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Passport Experience: Impact Analytics Fall 2014 to Fall 2018

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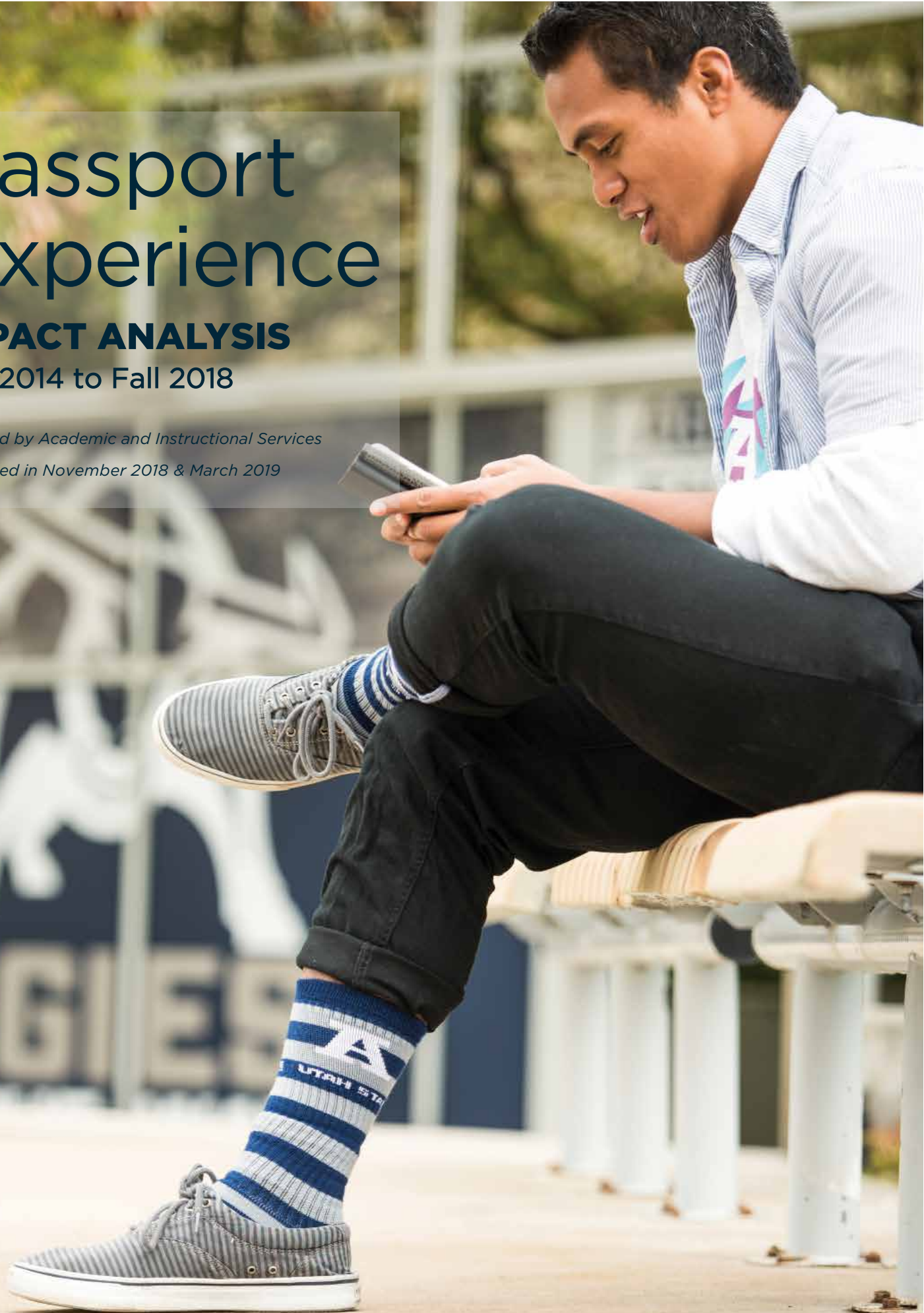
Passport Experience

IMPACT ANALYSIS

Fall 2014 to Fall 2018

Powered by Academic and Instructional Services

Presented in November 2018 & March 2019



USU student passport program supports persistence to the next term. Program components are essential to impact.

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Students who participated in the Passport Program experienced an increase in persistence to the next term compared to similar students who did not (DID = 0.059, $p < 0.001$). Programmatic changes impacted salience.

ABSTRACT:

Utah State University (USU) dedicates substantial resources to support student transition to higher education. The Passport Experience cuts across all university domains to support early student participation in curricular, co-curricular, and extra-curricular activities. Students are invited to attend a variety of events, when milestones are reached, students are rewarded. Persistence is a primary objective of the Passport Experience. The Passport Experience helps students develop an increased awareness of campus events, broad their engagement in the university experience, and become more involved in the University community. This report explores the association between the Passport Experience and students' persistence toward graduation.

METHODS: Passport participation was captured through card swipes. Students who had enough records of Passport participation to receive a reward were compared to similar students who had no record of participation. Students were

matched for comparison using prediction-based propensity score matching. Students were matched with non-users based on their persistence predication and their propensity to participate.

FINDINGS: Students were 97% similar following matching. Participating and comparison students were compared using difference-in-difference testing. Students who participated were significantly more likely to persist at USU than similar students who did not (DID = 0.054, $p < .001$). The unstandardized effect size can be estimated through student impact. It is estimated that the Passport Experience assisted in retaining 6 (CI: 1 – 9) students each year who were otherwise not expected to persist. When data collection procedures were improved in 2017, the impact of the Passport Experience increased to an estimated retention of 37 (CI: 1 to 72) students. Further tracking of this program is warranted given improved data collection and new practices.

Does participating in the Passport Experience enough to earn a monetary reward influence student persistence to the next term?

SUMMARY STATISTICS HEADLINE

Overall Change in Persistence:.....	5.49% (1.72% - 9.26%)
Overall Change in Students (per year):.....	6 (1 - 9)
Analysis Terms:.....	Fa14, Fa15, Fa16, Fa17
Students Available for Analysis:.....	477 Students
Percent of Students Participating:.....	0.8%
Students Matched for Analysis:.....	421 Students
Percent of Students Matched for Analysis	88.3%

PERSISTENCE & THE PASSPORT EXPERIENCE

Persistence is a primary objective of the Passport Experience. The program is marketed during freshmen orientation and is designed to engage students in cocurricular activities at Utah State. The Passport Experience helps students develop an increased awareness of campus events, broad their engagement in the university experience, and become more involved in the University community.

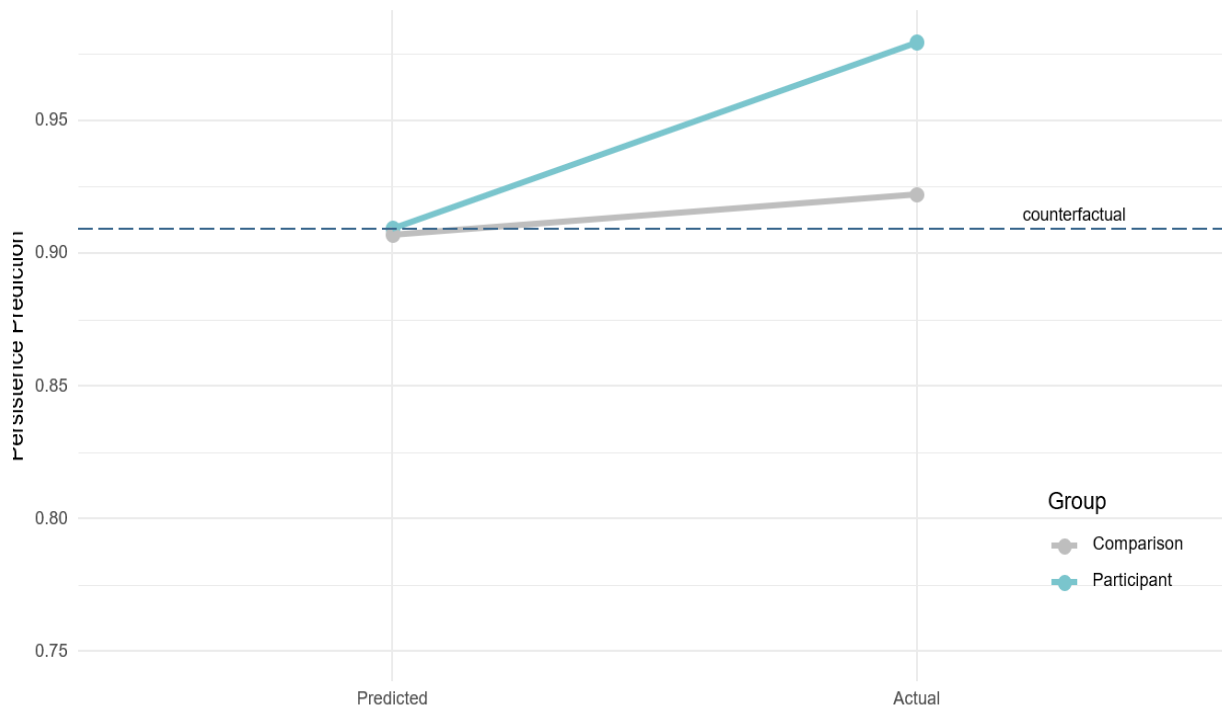


FIGURE 1

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

Passport Experience Results

STUDENT IMPACT

Students who participate in the Passport Experience experience a significant increase in persistence. The estimated increase in persistence is equivalent to retaining 6 (CI: 1 – 9) students between fall and spring semesters who were otherwise not expected to persist. This represents an estimated \$28,521.42 (\$4,753.75 - \$42,782.13) in retained tuition per year, assuming an average adjusted tuition of \$4,753.57 (see Appendix C).

PARTICIPANT DEMOGRAPHICS

Matching procedures for this analysis resulted in the inclusion of 89.9% of available participants. Students were 30.2% male, 90.7% Euro-American, and 86.7% first-time college students. Students are 97.0% undergraduate.

PARTICIPANT

The sample was limited to Logan campus students. Non-degree seeking students were excluded from the analysis. Participating students used the Passport Experience to the extent that they received a monetary reward (regardless of the amount). Possible comparison students did not have a record of any Passport Experience use. The way we captured students who had no Passport use varied by term, with Fall 2017 being the most accurate. Fall 2017 captured card swipes, allowing us to see low level Passport users. In Fall 2017 we were able to exclude low level users as comparison students, creating a cleaner comparison group than in other semesters. Further analysis on the Fall 2017 semester can be seen on page 7.

PASSPORT PARTICIPATION RECORDS

In 2017, the Passport Experience streamlined data collection by allowing card swipes to act as the tracking method. This resulted in the ability to track all Passport participation, not just those who received a reward. In 2017, there were 1,621 unique participants. This analysis estimated a 2.6% increase in persistence from participation and was believed to help retain 37 students (see page VIII).

Impact by Persistence Quartile

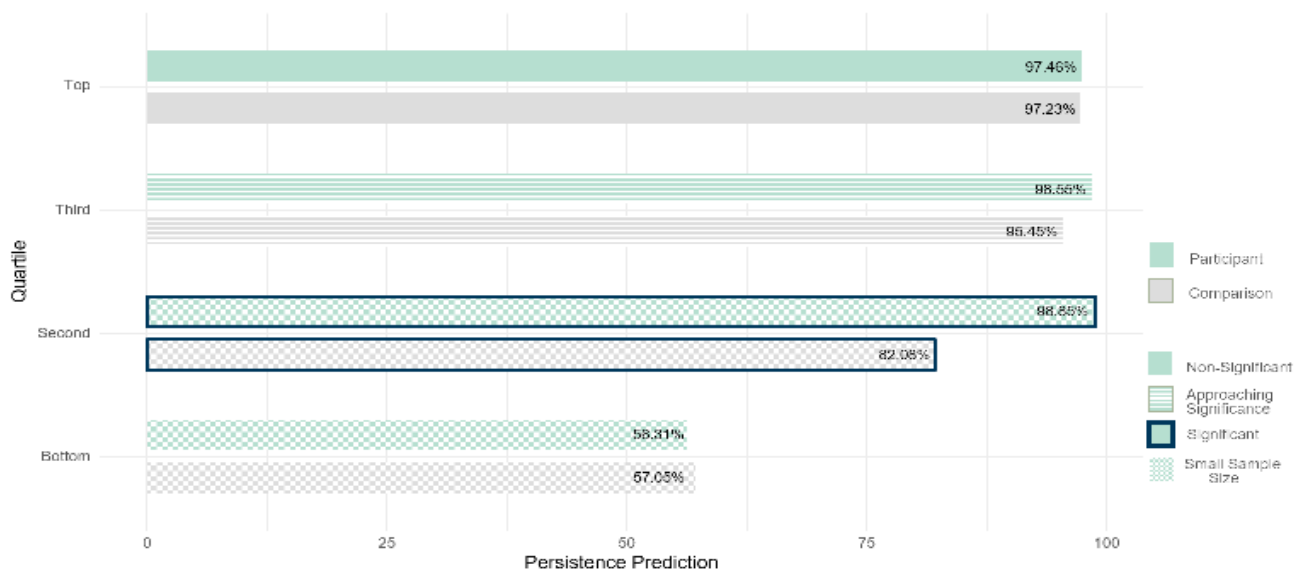
STUDENT PERSISTENCE

Illume Impact utilizes historical data to predict student persistence to the next term. The Passport Experience influences students in the second persistence quartile; students between the 25th and 49th persistence quartiles. In general students in the bottom and second persistence quartiles have the greatest potential for impact.

Students who are Passport users and who are in the second persistence quartile experience a significant increase in their likelihood to persist to the next semester. However, the large change in persistence (16.8%) for students in the second quartile is limited by a small sample size in the subgroup. A conservative approach to dealing with small sample sizes is to consider the lower bound of the confidence interval as a more accurate representation (9.9%).

FIGURE 2

Actual persistence by predicted persistence quartile for participating and comparison students



IMPACT BY TERM

The impact of using the Passport Experience varied by term. Lift ranged between 3.5% and 7.1%. The largest lift occurred during Fall 2017. Only Fall 2017 experienced a significant lift in persistence as a result of the Passport Experience. Fall 2014, Fall 2015, and Fall 2016 each had low recorded participation; results should be viewed in light of their small sample size. Figure 3 shows the change in persistence by term. The dashed line shows the overall impact from the analysis. Bars with bold outlines are statistically significant terms.

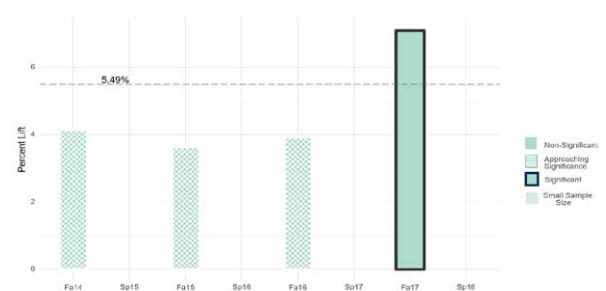


FIGURE 3

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

Student Subgroup Impact

TABLE 1:

Student Subgroups Experiencing a Significant Change From Participating

N	Student Group	Participant Persistence	Comparison Persistence	Difference	CI	Lift in People
421	Overall	97.95%	92.21%	5.49%	3.77%	23
413	Not Hispanic or Latino	98.40%	92.16%	5.92%	3.77%	24
411	Full-Time Status	98.07%	92.95%	4.96%	3.73%	20
408	Undergraduate Students	97.88%	92.42%	5.21%	3.95%	21
382	White or Caucasian	97.92%	92.91%	4.66%	3.73%	18
381	All On-Ground Courses	98.15%	92.10%	5.80%	3.90%	22
365	First Time in College	97.93%	91.85%	5.78%	4.20%	21
334	0 Terms Completed	97.92%	91.42%	6.20%	4.62%	21
294	Female Students	97.47%	92.33%	4.96%	4.30%	15
294	Non-STEM Major	98.28%	91.15%	6.82%	4.85%	20
127*	Male Students	99.06%	91.96%	6.71%	6.06%	9
66*	Second Persistence Prediction Quartile (25st - 49th Percentiles)	98.85%	82.08%	16.80%	9.97%	11

*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 using the Passport Experience. Appendix A lists all subgroups with non-significant findings.

Impact by Time Status: Participating in the Passport Experience improves student persistence for full-time students. This increase is estimated to maintain 5 students each fall semester who were otherwise not expected to persist

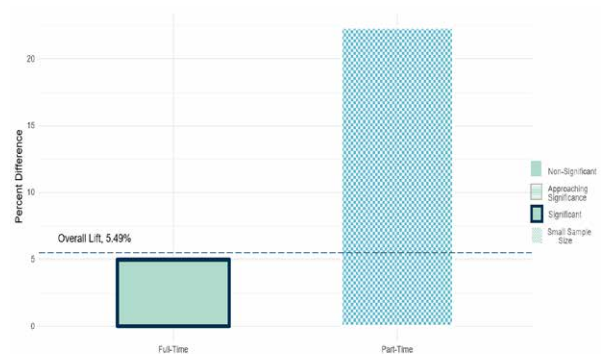


FIGURE 4

Change in student persistence by student time status.

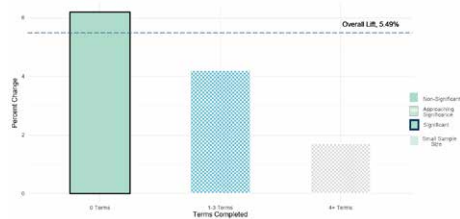


FIGURE 5
Change in persistence by number of terms completed.

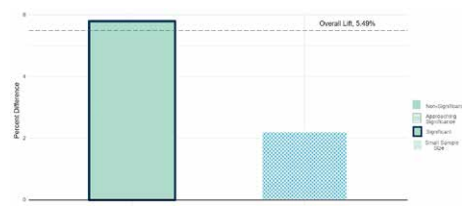


FIGURE 6
Change in persistence by course modality.

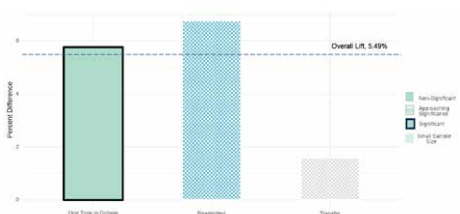


FIGURE 7
Change in persistence by student type

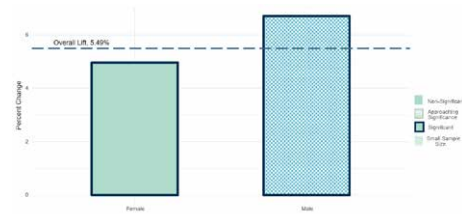


FIGURE 8
Change in persistence by gender

Impact by number of terms completed. Students who are in their first semester experience a significant increase in persistence when they participate in the Passport Experience.

Impact by course modality. There are three arrangements for student course modality: all on-ground, all online, or mixed modality. Students who have all on-ground course come to campus for all of their courses. All online students attend class online, no online students were included in this analysis. And mixed modality students have a combination of on-ground and online course. Students who attend classes on-campus experience a

significant increase in persistence from using the Passport Experience.

Impact by student type. There are three general admit types using in Impact analyses: first time in college, readmitted, and transfer students. Only first-time in college students experienced a significant increase in persistence due to using the Passport Experience.

Impact by gender. Both females and males experience significant increases in persistence associated with using the Passport Experience. Fewer males use the program than females, this is a statistically significant difference compared to the general gender breakdown at USU.

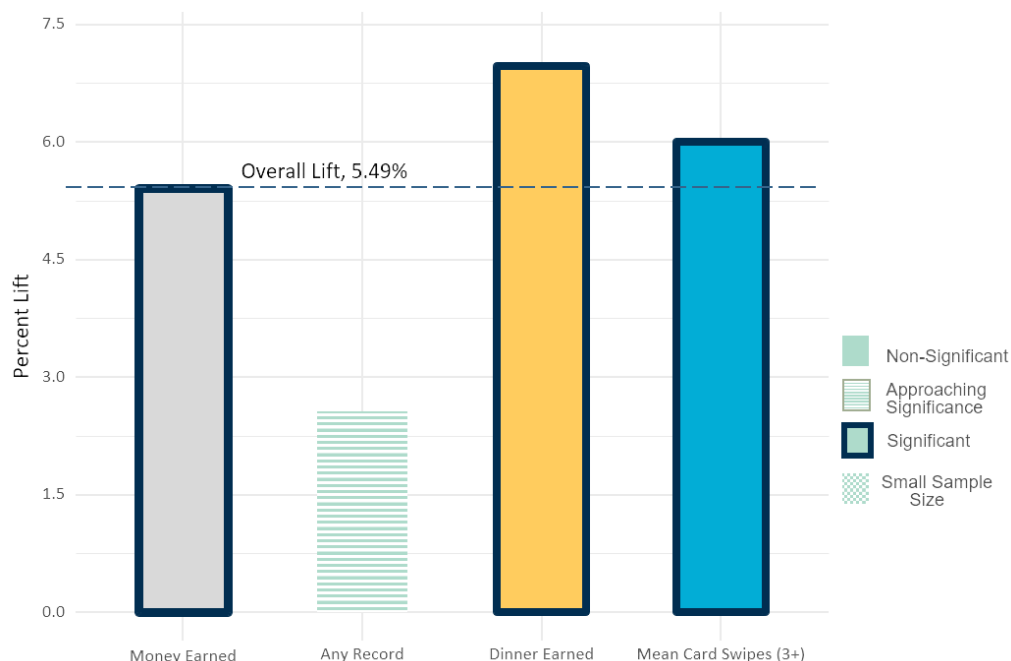


FIGURE 9
Change in persistence across multiple analyses.

Additional Analyses

MONEY EARNED

Money earned was used as the base analysis in this report because of the consistency in data collection across terms. Students who participated in the Passport Experience to the extent that they earned any monetary reward experienced a significant 5.49% (CI: 1.72% to 9.26%).

ANY RECORD & FA2017

Students with any recorded use of the Passport Experience were included in this analysis as a participant. A major limitation of this analysis is that lower levels of participation were not recorded until Fall 2017. This results in fewer students being classified as participants than actually participated. Despite this shortcoming, the analysis still resulted in a significant 2.7% (CI: 0.3% to 5.1%). The analysis is more accurately describe as an analysis of Fall 2017.

FALL 2017: Of the 1,621 participating students in this analysis, 88.2% (or 1,429 individuals) came from Fall 2017. Fall 2017 experienced a significant 2.59% (CI: 0.1% to 5.1%) increase in persistence. This single semester impacts an estimated 37 (CI: 1 to 72) students who were not expected to persist outside of their participation in the Passport Experience. This reflects an estimated \$175,882.09 (CI: \$4,753.57 to \$342,257.04) in retained tuition. The range for this analysis was wide because data came from a single semester. As more data is collected robustly through card swipes, this estimate will become more accurate.

DINNER EARNED

Dinner earned was also a consistently measured variable, but requires a higher threshold of participation. Students who used the Passport Experience enough to earn dinner experienced a significant 7.2% (CI: 2.14% to 12.2%).

MEAN CARD SWIPES (3+)

The mean number of passport uses was 3. This variable was driven by Fall 2017 which were the only semester that recorded participation at any level. Mean use of the Passport Experience resulted in a significant 6.0% (CI: 2.4% to 9.4%) increase in persistence. For Fall 2017, which contains the most accurate data for this analysis, mean use of the Passport Experience resulted in an estimated 34 (CI: 10 to 59) students persisting to the next semester who where otherwise expected not to persist.

The analysis from Fall 2017 is the most accurate representation of the impact of the Passport Experience on student persistence

Additional Analyses: Passport Reception

HOW IMPORTANT IS THE PASSPORT RECEPTION TO STUDENT PERSISTENCE?

The Passport reception has undergone several changes across the years. Most recently, in Fall 2018, the reception was eliminated from the program. This portion of the report evaluates that decision to eliminate the reception.

PARTICIPANT: STUDENTS WHO EARNED MONEY

The best student sample to test the impact of the reception is among students who engage in the Passport program enough to earn money. Using data from Fall 2017 and Fall 2018, students who earned money were compared to students who did not participate in the passport program.

DIFFERENCE BE TERM

The overall analysis returned significant results, with students who use the Passport program enough to earn money experiencing a 5.27% (CI: 2.02 to 8.52%) increase in persistence. However, there were differences in impact by term. Fall 2017 experienced a near 8% increase in persistence. Fall 2018 did not experience a significant change in persistence.

Within the analysis, Fall 2017 impacted many student subgroups, while Fall 2018 only impacted Non-STEM students.

SUMMARY STATISTICS HEADLINE

Overall Change in Persistence:	5.27% (2.02% to 8.52%)
Overall Change in Students (per year):	10 (4 - 16)
Analysis Terms:	Fa17 Fa18
Students Available for Analysis:	465 Students
Percent of Students Participating:	1.6%
Students Matched for Analysis:	390 Students
Percent of Students Matched for Analysis	83.9%

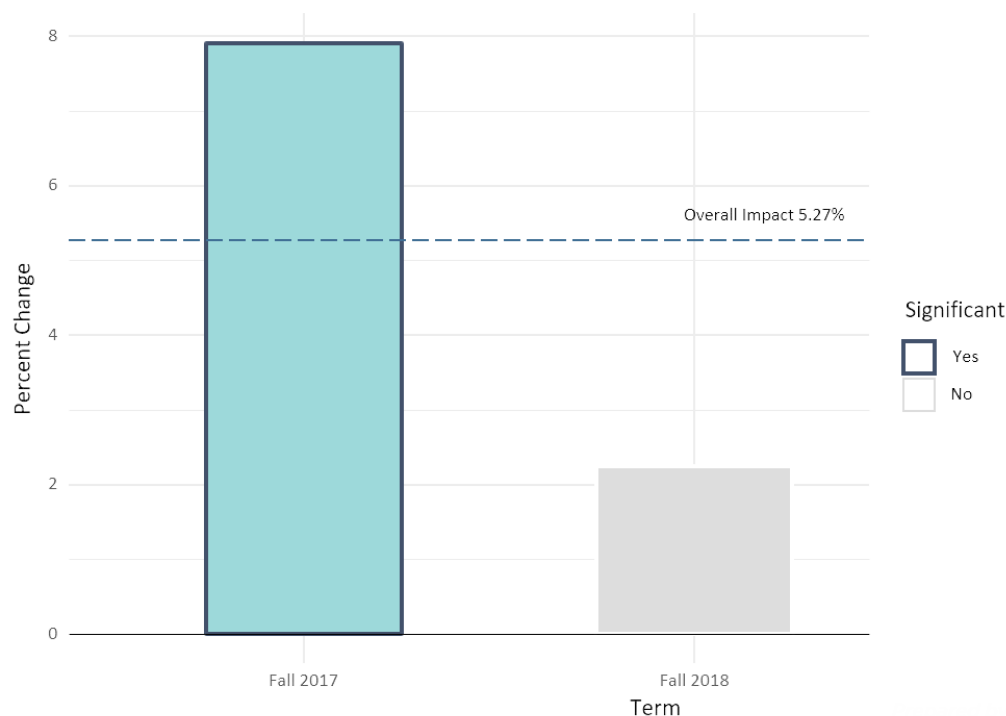
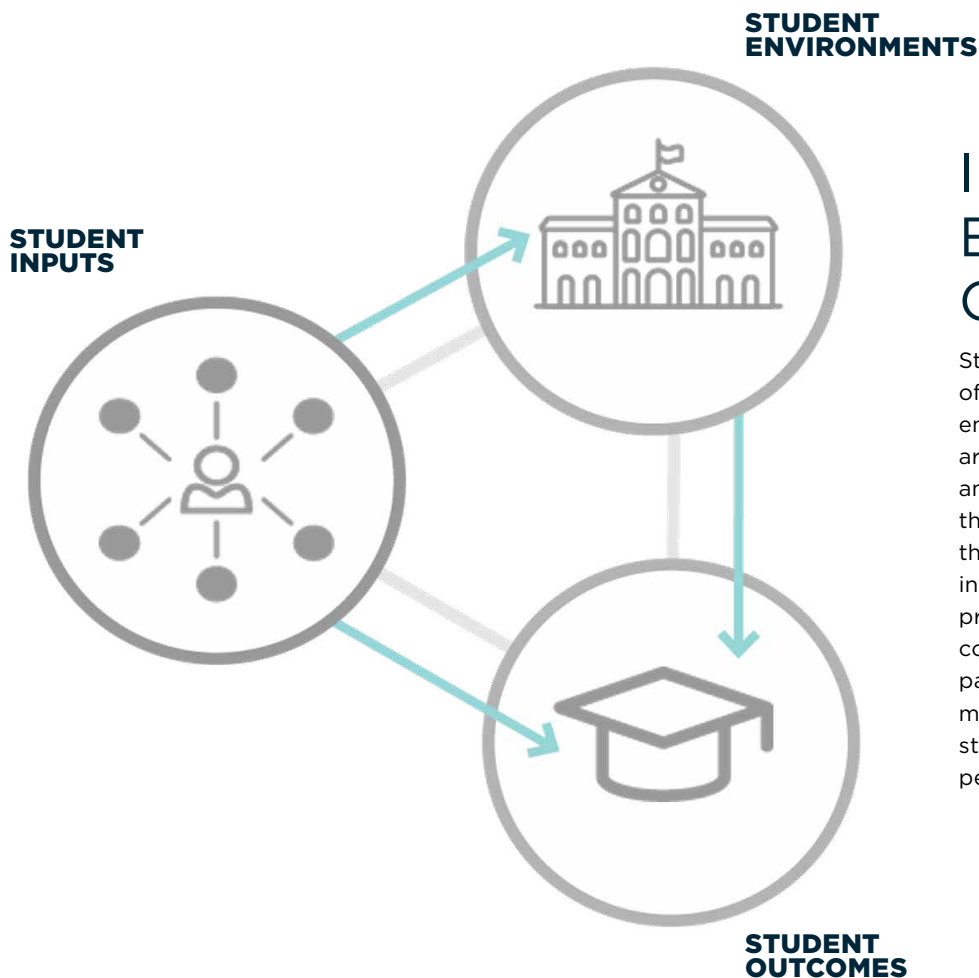


FIGURE 10
Change in persistence across multiple analyses.

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 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 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 student's 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 select 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. Statistical significance is measured at the 0.05 alpha level and utilizes confidence intervals. The results reflect 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 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 SEGMENTS THAT DID NOT EXPERIENCE A SIGNIFICANT CHANGE IN PERSISTENCE

N	Student Segment**	Model Fit***	Actual Persistence		Difference-in-Difference	CI	p-value
			Participants	Comparison Students			
282	Third Persistence Prediction Quartile (50th - 74th Percentiles)	Poor	98.55%	95.45%	2.97%	3.99%	0.0186
126*	STEM Major	Poor	98.24%	95.05%	2.88%	5.77%	0.0677
66*	Top Persistence Prediction Quartile (75th - 100th Percentiles)	Good	97.46%	97.23%	0.17%	6.53%	0.4675
52*	1-3 Terms Completed	Good	97.51%	93.43%	4.22%	11.90%	0.167
40*	Mixed or Blended Status	Poor	96.08%	93.65%	2.23%	12.58%	0.3078
34*	4+ Terms Completed	Poor	99.02%	97.17%	1.71%	7.71%	0.2734
28*	Transfer Students	Poor	96.73%	95.71%	1.61%	12.08%	0.4029
15*	Unknown Racial Heritage	Poor	95.74%	86.03%	9.68%	32.33%	0.1647
13*	Graduate Students	Poor	100.00%	87.37%	12.52%	25.60%	0.0817
13*	Two or More Racial Heritages	Poor	100.00%	85.38%	15.72%	28.96%	0.0821
10*	Readmitted Students	Good	100.00%	93.17%	6.79%	21.85%	0.178
9*	Part-time Courses	Poor	93.72%	69.20%	22.38%	44.85%	0.0572
8*	Hispanic or Latino	Poor	74.55%	97.94%	-18.29%	47.71%	0.0711
7*	Asian or Asian American	Poor	100.00%	81.63%	19.43%	44.24%	0.0598
5*	Bottom Persistence Prediction Quartile (1st - 24th Percentiles)	Poor	56.31%	57.05%	-0.91%	95.75%	0.4877

N = Sample size; CI = Confidence interval

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

**Student group definitions available in appendix F

***Model Fit is an indicator of how well the statistical model estimated the predicted persistence for the student segment. Good fit reflects only a small deviation between the predicted and actual persistence for the comparison group. Adequate fit reflects a deviation of less than 3 percentage points. Poor model fit reflects a deviation of 3 or more percentage points.

Appendix E

MATCHING DETAILS

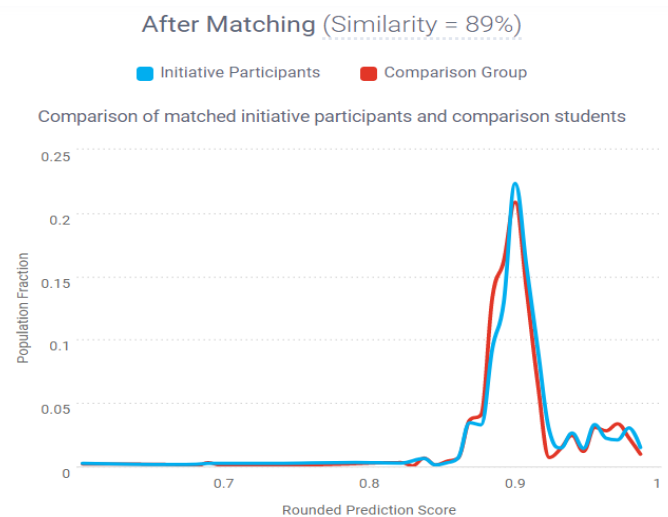
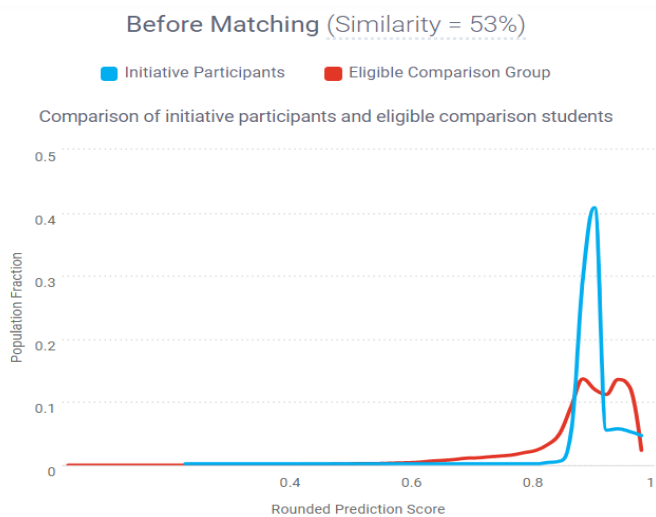
Matching for the analysis resulted in 81% of available participants, or 421 students, being successfully matched for the analysis. Participating students who did not have an adequate match in the comparison group during the PPSM process were excluded from the analysis. Match was adequate for this analysis, though the sample size was smaller than the recommended 1,000 students.

Upon reviewing the matching distributions for predicted persistence (Figure A) and propensity to participate (Figure B) there was

substantial overlap between the red and blue lines. This means that the matching included a representative sample of available participants.

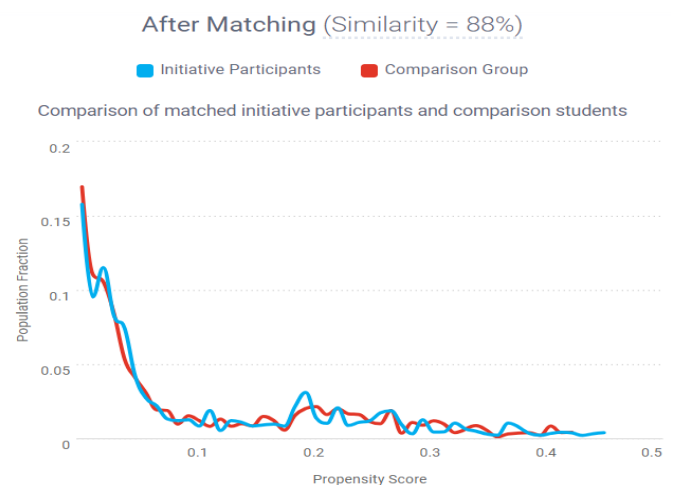
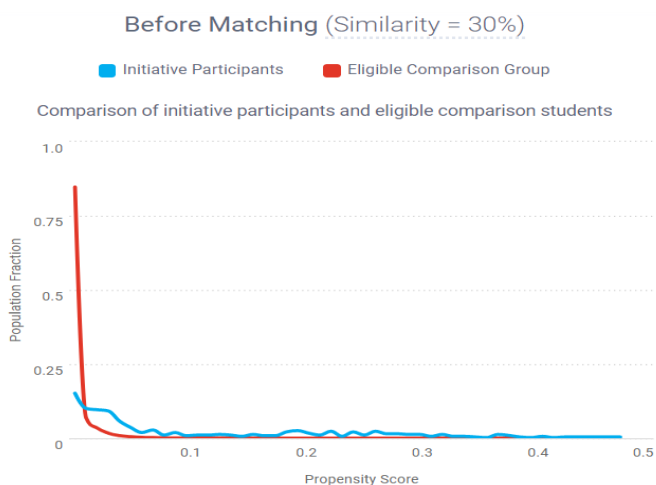
Prior to matching samples were 53% similar based on students' predicted persistence (Figure A). Following matching the samples were 89% similar.

Participating and comparison students were 30% similar based on propensity score prior to matching. Following matching, the similarity in propensity was 88%.



PREDICTED PERSISTENCE: PARTICIPATING & COMPARISON STUDENTS

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



PROPENSITY TO PARTICIPATE BTW PARTICIPATING & COMPARISON STUDENTS

Participating and comparison students received 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 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.