fellow(s) is/are doing	4.5	3.5	3.8	0.385	-0.196

	Overall n=81	Pathways n=45	Non- Pathways n=36	p-value	Effect Size (Cohen's d)
Fellows communicate openly with me	3.6	3.9	4.4	0.015	-0.548
Fellows communicate well with each other	4.1	4.0	4.4	0.057	-0.442
I have a clear understanding of what the Fellow(s) is/are trying to accomplish	4.1	3.8	4.1	0.185	-0.301
I know and understand the Fellow(s)' goals	4.0	3.8	4.1	0.222	-0.279
I have a clear sense of the Fellow(s)' roles and responsibilities	3.9	3.6	3.9	0.298	-0.238
Fellow(s) is/are able to adapt to campus conditions, such as fewer funds than expected, changing political climate, or change in leadership	3.8	3.9	4.0	0.557	-0.137

For many of the institutions in which there is a Pathways program, the Fellows have been a key asset to the work being done by the Pathways team. Sponsors from Pathways teams noted that:

- Their energy and passion for I&E gives us courage to take on the hard work of make change happen on campus.
- Created the foundation for pathways...showed the value of the program
- They provide student perspectives of what is helpful and not helpful as we pursue our Pathways initiatives.
- They were able to get our first maker space open and have started pop in classes there

Accomplishments

Once Fellows are prepared to become change agents on campus, it is expected that they will work to provide opportunities for their peers to experience I&E. Most Fellows initially work to provide extracurricular events such as TEDx lectures and workshops to expose their peers to I&E and design thinking. Over time, Fellows are able to engage their peers through hackathons or competitions and may even galvanize the institutional support to create dedicated I&E space.

Fellows can have a profound impact on the landscape of their campus. Table 19 shows that as a result of the UIF program, the following types of events have occurred at least once per institution:

Event	Number of institutions n=74	
	Complete	In progress
TEDx	35	20
Lecture	41	19
Hackathon	37	27
Challenge	48	20
Info session	43	22

Table 19: Extracurricular events		
Event	Number of institutions n=74	
	Complete	In progress
Celebration/recognition ceremony	30	17
Showcase	35	21

Fellows shared some of their accomplishments in creating and hosting events saying that they were proud of:

- Getting a TEDx license and being lead planner for the event
- Another Fellow and I put on a design competition, and though the scale of the competition was not that grand, the people that participated definitely found great value in the experience. Additionally, we were able to have a team of non-engineers participate, which I am very excited about, as one of my goals as a Fellow is to lower the barrier to innovation.
- I ran two hackathons in two months and gave away over \$8,000.
- Facilitating the discovery and brainstorming at the Hack-a-Thon. People excitedly telling me they had never used their brain this way before.

In addition to events, the Fellows also run extracurricular programs to provide opportunities to engage in I&E. Table 20 shows the number of institutions that have had each type of program.

Table 20: Extracurricular programs		
Program	Number of institutions n=74	
	Complete	In progress
Club	55	12
Competition	55	17
Challenge	45	24
Living-learning communities	26	24
Coop/Internship	31	18
Mentoring program	27	25

Students described some of the extracurricular programming they created as follows:

- For now, it has been the innovation competition. [Company] donated \$70K for establishing the student council of the presidents of the engineering/academic based clubs on campus
- I am very proud of the fact that we started an innovation club and hosted a hackathon/innovation day in just one semester.
- So far I've started a student entrepreneur club on campus and gotten a lot of students excited about the idea of being a part of something like this.

Students in the UIF program go beyond engaging students through organizing events and programs to make a sustainable impact on the institutions landscape. This requires working with faculty, staff, and administrators to secure commitments and investment in I&E offerings. Table 21 provides an overview of the percent of UIFs who self-report being “very successful” as compared to the percent of Sponsor agreeing their Fellows were “very successful” in working with the institution.

Table 21 Working with the institution		
% agreeing Fellows were “very successful”		
	Fellows	Sponsors
Demonstrating to faculty and leaders the interest/need among students for I&E learning opportunities in the curriculum	37%	30%
Influencing faculty to adopt I&E into curricular and/or co-curricular offerings	23%	8%

Another 53% of faculty agree students were “successful” in demonstrating the need and 46% said students were successful in influencing faculty to adopt I&E into the curricular and co-curricular offerings.

Among the Fellows that described their proudest achievements as working with faculty for strategic planning, several reported:

- Having a successful stakeholder meeting which resulted in many influential faculty being on board with our ideas.
- The fact that we were able to get all of our stakeholders in one room, some of the most influential people on campus, and get them excited about bringing innovation and an entrepreneurial mindset to our campus.

Fellows report that they were able to influence the academic offerings on campus. Tables 23 shows the accomplishments Fellows and Sponsors report on each campus as a result of involvement in the Epicenter program.

Table 23: Academic Accomplishments:	Fellow Report		Sponsor Report	
	Number of institutions n=74		Number of institutions n=65-72	
	Complete	In progress	Complete	In Progress
Certificate/degree	40	13	20	12
Course	33	23	25	17
Curriculum redesign- Courses only	19	37	16	24
Curriculum redesign- Program	17	35	6	18
Non-credit offering	43	29	31	18
Faculty development	17	34	18	16

Fellows from five of the 12 schools which joined the program as part of Cohort 9 reported that they established a certificate or degree, with four saying they completed a course or curriculum redesign. Though it seems highly unlikely that within a month of their training the students were able to successfully complete these tasks, there is corroboration at three of these institutions from the Sponsor survey data.

Comments from Fellows who have created academic resources include:

- Successfully developed plan to integrate students from business school and entrepreneurship minor into the biomedical engineering students' Junior and Senior Design courses to build interdisciplinary teams that can create businesses around their technologies. The department

of engineering has approved this proposal and has funded the development of the new course syllabus. The new version of the course should launch in Fall 2017.

- This coming fall we will be able to offering Engineering 101 as a general education course that any student can take. This course will include a design project for teams comprised of students representing the different colleges on campus.
- Helping plan pop up classes for our entrepreneurship organization.

Fellows help catalyze institutional investment in I&E offerings. Twenty-seven percent of Fellows report that they were “very successful in catalyzing institutional investment in I&E offerings. Nineteen percent of Sponsors report Fellows were “very successful” at catalyzing institutional investment.

Fellows also create dedicated positions on campus and secure dedicated spaces for I&E-related activities. Table 24 shows the number of institutions that report having completed the securing of institutional investment, as reported by Fellows and Sponsors.

Table 24: Institutional Investment		
	# of Institutions n= ##	
	Complete	In Progress/Concrete plans for future
Investment from within institution	38	28
Paid Position		
Faculty	34	11
Student	35	21
Staff	34	16
Space		
Ideation/brainstorming/lo-tech prototyping	43	28
Makerspace /Innovation space	33	36
Incubator /accelerator	34	21
New building/center	27	26

Several Fellows described their proudest accomplishments as creating spaces:

- Opening the first Makerspace at [Institution] and then having it be student run and managed while providing free and open access to tools and tech for all students.
- Submitted a grant proposal and received \$30,000 for supplies in our future maker space.

Fellows also help secure outside investment in I&E offerings. Fellows from 34 institutions secured outside investment. Sponsors from 23 institutions report that as a consequence of Epicenter there has been outside investment in I&E.

Building awareness of and support for I&E on campus is an important part of the UIF program. Of the 74 UIF institutions represented in survey responses, 44 report engaging leadership in strategic planning.

Sponsor comments include:

- The students are making curricular advancements that I could not achieve alone.
- The message is stronger when it comes from students (in this case the Fellows) than from staff and faculty. More administration interest and participation!

Many of the Fellows work on campus to focus and amplify the student voice. Sponsors have noticed that:

- Students have been much more able to break down doors and barriers on campus. Their ideas are innovative and novel and fresh and faculty tend to listen to them more readily than other faculty members
- UIFs provide valuable insight and traction for many of the I/E initiatives that are used to engage undergraduates. They play a role as a sounding board and collaborators for our I/E goals.
- Student-led activities get visibility and create energy in ways that curricular changes never will.
- The Fellows have been instrumental in building enthusiasm and momentum in efforts to change our I&E culture from the student base.

Online Training

The Spring 2016 survey asked Cohort 9 Fellows for feedback on the online training. The training continues to be highly rated. Fellows found *Session 2: Landscape Canvas* to be the most valuable, with *Session 5: Leadership* and *Session 1: Design Thinking* to be close second and third valuable respectively. The lowest ranked session was the orientation.

Most (43%) of the Fellows spent between 2-5 hours per week on training with another 31% spending 6-8 hours per week on training. Nearly 20% spent 9-14 hours per week on UIF training. Overall most Fellows (58%) felt the time was just right, but another 32% felt it was too much time. Fellows overwhelmingly agree that the training was worth their time.

Fellows were asked what changes they would make for a future online training. Though Fellows were overwhelmingly positive overall, they did offer requests for clearer expectations; more time for collaboration both as campus-based teams and other Fellows- current and alumni; ensuring relevancy of all sessions and; better differentiate the training for those who have had more experience with design thinking/I&E. Sample comments include:

- The expectations of the online assignments need to be clarified. There were different requirements noted at times and I was not completely sure what was needed.
- Some of the directions were contradictory of each other and it seemed like some parts were disorganized. For example, the directions online were different depending on where you looked.
- I would give more of an upfront outline so those going through the training have clear expectations of what each section will entail, so people can start preparing and working on future sessions as they have time, instead of having a week or less between finding out the assignment and having to get it done. At least then, if you procrastinate and are crunched for time, it's your own fault! That was probably my biggest frustration going through the training - not knowing what was coming down the line and whether I would have enough time to do it that week along with my coursework.
- More projects/sessions that encourage the Fellows to work together such as design thinking workshop around a single campus' problems. Sometimes the session format made it hard to really get to know what problems a campus is having and not enough time to really address how to solve them. Presenting a large list of problems from various campuses only allowed for very basic suggestions on how to tackle them.

- One of the sessions should include a mandatory session with the previous cohort from your university, this can help the new cohort leverage from their knowledge.
- I didn't see how the training sessions were important or relevant, so I was less inclined to take them seriously. I think there needs to be some more explanation of how the training is applicable.
- As a new member it was a great introduction program. There should be another advanced level where students can further their work
- Making videos might not be the best way to pitch a project. Why don't we leave some "space for interpretation" in order to use the Fellow's creativity to do the final project pitch?

For the Fellows who followed prior Fellows on campus, they had suggestion to work to consolidate the landscape canvases, and provide more opportunity to collaborate with alumni.

Meetup

The in-person Meetup in Silicon Valley is for many the highlight of the UIF program. For many this is where the elements of the online training come together. The Fellows meet other students with a similar passion and commitment and many report this is when they feel part of a national community. They develop the relationships they subsequently draw upon as they make change on their own campuses.

The participants of the 2016 Meetup were highly complementary of the event. The Fellows were in strong agreement that:

- The Meetup reinforced in me sense of belonging to a national student-driven movement supporting innovation and entrepreneurship in higher education
- The Meetup provided me with valuable networking opportunities with other students
- I will apply what I learned during the event to my work as a Fellow
- During the event I experienced meaningful interactions with other Fellows

Networking is one of the most important aspects of the Meetup. Of the 135 Fellows that took the survey, 73% report that at the time of the survey, they were actively exchanging ideas with other Fellows.

Fellows leave the Meetup inspired. When asked what they will implement as a result of the Meetup, the most common responses were:

- Non-credit workshop, seminar or pop-up course (43%)
- Ideation/Brainstorming/Low-resolution prototyping space (39%)
- Makerspace/innovation space with high-tech tools and machines (35%)

These plans represent a slight shift from the more typical lecture or other event that we've seen Fellows commonly implement in the past.

Fellows who attended the Meetup were asked how they might redesign future Meetups. The comments included creating a schedule that is slightly less strenuous and includes more "informal" time. Fellows also suggested more time to collaborate and network. Fellows also had some specific suggestions such as:

- I would suggest having more professional female speakers. Overall everything was phenomenal.
- The Meetup activities were great but geared towards undergraduates and career development. It took a long time to find and network with other graduate students. It would be good to have an activity that focuses on graduate student-faculty-undergraduate interactions since graduate students can empathize with both undergrads and faculty.
- As UIF grows in numbers, can we have a conference for alumni, current Fellows, etc.
- I also wished we had a little bit of structured time for brainstorming and reflecting with our LCs while new concepts and ideas were fresh. Not that it didn't happen spontaneously some.
- More dancing!

#UIFresh

The #UIFresh initiative was launched by Epicenter’s University Innovation Fellows in March 2015 as part of a White House collection of initiatives during the fifth-annual White House Science Fair. Leaders and Fellows from 10 schools committed to exposing incoming students at their schools to entrepreneurship, design thinking, creativity and innovation as part of freshmen orientation. Fellows work to gain the commitment of their institution’s president and/or provost to offer I&E to all freshmen, as part of orientation or a course. To date, 30 schools have made a commitment to this effort. The freshman classes at these schools total approximately 90,000 students.

Value of Program

The program has consequence to the institutions, which is enhanced when there are multiple Fellows operating on an campus:

- Fifty-eight percent of Sponsors from campuses with multiple Fellows strongly agree the institution will benefit from involvement.
- 43% with single Fellows strongly agree, which suggests that a multi-Fellow model (concurrent or sequential) is of greater value to the schools.
- 73% of Fellows strongly agree the institution will benefit.
 - 100% from those with multiple Fellows
 - 50% from those with a single Fellow suggesting that it is easier to make meaningful change for Fellows who are not undertaking a change endeavor on their own.

Fellows overwhelmingly agree that as a result of the UIF program, they feel part of a national community of Fellows. Almost all (98%) would recommend the UIF program to a peer, an exceptionally strong endorsement for the program.

CONCLUSION

The UIF program has had remarkable fidelity to the plan set forth in 2013 and the effort has proven is a powerful mechanism for making change on a campus. The project has been effective at developing the individual participants, supporting Fellows in expanding I& E at the institutions and the national landscape.

Individually, student participants show an increase in their knowledge, skills, commitment and degree of influence on a campus. Students devote a substantial amount of time to their training and subsequent work on campus. As members of the social learning community the Fellows develop their abilities to work with campus administrators and faculty and to galvanize student participation on campus.

The efforts of the Fellows have led to significant changes on campuses. Most campuses have benefited from events and programs that engage students, faculty and administrators in I&E activity. Campuses have developed innovation spaces, from low-tech prototyping carts to new centers and buildings. Fellows are being recognized as campus change agents by faculty and administrators. Fellows are also recognized through media and press coverage.

The national community of Fellows has been an important resource for the Fellows in their work to serve as change agents. They often turn to the network through social media to get advice and ideas when undertaking projects. The national network also gives a substantive student voice in the I&E change community. Fellows participate in national events, such as White House science fairs, ASEE and OPEN.

Moving Forward

The UIF program underwent a substantial iteration for the fourth and fifth cohorts, when the training became an on-line/in person hybrid model. This new model was tested and seemed to be met with success as Fellows reported satisfaction with the training and were effective at making change on their campuses. In year 4, the program turned to thinking through how to scale, and was able to recruit and train 151 Fellows. Year five doubled that number again to over 300. The program made a concerted effort to plan for the future, and have been successful to that effect with a new home in the d.school.

Moving forward, the UIF program may want to consider the following:

Recruitment: The UIF program has had a challenging time diversifying the participant pool. The data shows that the Fellows typically come from families that are middle to upper class. The evaluation team has found in other programs that students are often limited by work obligations from participating fully in extracurricular and co-curricular activities such as research experiences. If the program can find a way to pay for participation, essentially “buying” the students’ time, they may be able to diversify the Fellows’ cohort and include students that might otherwise not have the opportunity.

Training: As more campuses sustain engagement through sponsorship of consecutive Fellows, the program may want to consider a multi-track model. There are likely topical areas in which all Fellows need to be trained, however some activities such as the landscape canvas may benefit from a track for novice Fellows and a more advanced or tailored track for those that are coming from campuses with a history of UIF activity, and/or those Fellows who report having been active partners of the Fellows that preceded them. The program may want to consider what topics could be tracked into different tiers and what the defining characteristics might be.

Cohort size: The training has been effective over the course of the Epicenter program, yet there remains a question as to how large a cohort can be without diluting the UIF brand. In the earlier years of the program, the Fellows received highly individualized support. As the program expanded, the leadership team remained highly accessible, however the number of Fellows precluded the universal level of support and accountability that was previously enjoyed. There are likely Fellows from the larger cohorts who did not fully engage once the training was over, but it is unknown who or how many of these Fellows there are. There is probably an ideal cohort size in which Fellows are tracked and supported with minimal numbers of students who drop out, leaving the UIF brand strong. Should too many Fellows

take on minimal responsibility, it could be a problem. One protective factor is the rigorous application process, in which Fellows demonstrate their commitment to the effort.

Engaging Faculty: The training has been overall well received and effective, as demonstrated by the changes being made on campus, however, meaningful engagement of faculty has been a struggle. Though the leadership team has tried several mechanisms, including inviting faculty sponsors to orientation, the annual Meetup and most recently, will be offering an intensive workshop for faculty. The number of faculty involved in the UIF program has grown. Developing a minimal viable communication product would behoove the program for ensuring sustained faculty support. Faculty sponsors are often the “repeat customers” of the program as they sent consecutive Fellows through training. Importantly, they are also resources for the Fellows undertaking small to ambitious projects on campus.

National Presence: The UIF program benefited from being part of Epicenter in that it had visibility among faculty and other leaders who are at the forefront of the I&E educational movement. It is through these networks (particularly OPEN) that the Fellow program gained notoriety, and Faculty support for the program was significantly gained. Fellows are part of a change process that is bigger than UIF, though it may not be felt explicitly. Students are a part of a larger ecosystem of change and finding ways to stay connected and integrated to the national efforts to expand I&E education will have a positive effect on recruitment, training and Fellows’ unique efforts. It will also ensure that the student voice remains a strong, vibrant part of the change efforts.