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Connections Impact on Student Persistence: Impact Report Spring 2015 to Fall 2018

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Connections Impact on Student Persistence

IMPACT Report Spring 2015 to Fall 2018

Powered by Academic and Instructional Services

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UtahStateUniversity

Does participating in Connections influence student persistence to the next term?

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SUMMARY STATISTICS HEADLINE

Overall Change in Persistence:	1.39% (0.02% - 2.76%)
Overall Change in Students (per year):	12 (1 - 24)
Analysis Terms:	Sp15, Fa15, Sp16, Fa16, Sp17, Fa17, Sp18, Fa18
Students Available for Analysis:	8,097 Students
Percent of Students Participating:	57.05%
Students Matched for Analysis:	3,582 Students
Percent of Students Matched for Analysis	44%

PERSISTENCE & THE CONNECTIONS EXPERIENCE

Connections is Utah State University's (USU) first-year seminary. A primary objective of Connections is student persistence. It is designed to help students become learners. While being a learner is not synonymous with being a college student, it aligns students' expectations with what is required to succeed in college and at USU. This impact report explores the influence of Connections participation on student persistence to the next term. Participation in Connections is associated with a 1.4% increase in persistence to the next term. The positive impact of Connections is increasing with strategic programmatic changes.

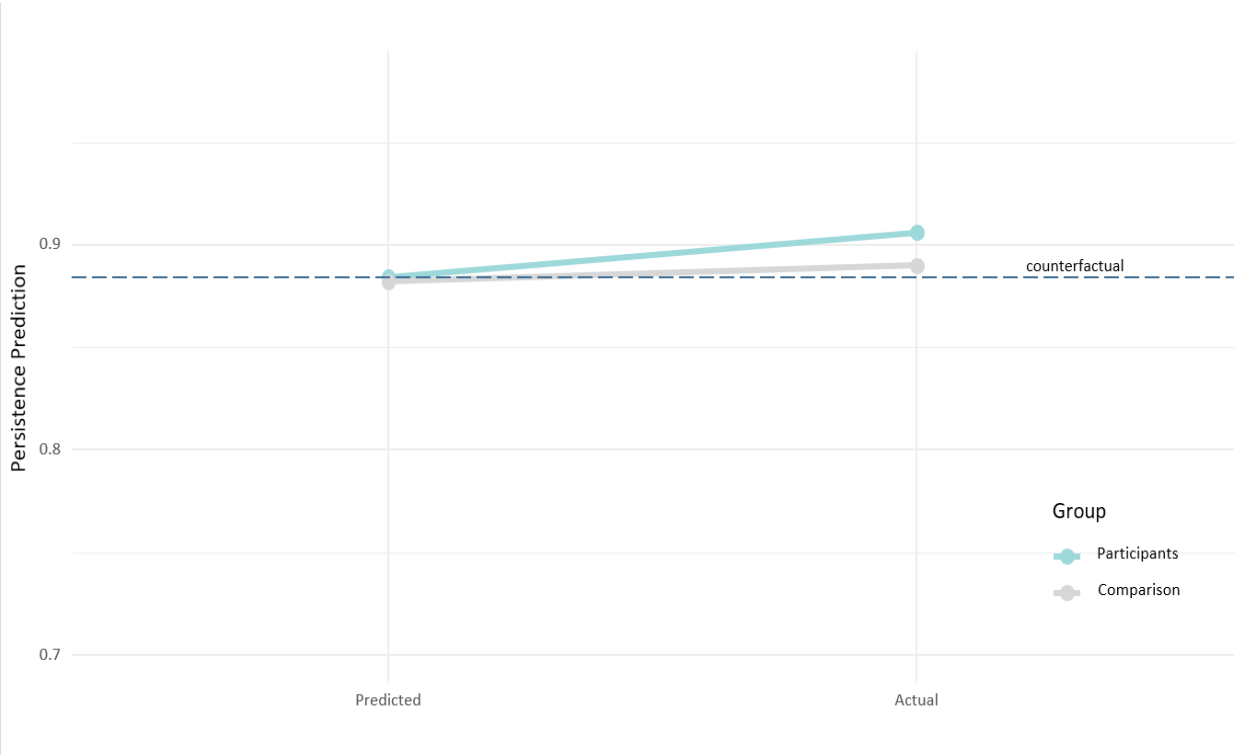


FIGURE 1

Participant and comparison students begin with highly similar persistence predictions. Actual persistence is significantly different between groups.

Connections Results

STUDENT IMPACT

Students who participate in Connections experience a significant increase in persistence. The estimated increase in persistence is equivalent to retaining 12 (CI: 1 – 24) students each year who were otherwise not expected to persist. This represents an estimated $105,486.20 ($8,790.52 - $210,972.50) in retained tuition per year, assuming an average tuition of $8,790.52.

PARTICIPANT DEMOGRAPHICS

Matching procedures for this analysis resulted in the inclusion of 44% of available participants. Students were 50.6% male, 92.3% Euro-American, and 100% first-time college students. Students are 100% undergraduate.

PARTICIPANT

The sample was limited to Logan campus incoming freshmen students. Non-degree seeking students were excluded from the analysis. Participating students were enrolled in Connections, USU1010. Possible comparison students did not take Connections.

DIFFERENCES BETWEEN PARTICIPANTS AND GENERAL USU POPULATION

Compared to the USU general population, there are significantly more female students taking Connections than male students (Chi2 = 6.45, p = 0.01, residual = 2.55).

Compared to the USU general population, Connections was racially and ethnically representative of the USU general population.

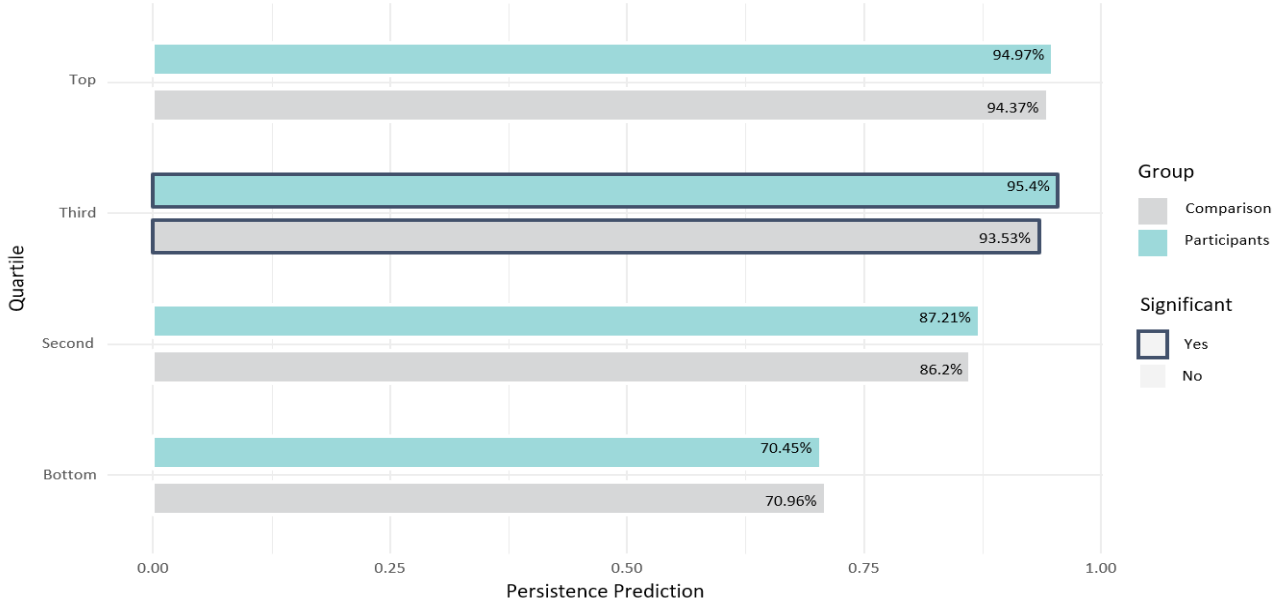
Impact by Persistence Quartile

STUDENT PERSISTENCE

Illume Impact utilizes historical data to predict student persistence to the next term. Attending Connections significantly influences students in the third persistence quartile. Students in the thrid persistence quartile are considered to be at a lower risk of not peristing. They are also considered to be “students with options”, meaning that in addition to USU, these students could be accepted to other universities.

For example, the main predictor of success for all Logan campus freshmen are associated with engagement and progress, but for third persistence quartile students, the biggest predictors include, standardized tests, merit based scholarships, and demographics. This group of students have options for their college experience.

FIGURE 2
Actual persistence by predicted persistence quartile for participanting and comparison students



IMPACT BY TERM

The impact of participating in Connections varied by term. Most students attend Connections prior to fall semester. The sample taking Connections during spring semesters was much small, because of the small sample, the results are highly variable and likely inaccurate.

Considering only fall semesters, the largest lift was in Fall 2017, and the other fall semesters had similar impacts. None of the semesters were found to be significant on their own.

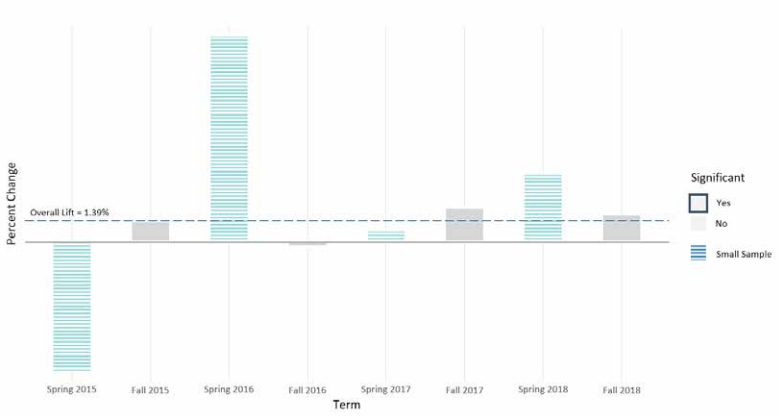


FIGURE 3
Change in persistence by term. Only fall semesters are shown because the majority of Passport activitiies happen during fall semester.

Student Subgroup Impact

TABLE 1:

Student SubgroupsExperiencing a Significant Change From Participating

N	Student Group	Participant Persistence	Comparison Persistence	Difference	CI	Lift in People
3,582	Overall	90.61%	89.00%	1.39%	1.37%	50
3,582	Academic Level: Undergraduate	90.61%	89.00%	1.39%	1.37%	50
3,579	Undergraduate Type: First Time in College	90.62%	89.00%	1.41%	1.37%	50
3,542	Ethnicity: Not Hispanic or Latino	90.62%	89.01%	1.39%	1.38%	49
3,386	Full-time vs. Part-time: Full-time	91.93%	90.03%	1.64%	1.35%	56
3,277	Race: White or Caucasian	90.73%	89.09%	1.44%	1.43%	47
1,631	Prediction Percentile: Third Quartile	95.40%	93.53%	1.73%	1.61%	28
379	Course Modality: Mixed or Blended	95.02%	89.10%	5.53%	3.80%	21

*Subgroups with fewer than 250 students are considered too small for reliable analysis

Student Subgroup Findings

MOST IMPACTED

Illume Impact provides an analysis that looks at various student groups to identify how the program influenced different populations of students. Please note that the student groups are not mutually exclusive. Table 1 shows all student groups who experienced a significant change from participating in Connections. Appendix A lists all subgroups with non-significant findings.

Impact by Time Status: Participating in Connections improves student persistence for full-time students. This increase is estimated to maintain 6 students each semester who were otherwise not expected to persist. The change was not significant for students who are part-time.

Impact by Course Modality: Participating in Connections improves student persistence for students who have mixed modality, meaning on-ground and online or broadcast courses. This increase is estimated to maintain 2 students each semester who were otherwise not expected to persist.

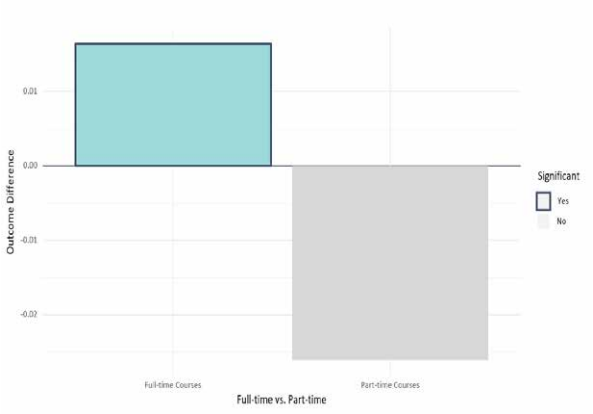


FIGURE 4

Change in student persistence by student time status.

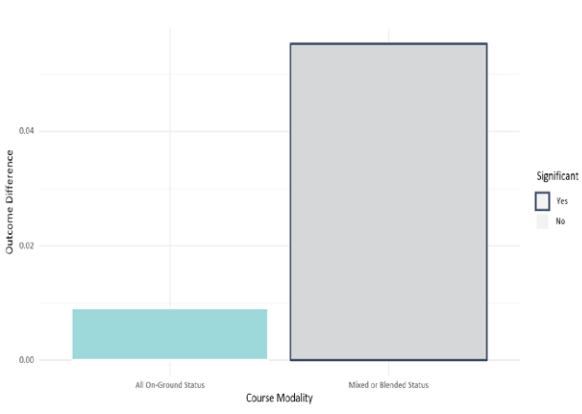


FIGURE 5

Change in student persistence by Course modality.

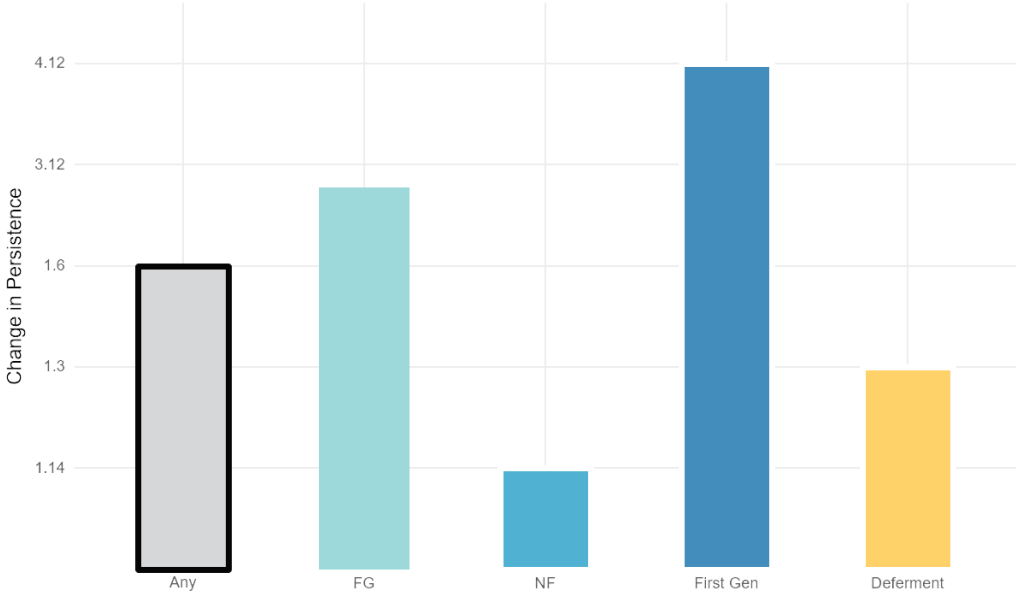


FIGURE 6
Change in persistence across multiple analyses.

Additional Analyses

OVERALL ANALYSIS

This analysis has focused on all newly admited freshmen who took Connections. Given that the Connections population is composed of multiple types of students, additional analyses were conducted to see the impact on the following groups of students:

- Freshmen Graduates (1+ year since high school; FG)
- New Freshmen (just graduated from high school; NF)
- First Generation Students
- Students Returning from Deferment

These analyses did not yeild significant results. All subgroups lean towards an increasein persistence from attending connections.

IMPACT OF CONNECTIONS ON PERSISTENCE TO THE FOLLOWING FALL

Connections efforts are consentrated in the fall semester, with only a few students taking Connections during the spring. However, it is expected that the impact of Connections should endure through the first year of college. To test this idea, an impact analysis was conducted duplicating fall participation to the spring sememster. In other words, students who took Connections in the fall were counted at "participants" in the analysis for both fall and spring of that academic year.

THIS ANALYSIS WAS had a non-significant 0.3% (CI: -0.8% to 1.4%) lift on persistence. Within the analysis Connections maintained a significant impact on students in the 3rd persistence profile.

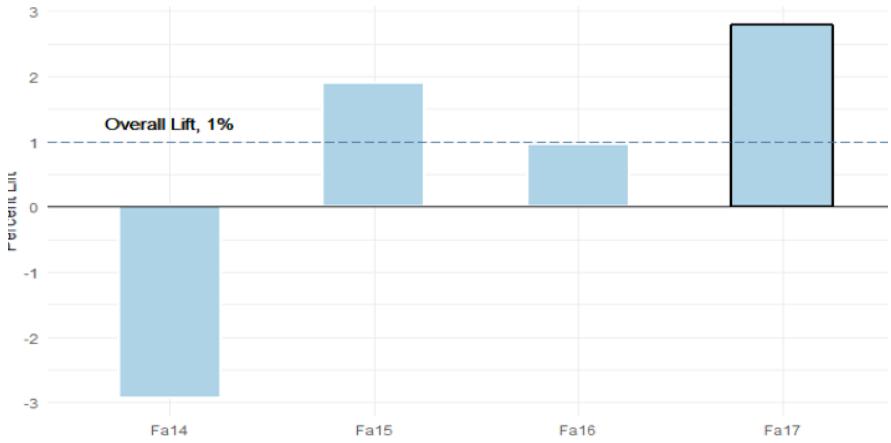
INSIGHTS FROM THE ANALYSIS OF CONNECTIONS ON PERSISTENCE TO THE FOLLOWING FALL

Connections maintained a significant impact on students in the 3rd persistence profile. These students are considered students with options. They are making progress through their academic program, they maintain good grades, and participate in their courses. Connections is showing a significant ability to keep these students at USU.

Interesting Fact

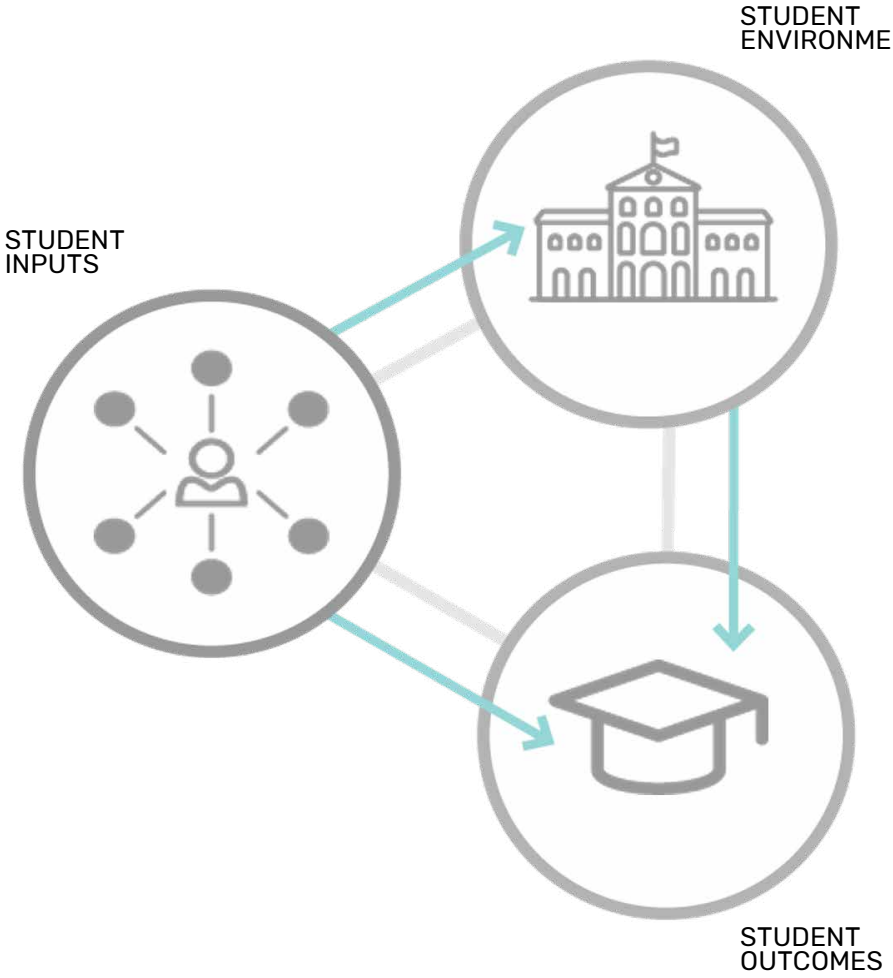
COMPARING 2018 AND 2019 TERM GRAPHS

IN 2018, CONNECTIONS took part in one of the University's first impact analyses. Comparing the results from 2018 and 2019 indicate that Connections is improving in its ability to make an impact. And, comparing the term graphs highlights the stability of the Impact Analysis. Conside Figure 7, the term graph from the 2018 evaluation, along with Figure 3, the term graph from the 2019 evaluation. Figure 7 only includes fall semesters, but the direction and magnitude of the change in persistence is very similar.



Appendix A

THEORETICAL FOUNDATION FOR IMPACT ANALYSES: INPUT, ENVIRONMENT, OUTPUT MODEL (ASTIN, 1993)



Input – Environment – Outcomes

Student success is composed of both personal inputs and environments to which individuals are exposed (Astin, 1993). Impact analysis controls for student input though participant matching on their (1) likelihood to be involved in an environment and (2) their predicted persistence score. By controlling for student inputs, impact analyses can more accurately measure the influence of specific student environments on student persistence.

STUDENT INPUTS

Students bring different combinations of strengths to their university experience. Their inputs influence student life and success, but do not determine it.

STUDENT ENVIRONMENTS

The University provides a diverse array of curricular, co-curricular, and extra-curricular activities to enhance the student experience. Students selectively participate to varying degrees in activities. Student environments influence student life and success, but do not determine it.

STUDENT OUTCOMES

While student success can be defined in multiple ways, a good indicator of student success is persistence to the next term. It means that students are continuing on a path towards graduation. Persistence is influenced by student inputs and university environments.

IMPACT ANALYSIS

An impact analysis can effectively measure the influence of university initiatives on student persistence by accounting for student inputs through matching participants with similar students who chose not to participate.

Appendix B

ANALYTIC DETAILS: ESTIMATING PROGRAMMATIC IMPACT THROUGH PREDICTION-BASED PROPENSITY SCORE MATCHING (PPSM)

Impact analyses are quasi-experiments that compare students who participate in university initiatives to similar students who do not. Students who participate are called participants, students who do not have a record of participation are called comparison students. The analysis results in an estimation of the effect of the treatment on the treated (ETT). In other words, it estimates the effect of participating in university initiatives on student persistence for students who participated. This estimation is appropriate for observational studies with voluntary participation (Geneletti & Dawid, 2009).

Accounting for bias. While ETT is appropriate for observational studies with voluntary participation, voluntary participation adds bias. Specifically, voluntary participation results in self-selection bias, which refers to the fact that participants and comparison students may be innately different. For example, students who self-select into math tutoring (or intramurals or the Harry Potter Club) may be quantitatively and qualitatively different than students who do not use math tutoring (or intremurals or the Harry Potter Club). To account for these differences, reduce the effect of self-selection bias, and increase validity a matching technique called Prediction-Based Propensity Score Matching (PPSM) is used.

In PPSM, matching is achieved by pairing participating students with non-participating students who are similar in both their (a) predicted persistence and (b) their propensity to participate in an iterative, boot-strapped analysis (Milliron, Kil, Malcolm, & Gee, 2017).

(A) Predicted Persistence. Utah State University utilizes student data to create a persistence prediction for each student. The main benefit to students of the predictive system is that it can be an early alert system; it identifies students in need of additional resources to support their success at USU. A secondary use of the predicted persistence scores is to evaluate the impact on student-facing programs on student success. This is an invaluable practice that fosters accountability, efficiency, and innovation for the benefit of students.

The predicted persistence scores are derived through a regularized ridge regression. This technique allows for the incorporation of numerous student data points, including:

- academic performance
- degree progress metrics
- socioeconomic status
- student engagement

The ridge regression rank orders the numerous covariates by their predictive power. This equation is then used to predict student persistence scores for students at USU. This score is utilized as one point for matching in PPSM.

(B) Propensity to Participate. The second point used for matching in PPSM is a propensity score. Propensity scores reflect a students likelihood to participate in an initiative (Rosenbaum & Rubin, 1983). It is derived through logistic ridge regression that utilizes participation status as the outcome variable. Using the equation, each student is given a propensity score which reflects thier likelihood to participate regardless of their actual participation status.

Matching is achieved through bootstrapped iterations that randomly selects a subset of participant and comparison students. Within each bootstrapped iteration, comparison students are paired using 1-to-1, nearest neighbor matching. Matches are created when students' predicted persistence and propensity scores match within a 0.05 calliper width. Within the random bootstrapping iterations, all participants are included at least once. Students who do not find an adequate match are excluded from the analysis (for additional details see Louviere, 2020).

Difference-in-difference. To measure the impact of university services on student persistence, a difference-in-difference analysis is used. A difference-in-difference analysis compares the calculated predicted means from the bootstrapped iteration distributions to the actual persistence rates of participating and comparison students. In other words, the analysis looks at the difference between predicted persistence and actual persistence between the two groups of well-matched students.

Appendix C

ADJUSTED RETAINED TUITION MULTIPLIER

Retained tuition is calculated by multiplying retained students by the USU average adjusted tuition. Average adjusted tuition was calculated in 2018/2019 dollars with support from the Budget and Planning Office. The amounts in the table below reflect net tuition which removes all tuition waivers from the overall gross tuition amounts. Utilizing net tuition provides a more accurate and conservative multiplier for understanding the impact of university initiatives on retained tuition. The table below parses the average adjusted tuition by campus and academic level. The teal highlighted cell represents the multiplier used in this analysis.

RETAINED TUITION MULTIPLIER CALCULATION

Student Groups	Net Tuition	Number of Students	Average Annual Tuition & Fees
All USU Students	$148,864,384	33,070	$4,501.49
Undergraduates	$131,932,035	29,033	$4,544.21
Graduates	$16,932,349	4,037	$4,194.29
Logan Campus Students	$119,051,003	25,106	$4,741.93
Undergraduates	$107,711,149	22,659	$4,753.57
Graduates	$11,339,854	2,447	$4,634.19
State-Wide Campus Students	$25,941,419	7,964	$3,257.34
Undergraduates	$20,303,215	3,864	$5,254.46
Graduates	$5,638,204	1,590	$3,546.04
USU-E Price & Blanding Students	$3,871,962	2,560	$1,512.49

Appendix D

STUDENT SUBGROUPS THAT DO NOT EXPERIENCE A SIGNIFICANT CHANGE IN PERSISTENCE

N	Student Group	Participant Persistence	Comparison Persistence	Difference	CI	p-value
282	Third Persistence Prediction Quartile (50st - 74th Percentiles)	98.55%	95.45%	2.97%	3.99%	0.0186
126*	STEM Major	98.24%	95.05%	2.88%	5.77%	0.0677
66*	Top Persistence Prediction Quartile (75th - 100th Percentiles)	97.46%	97.23%	0.17%	6.53%	0.4675
52*	1 - 3 Terms Completed	97.51%	93.43%	4.22%	11.90%	0.167
40*	Mixed or Blended Courses	96.08%	93.65%	2.23%	12.58%	0.3078
34*	4+ Terms Completed	99.02%	97.17%	1.71%	7.71%	0.2734
28*	Transfer Students	96.73%	95.71%	1.61%	12.08%	0.4029
15*	Unknown Racial Heritage	95.74%	86.03%	9.68%	32.33%	0.1647
13*	Graduate Students	100.00%	87.37%	12.52%	25.60%	0.0817
13*	Two or More Racial Heritages	100.00%	85.38%	15.72%	28.96%	0.0821
10*	Readmitted Students	100.00%	93.17%	6.79%	21.85%	0.178
9*	Part-Time Status	93.72%	69.20%	22.38%	44.85%	0.0572
8*	Hispanic or Latino	74.55%	97.94%	-18.29%	47.71%	0.0711
7*	Asian or Asian American	100.00%	81.63%	19.43%	44.24%	0.0598

*Subgroups with fewer than 250 students are considered too small for reliable analysis

N = sample size; CI = confidence interval

p-value < 0.05 is statistically significant in a traditional sense; however, all subgroups on this table either have a CI larger than the Difference change or a non-significant p-value (or both). When items have a significant p-value consider (1) the sample size, (2) the size of the CI compared to the Difference score. Similar values for the CI and the Difference score is good and can be interpreted as approaching statistical significance. Large difference between the CI and the Difference score indicates more problems and should not be interpreted as approaching signficance.

Appendix E

ANALYTIC DETAILES

Impact analyses compare students who participate in University initiatives to similar students who do not, aka comparison students. Possible comparison students are included in the analysis through predictive-propensity score matching (PPSM). This process has four steps.

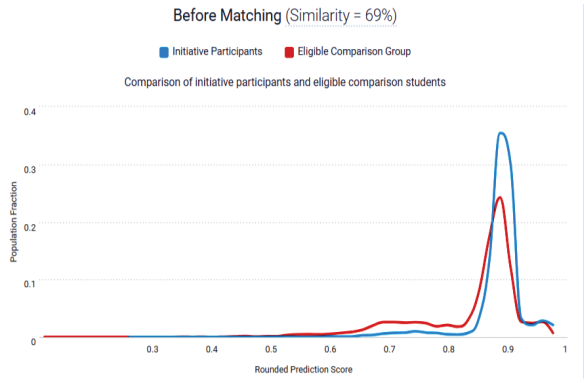
1. Students are categorized by demographic and educational characteristics (specifically the student subgroups seen in Table 1 and Appendix A; remember students can be in more than one category)
2. Participating and comparison students are given a score for their likelihood to participate in a University initiative.
3. Participating and comparison students are given a score based on their predicted persistence to the next semester.
4. Participating and comparison students who have a close match from steps 2 and 3 are selected for analysis.

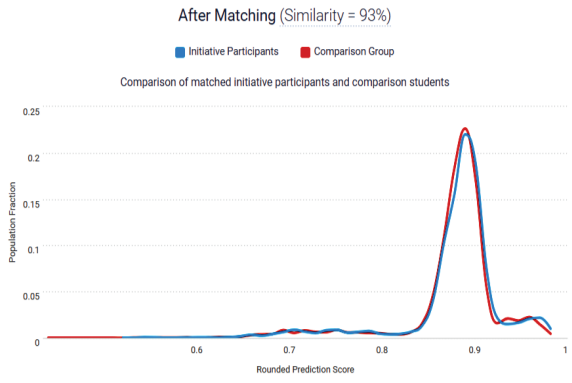
After matching, the analysis considers the difference between the two groups actual persistence scores from the following semester. This difference is reported in a lift or a drop in persistence to the next term.

Because a majority of new freshmen attend Connections, there are fewer available comparison students. This limits the power of the Impact Analysis. Most students who attend connections and are excluded from the analysis, "look" like they would attend Connections (i.e. they have a higher propensity score) and have a highter predicted peristence rate. These differences likely underestimate the impact of Connections for two reasons.

1. Connections impacts students in the 3rd persistence quartile. Many students from this group may have been excluded because they call towards the left-hand side of both curves.
2.

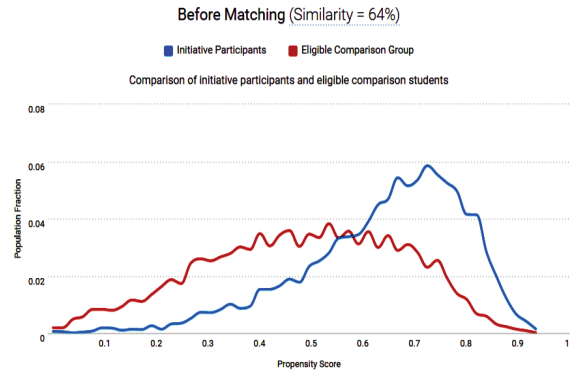
STATEMENT OF INTENT

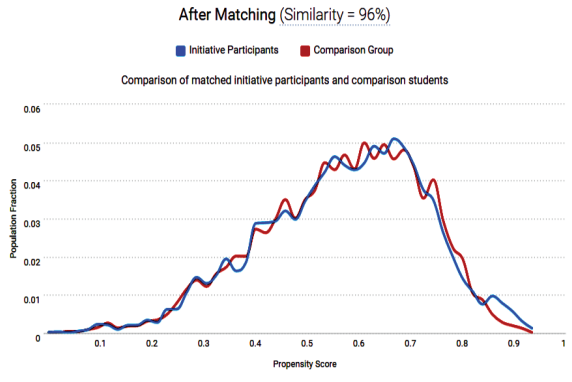




PREDICTED PERSISTENCE: PARTICIPATING & COMPARISON STUDENTS

Participating and comparison students receive scores based on their predicted persistence to the next semester. This score is based on historic data from Utah State University Students





PROPENSITY TO PARTICIPATE BTW PARTICIPATING & COMPARISON STUDENTS

Participating and comparison students receive scores based on their likelihood to participate in the

Appendix F

STUDENT SEGMENT DEFINITIONS

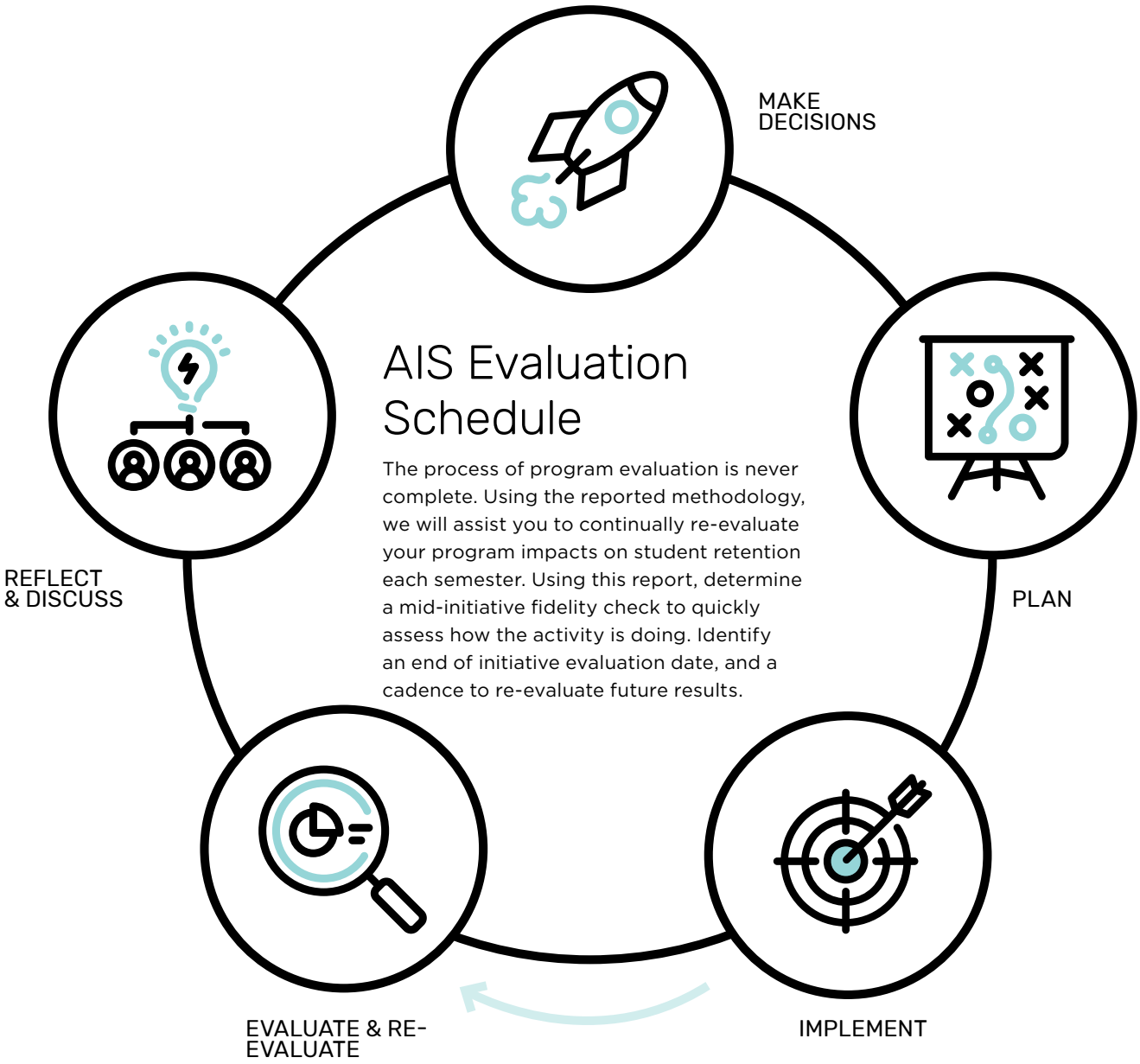
Student Subgroup	Definition
0 Terms Completed	Students with 0 terms in their collegiate career completed; incoming freshmen
1 – 3 Terms Completed	Students who have completed 1 to 3 terms in their collegiate career
4+ Terms Completed	Students with 4 or more terms in their collegiate career completed
All On-Campus	Students attending all courses face-to-face
Online or Broadcast	Students attending all courses online or via broadcast
Mixed or Blended Course Modality	Students attending both face-to-face and online or broadcast courses
Full-time Students	Undergraduate students enrolled in 12 or more credits; graduate students enrolled in 9 or more credits
Part-time Students	Undergraduate students enrolled in less than 12 credits; graduate students enrolled in less than 9 credits
First Time in College	Students who entered USU as new freshmen, who have maintained continuous enrollment or records of absences (i.e. LOA)
Transfer Students	Students who attended another university prior to attending USU
Readmitted Students	Students who attended USU, left for a time (without filing a LOA), and returned after re-applying to USU
Unknown Undergraduate Type	Students with an unknown admitted type
High School Dual Enrollment	High school students simultaneously taking high school and college courses
STEM	Students with a primary major in science, technology, engineering, or mathematics
Non-STEM	Students with a primary major not in science, technology, engineering, or mathematics
Top Persistence Prediction Quartile	The total USU student population is divided so that 25% of students fall in each quartile. The bottom quartile contains students with the lowest predicted persistence (75th – 100th percentile)
Third Persistence Prediction Quartile	The total USU student population is divided so that 25% of students fall in each quartile. The bottom quartile contains students with the lowest predicted persistence (50th – 74th percentiles)
Second Persistence Quartile	The total USU student population is divided so that 25% of students fall in each quartile. The bottom quartile contains students with the lowest predicted persistence (25th – 49th percentiles)
Bottom Persistence Quartile	The total USU student population is divided so that 25% of students fall in each quartile. The bottom quartile contains students with the lowest predicted persistence (1st – 24th percentile students)
Female	Students identifying as female
Male	Students identifying as male

STUDENT SEGMENT DEFINITIONS [CONTINUED]

Student Subgroup	Definition
Non-Hispanic or Latino	Students who do not identify as Hispanic or Latino
Hispanic or Latino	Students who identify as Hispanic or Latino
Race: Two or More	Students who identify with two or more races
Race: Unknown	Students who did not provide race information
Race: Asian	Students who identify as Asian
Race: Black or African American	Students who identify as African American
Race: Pacific Islander	Students who identify as Pacific Islander
Race: American Indian/ Alaskan Native	Students who identify as American Indian or Alaska Native
Race: White or Caucasian	Students who identify as White or Caucasian

Appendix G

UTAH STATE UNIVERSITY'S EVALUATION CYCLE



EVALUATE & RE-EVALUATE

Get the data to AIS and we can run an evaluation on persistence. For goals that don't include persistence, AIS can assist you in finding resources to measure your improvement.

REFLECT & DISCUSS

Consider the report and the evaluators' insights to produce discussion within your department.

MAKE DECISIONS

Formulate possible actions to improve your program. Select actions that align with your program goals.

PLAN

Make concrete plans to apply your decisions. Determine the who, where, and when of your actions.

IMPLEMENT

Put your plans into actions. Remember to periodically check the progress of your plans as they are being implemented.