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Student Nutrition Access Center: Impact Analysis 2019

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Hagman, Amanda M.; Hoopes, Hayden; and Ault-Dyslin, Nelda, "Student Nutrition Access Center: Impact Analysis 2019" (2019). *Publications*. Paper 7.

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Student Nutrition Access Center

IMPACT ANALYSIS 2019

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Report Presented May 2019

UtahStateUniversity®

Use of Student Nutrition Access Center Influences Student Persistence to the Next Term

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Students who used the Student Nutrition Access Center (SNAC) experienced an increase in persistence to the next term compared to similar students who did not (DID = 0.0156, $p < 0.05$).

INTRODUCTION: Access to nutritional food items is crucial to student well-being, which in turn is crucial to student success. Student success emerges from “the amount of physical and psychological energy that the student devotes to the academic experience” (Astin, 1984). Campus nutrition programs help students eliminate food security issues so that they can devote more energy to the academic experience. However, creating efficient and convenient nutrition programs requires that administrators understand the complexities of their implementation, their effect on specific student segments, and their effect on decisions to either persist at or leave an institution.

This report explores the impact of student nutrition services at Utah State University on student persistence. It also disaggregates results to identify which segments of students benefit most and explores the impact by level of use and timing.

METHODS: Students who used SNAC were compared to similar students who did not use SNAC. They were compared using prediction-based propensity score matching. This technique matched students who used SNAC with non-users based on their persistence prediction and their propensity to participate. The differences between predicted and actual persistence rates were compared using difference-in-difference testing.

FINDINGS: Students were 98% similar following matching. Analysis of the matched group revealed that those who participated in SNAC were significantly more likely to persist at USU than similar students who did not participate in SNAC, (DID = 0.0156, $p < .05$). The unstandardized effect size can be estimated through student impact. It is estimated that SNAC assisted in retaining 18 (CI: 2 to 34) students each year who were otherwise not expected to persist.

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Do students who use the Student Nutrition Access Center (SNAC) experience a change in persistence?

WHY PERSISTENCE?

Student success can be defined in various ways. One valuable way to view student success is through progress towards graduation. Progress towards graduation reflects students acquiring the necessary knowledge and accumulating credentials that prepare them for graduation. Progress towards graduation can be measured through student persistence. Here, persistence is defined as term-to-term enrolment at Utah State University. As a measurement, persistence facilitates a quick feedback loop to identify what's working well and what can be better (Baer, Hagman, & Kil, 2020; Colver, 2019).

WHY USE ANALYTICS?

Higher education professionals labor to support student success in all its various forms, not just through persistence. However, professionals now have access to far more data than they can feasibly interpret and utilize to support student success without the help of analytics. Fortunately, USU has access to professional tools that can process and organize data into insights that have historically been hidden from view (Appendix A). University professionals can leverage insights to directly influence student success (Baer, Kil, & Hagman, 2019). Indeed, analytics aligns with USU's mission to be a "premier student-centered land-grant institution" by allowing professionals to know what is going well and what could be better (see Appendix G for the evaluation cycle).

SNAC ASSOCIATION WITH STUDENT PERSISTENCE

Food insecurity is commonly associated with low academic performance and low energy among students (Maroto, 2013). Programs like the Student Nutrition Access Center (SNAC) are an integral part of solving food insecurity issues at the university. They provide means for acquiring food resources to students who may be unable to access stores and/or cooking facilities.

The impact of SNAC use on student persistence was measured in this report. Students with a record of using SNAC during the semester were compared to similar students who did not use SNAC. The results from this analysis support the theory that food security facilities can be an effective tools for increasing persistence at the university.

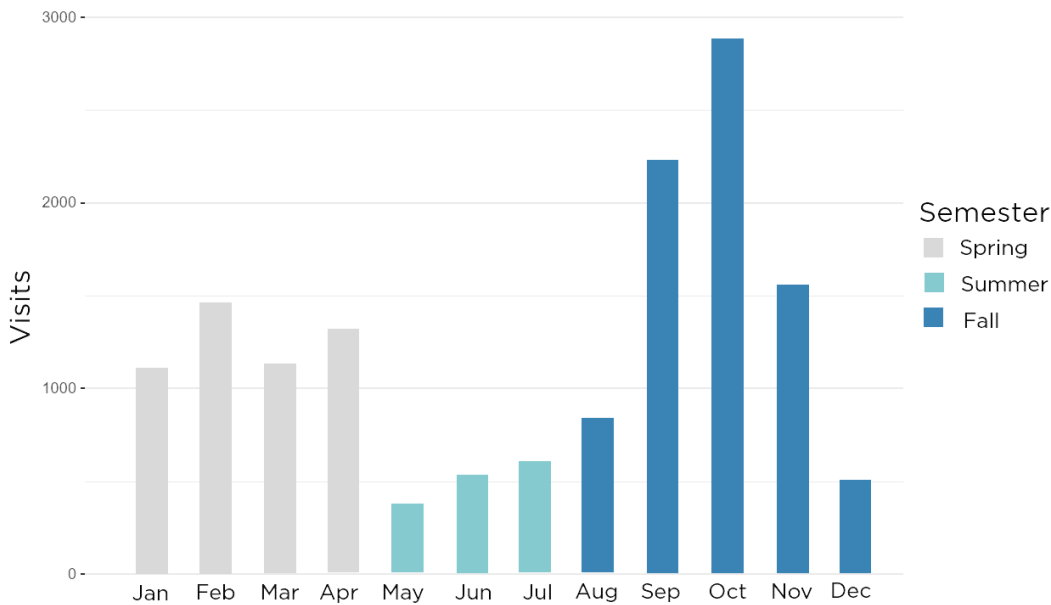


FIGURE 1

The number of SNAC visits by month.

Descriptive Data Insights

AVERAGE USE

Since Fall 2017, SNAC received 14,525 visits by 2,566 unique students. The range of use was 1 to 36 visits during a semester. Median use was 2 visits per semester, while mean use was 3.6 visits. The majority of visits were from single visitors, 1,688 students used SNAC only once. Interestingly, because policy limits SNAC use to once per week, students should have a maximum of 16 visits per semester. However, there were 27 students who visited SNAC more than 16 times during a semester.

The number of visits varied by term. Figure 1 illustrates when most SNAC visits occur. Distribution shows a peak in use during October, this peak is associated with an increased number of unique visitors, not more regular users. Across all months, mean visits per student was between 1 and 2 visits.

Table 1 displays semesterly visits to SNAC. Visits were highest during fall and spring semesters. Both total visits and total students increased across time. Interestingly, spring and fall of 2019 had similar total visits, yet fall 2019 had nearly 300 more unique visitors. Furthermore, data from fall 2019 was incomplete; data was drawn in early November. The total number of visit and visitors for fall 2019 is projected to exceed any other semester to date.

The last column of Table 1 also displays the number of verified students in the data set. Verified students are those who used SNAC who were also currently

attending USU. Only a small proportion of participants using SNAC during fall and spring semesters were not verified USU students (about 9%).

TABLE 1:
The number of SNAC visits by term.

Term	Total Visits	Total Students	Verified Student ID
Fall 2017	2,292	679	668
Spring 2018	2,336	627	609
Summer 2018	557	155	63
Fall 2018	2,674	763	731
Spring 2019	3,055	767	757
Summer 2019	572	152	52
Fall 2019	3,039	1,047	1,022

The Relationship Between SNAC and Persistence

Persistence is a measure of term-to-term enrollment at Utah State University. Because persistence represents progress towards graduation, it is a valuable indicator of student success.

The Student Nutrition Access Center (SNAC) is a food pantry at Utah State University where students retrieve donated food items. The program is

designed to promote food security for students. Food security is associated with increased academic performance, cognitive and psychosocial development, and mental health (Maroto, 2013). By giving students additional access to food items, SNAC impacts students' abilities to be successful college students and remain enrolled (persist) at USU.

Impact Analysis Results

PARTICIPANT DEMOGRAPHICS

Matching procedures for this analysis resulted in the inclusion of 82.7% of available participants. Students were 50.6% male, 85.0% Euro-American, 64.8% first-time college students, and 99.0% undergraduate.

Non-degree seeking students were excluded from the analysis. Participating students were registered at the Logan Main Campus and had at least 1 record of SNAC use. Semester-level of participation varied widely between participants (min = 1, max = 36). Median participation was 2 uses per semester. Comparison students were Logan Main Campus, degree-seeking students who had no record of SNAC use during a semester.

Prior to matching, participating and comparison students were 80% similar based on propensity to participate in

SNAC and 87% similar based on predicted persistence. Following matching, the participating and comparison students were 97% and 98% similar based on propensity to use SNAC and predicted persistence, respectively (see Appendix E for more details).

STUDENT IMPACT

Students with any record of SNAC use experienced a significant 1.56% (CI: 0.18% to 2.94%) increase in persistence to the next term. This estimated increase reflects retaining 18 (CI: 2 to 34) students who were otherwise not expected to persist per year. Using an adjusted net tuition multiple of \$4,741.93, the estimated retention reflected \$85,354.74 (CI: \$9,483.86 to \$161,225.62) in retained tuition through implementation of SNAC programming (see Appendix C for estimated tuition table).

Student Nutrition Access Center (SNAC)

SNAC is the on-campus food pantry at Utah State University that operates through the Val R. Christensen Service Center. Students with a valid USU ID can go to the SNAC office once per week to pick up perishable and non-perishable food items at no cost.

Goods are donated by the Cache Community Food Pantry, the Utah Conservation Corps Urban Community Farm, USU Dining Services, and USU Campus Kitchen. The service is run by volunteers on a daily basis, who help distribute, prepare, and deliver food items to students in need.

SUMMARY STATISTICS

Overall Change in Persistence:	1.56% (0.18% to 2.94%)
Overall Change in Students (per term):	18 (2 to 34) Students
Analysis Terms:	Fall 2017 to Spring 2019
Students Available for Analysis:	2,842 Students
Percent of Students Participating:	3.6%
Students Matched for Analysis:	2,350 Students
Percent of Students Matched for Analysis	82.7%

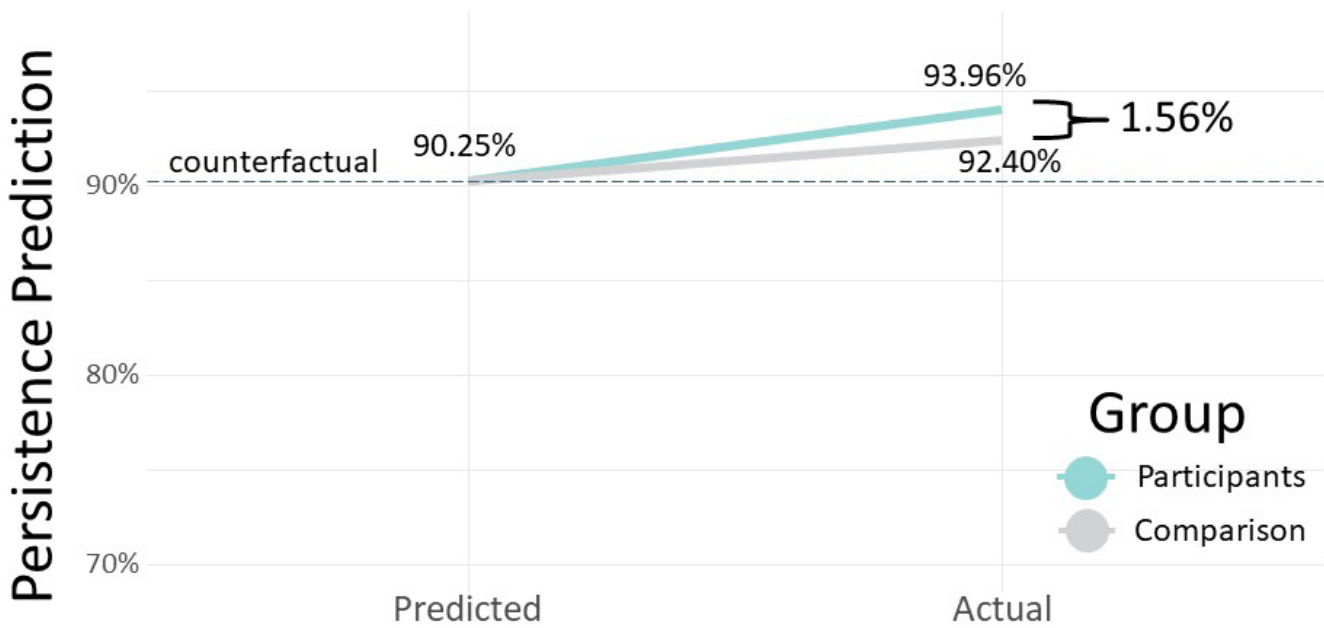


FIGURE 2

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

Impacted Student Segments

Illume Impact provides an analysis that looks at various student segments to identify how the program influenced students with specific characteristics. Please note that the student segments are not mutually exclusive. Table 2 shows all student segments who experienced a significant change from participating in SNAC. Appendix D lists all student segments with non-significant findings.

Impact by Term (Figure 3): The impact of using SNAC resources varied by term. In fact, the change in persistence is increasing each semester. There have been substantial changes in SNAC across terms, and this analysis suggests that the changes have contributed to significant improvements in the program. With that in mind, only students who used SNAC in the spring 2019 semester were shown to have experienced a significant increase in persistence from using SNAC resources.

Impact by Student Time Status: Students who attended USU full-time and used SNAC experienced a significant increase in persistence compared to full-time students who did not use SNAC.

Impact by Course Modality: There were three types of course modality considered in the analysis; all on-ground, mixed modality, and all online. Using SNAC had a significant influence on all on-ground students. Very few students who used SNAC were online students, only 0.5%. About 30% of SNAC users were mixed modality students (some on-ground and some online courses).

These groups of students did not experience an increase in persistence.

Impact by Degree Type: The analysis divided students by majors into STEM and non-STEM students. Non-STEM majors experienced a significant increase in persistence, while STEM majors did not experience an increase.

Impact by Race & Ethnicity: USU has a high population of White or Caucasian and non-Hispanic or Latino students. For this reason, impact analyses can often detect changes in persistence for these groups. However, students of other races and ethnicities rarely reach the critical mass necessary to detect a significant change. With this in mind, the analysis found a significant increase in persistence for White or Caucasian and non-Hispanic/Latino students.

Impact by Terms Completed (Figure 4): The analysis considered three term breakpoints: new students (0 terms completed), early career students (1 to 3 terms completed), and late career students (4 or more terms completed). Late career students who used SNAC resources experienced a significant increase in persistence. Interestingly, the majority of SNAC users at USU had completed 4 or more terms (49.5%). This is similar to the USU general population (49.7% of students have completed 4 or more terms). However, most student facing programming is dominated by new or early career students.

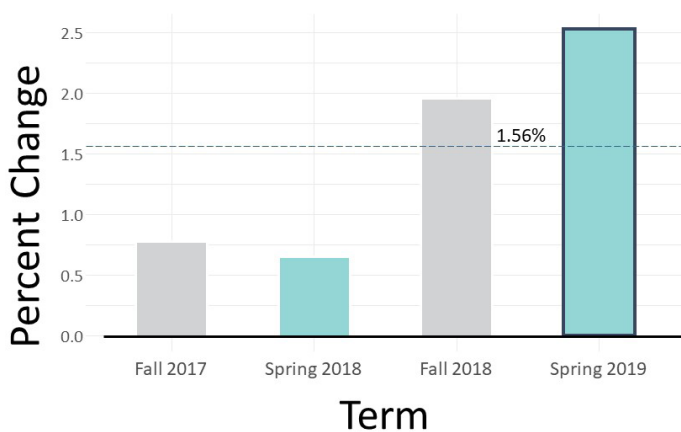


FIGURE 3
Change in persistence by term.

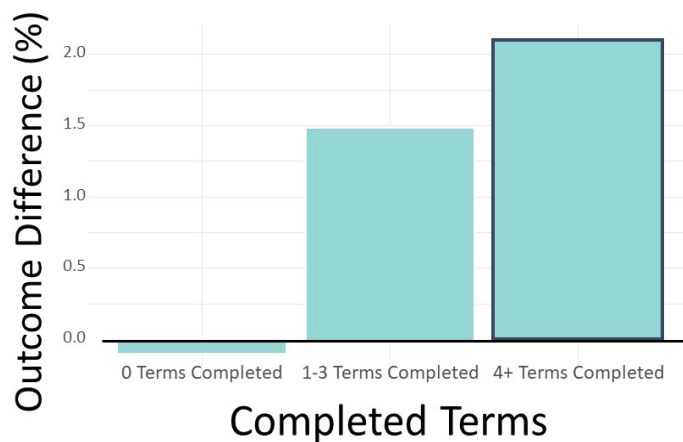


FIGURE 4
Change in persistence by number of terms completed.

Student Segment Impact

TABLE 2:
Student segments experiencing changes from using SNAC

N	Student Segment**	Actual Persistence		Difference-in-Difference	CI	Lift in People
		Participant Persistence	Comparison Persistence			
2,350	Overall	93.96%	92.40%	1.56%	1.38%	18
2,326	Undergraduate Students	94.21%	92.59%	1.63%	1.38%	19
2,136	Not Hispanic or Latino	94.32%	92.52%	1.72%	1.42%	18
2,120	Full-time Courses	95.25%	93.99%	1.43%	1.33%	15
1,998	White or Caucasian	94.58%	92.48%	1.89%	1.45%	19
1,563	All On-Ground Status	93.89%	91.72%	2.17%	1.72%	17
1,486	Non-STEM Major	93.56%	91.76%	1.88%	1.78%	14
1,164	4+ Terms Completed	96.68%	94.77%	2.10%	1.61%	12

* Segments with fewer than 250 matched student pairs are considered too small for reliable analysis

** Student segment definitions available in Appendix F

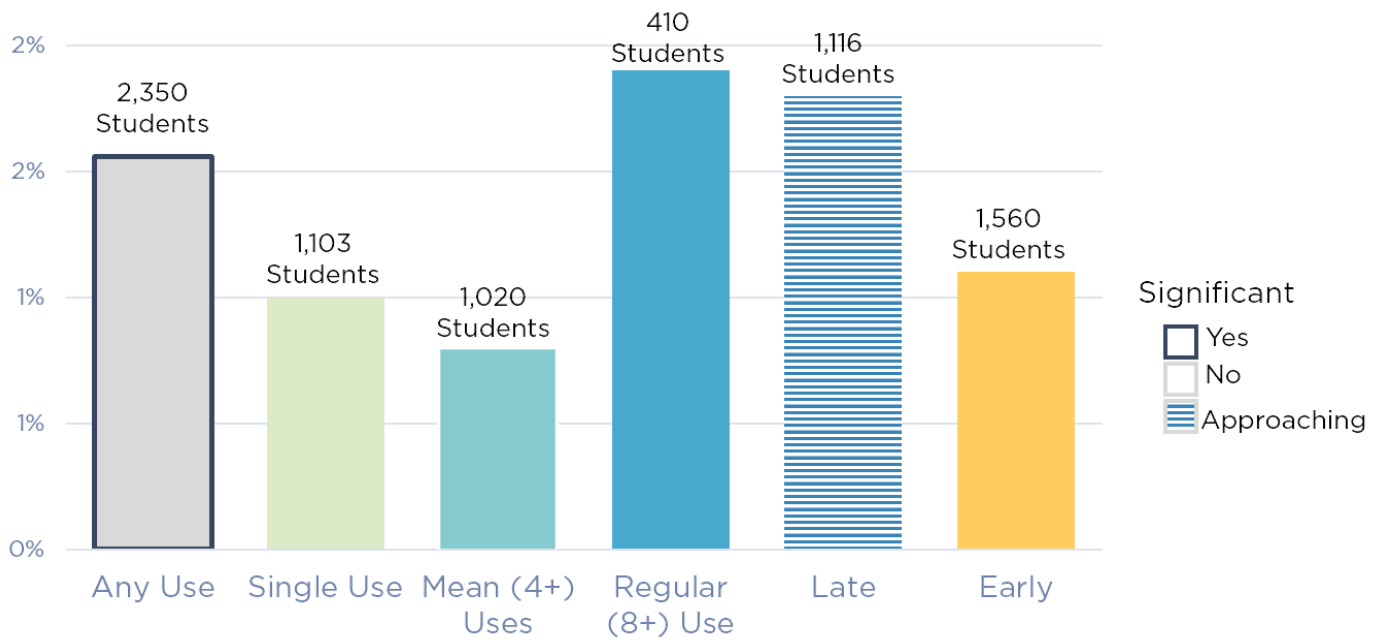


FIGURE 5

Change in persistence across different segments of SNAC users.

Additional Analyses

INVESTIGATING THE EFFECT OF LEVEL & TIMING OF PARTICIPATION ON PERSISTENCE

SNAC resources are available throughout the semester. Students are permitted to collect food as often as once per week. This means that students can use SNAC in many ways. Students may access resources only once, a few times, or weekly. Students can initiate SNAC use early in the semester or late in the semester. It is possible that level and timing of use may have differential impacts on student persistence. Here we explored the impact of pattern of use on student persistence.

Only Once: When students used SNAC only once during a semester, they experienced a near-significant increase in persistence. Near-significant means that the analysis was not significant at the 0.05 level, but it had a p-value less than 0.1. These results can be explored in context to better understand the significance of their meaning. Interestingly, 31.6% of all SNAC participation was from single-use students.

Regular Use: Two analyses explored the impact of regular use. The first considered the sample median as the splitting point.

Median participation was 4 visits. This analysis compared all students with 4 or more SNAC records to students who did not have a record of use. The second analysis considered a practical regular-use splitting point, 8 visits which roughly falls out to be a visit every other week. Neither mean (4+) or regular use (8+).

Early & Late Use: Students who visited SNAC for the first time early in the semester (in the first 2-months of the term) did not experience a significant increase in persistence compared to similar students. Students who used SNAC resources for the first time later in the semester experienced a near-significant increase in persistence.

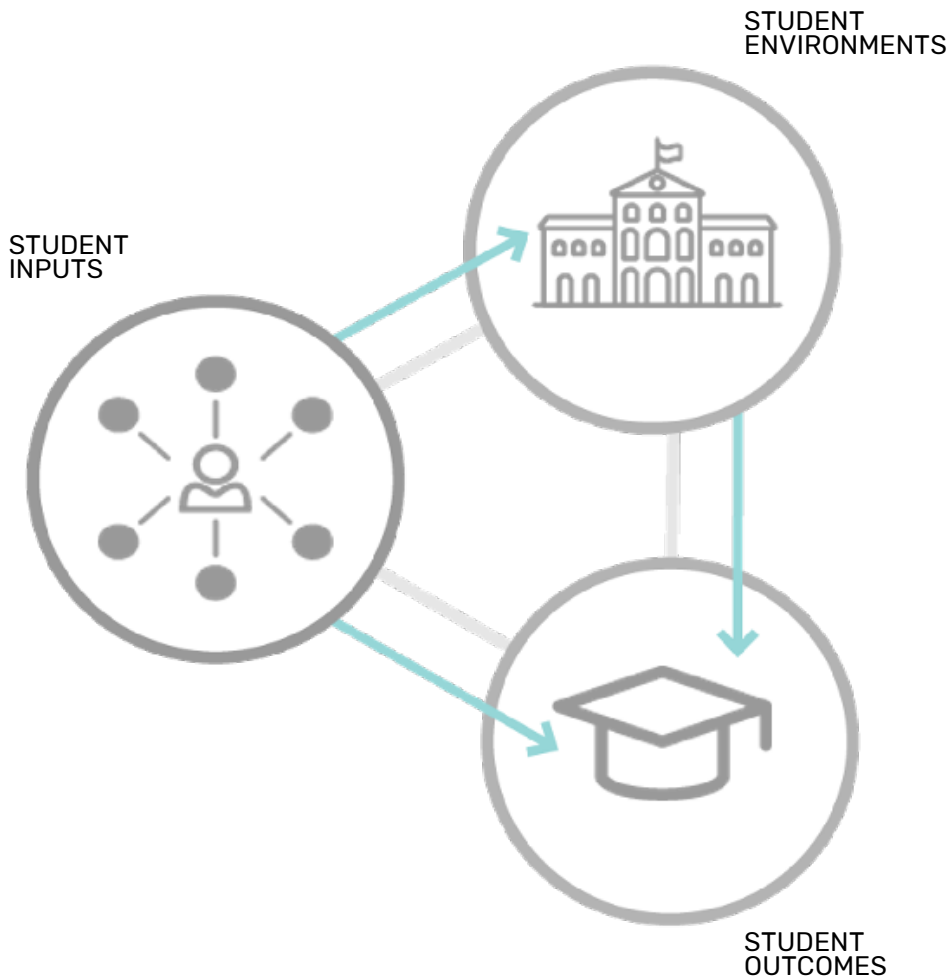
SNAC Insight: The timing of SNAC initiation may be associated with term funding. Students may find a greater need at the end of the semester as their funding runs dry.

References

- **Astin, A. (1993).** What Matters in College? Jossey-Bass. San Francisco, CA.
- **Astin, A. W. (1984).** Student involvement: A developmental theory for higher education. *Journal of college student personnel*, 25(4), 297-308.
- **Baer, L. L., Kil, D., & Hagman, A. M. (2019).** Sherlock Holmes redux: Putting the pieces together. In L. L. Baer & C. Carmean (Eds.), *An analytics handbook: Moving from evidence to impact* (pp. 39-50). Ann Arbor, MI: Society for College and University Planning.
- **Baer, L., Hagman, A. M., Kil, D. (2020).** Preventing the winter of disillusionment. *Educause Review*. 1: 46-54.
- **Louviere, J. (2020).** Persistence impacts on student subgroups that participate in the high impact practice of service learning. *All Graduate Theses and Dissertations*. 7746. <https://digitalcommons.usu.edu/etd/7746>
- **Maroto, M. E. (2013).** Food insecurity among community college students: Prevalence and relationship to GPA, energy, and concentration (Doctoral dissertation, Morgan State University).
- **Milliron, M., Kil, D., Malcolm, L., Gee, G. (2017).** From innovation to impact: How higher education can evaluate innovation's impact and more precisely scale student support. *Planning for Higher Education Journal*, 45(4), 1-12.
- **Rosenbaum, P. R. & Rubin (1983).** The central role of the propensity score in observational studies for causal effects. *Biometrika*, 70(1), 41-55.

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 (1) their 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 intramurals 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 from the predictive system is an as 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 are 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 their 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 neighbour matching. Matches are created when student 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. Statistical significance is measured at the 0.05 alpha level and utilizes confidence intervals. The results reflects the ETT.

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 below table 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 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 SEGMENTS THAT DID NOT EXPERIENCE A SIGNIFICANT CHANGE IN PERSISTENCE

N	Student Segment**	Actual Persistence			CI	p-value
		Participants	Comparison Students	Difference-in Difference		
1,523	First Time in College	94.35%	92.56%	1.67%	1.67%	0.0501
1,190	Male Students	93.76%	92.03%	1.54%	1.95%	0.1212
1,159	Female Students	94.17%	92.77%	1.61%	1.97%	0.1097
956	Top Persistence Prediction Quartile (75th - 100th Percentiles)	97.94%	96.92%	1.01%	1.41%	0.1612
873	1-3 Terms Completed	92.33%	90.59%	1.49%	2.52%	0.2468
848	STEM Major	95.40%	94.22%	1.03%	2.09%	0.3344
788	Third Persistence Prediction Quartile (50th - 74th Percentiles)	95.84%	93.79%	2.02%	2.18%	0.07
771	Mixed or Blended Status	94.72%	94.23%	0.49%	2.25%	0.6677
428	Second Persistence Prediction Quartile (25th - 49th Percentiles)	89.66%	88.13%	1.52%	4.16%	0.4753
417	Transfer Students	93.02%	93.33%	0.22%	3.35%	0.8996
380	Readmitted Students	95.15%	91.95%	3.12%	3.48%	0.0782
299	0 Terms Completed	88.10%	88.02%	-0.10%	4.90%	0.9672
226*	Part-time Courses	82.62%	78.88%	2.95%	6.78%	0.3927
214*	Hispanic or Latino	90.36%	90.28%	0.20%	5.92%	0.9473
170*	Bottom Persistence Prediction Quartile (1st - 24th Percentiles)	73.76%	71.20%	2.62%	9.38%	0.5827
95*	Unknown Racial Heritage	89.64%	92.55%	-1.03%	7.87%	0.7975
80*	Asian or Asian American	94.10%	93.81%	0.56%	7.72%	0.8851
78*	Two or More Racial Heritages	87.41%	92.56%	-4.26%	9.69%	0.3861
46*	American Indian/Alaskan Native	93.69%	86.20%	8.53%	15.28%	0.2644
36*	Black or African American	86.65%	88.88%	-0.18%	15.13%	0.9816
17*	Graduate Students	58.65%	64.39%	-5.93%	27.74%	0.6664
12*	All Online Status	53.76%	64.59%	-10.77%	38.99%	0.5724
9*	Pacific Islander	94.36%	91.94%	1.33%	22.00%	0.9004

* Cells with fewer than 250 matched student pairs are too small for reliable analysis

** Student group definitions available in Appendix F

Appendix E

MATCHING DETAILS

Matching for the analysis resulted in 82.7% of available participants, or 2,350 students, being successfully matched for the analysis. Participating students who did not have an adequate match in the comparison group during the PPSM process were excluded from the analysis. A 70% match rate is considered adequate, this analysis exceeds the minimum expected matching.

PERSISTENCE MATCHING: Prior to matching, samples were 87% similar based on students' predicted persistence (Figure A). Following matching the samples were 98% similar.

PROPENSITY MATCHING: Participating and comparison students were 80% similar based on propensity score prior to matching (Figure B). Following matching, the similarity in propensity was 97%.

Both the persistence matching graph (Figure A) and the propensity matching graph illustrate substantial overlap between the red and blue lines. Detectable self-selection bias was not found between populations of participants and non-participants. A representative sample was created and used in the analysis.

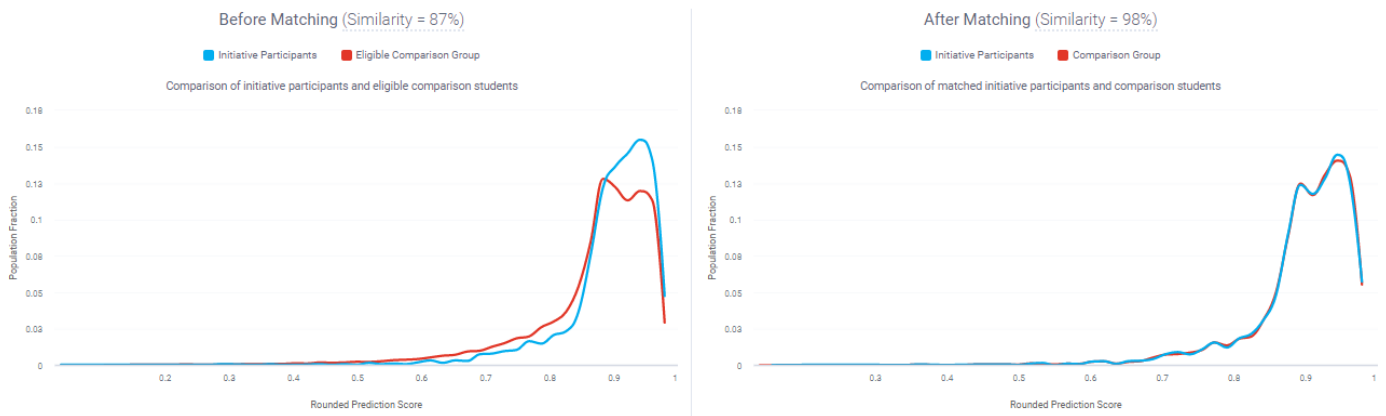


FIGURE A PREDICTED PERSISTENCE: PARTICIPATING & COMPARISON STUDENTS

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

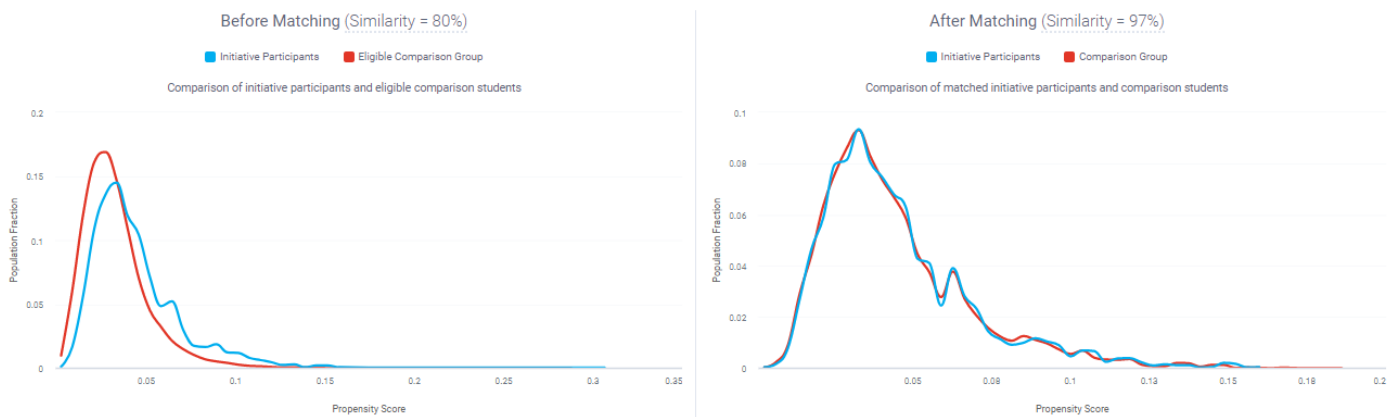


FIGURE B PROPENSITY TO PARTICIPATE BTW PARTICIPATING & COMPARISON STUDENTS

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

Appendix F

STUDENT SEGMENT DEFINITIONS

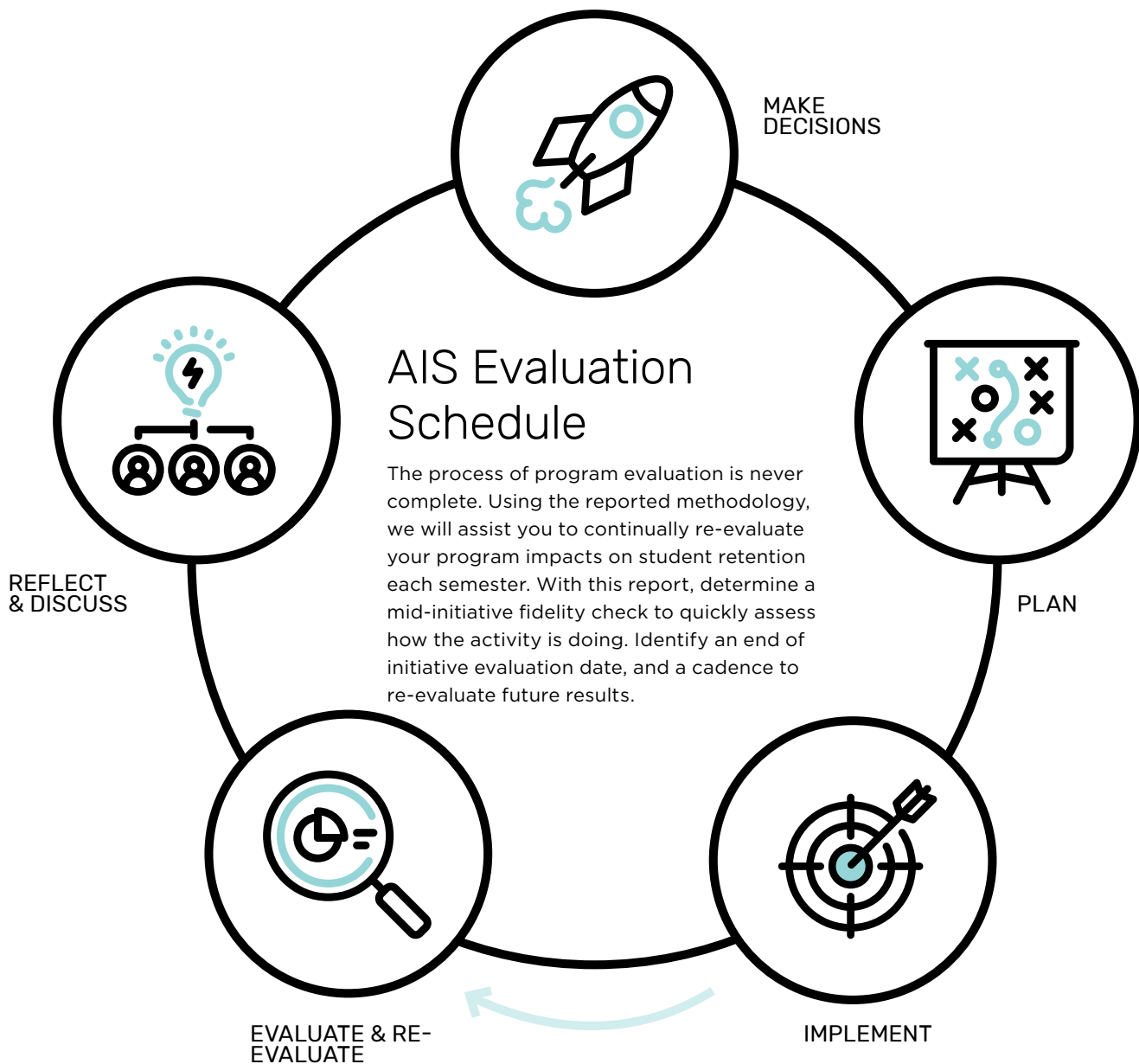
Student Subgroup	Definition
0 Terms Completed	Students with 0 terms in their collegiate career completed; incoming freshmen
1 - 3 Terms Completed	Students who have completed 1 to 3 terms in their collegiate career
4+ Terms Completed	Students with 4 or more terms in their collegiate career completed
All 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 enter 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 that is 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 top quartile contains students with the highest 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 third quartile contains students with higher 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 second quartile contains students with lower 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 a 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.