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2018 FITW Annual Evaluation Report
John Carroll University – Grant #P116F150059
Linked Learning and Early Warning Approach for At-Risk Student Success (LLASS)

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I. External Evaluation Executive Summary

A. Objectives and Methods

The Linked Learning and Early Warning Approach for At-Risk Student Success (LLASS) FITW program at JCU is designed to mitigate effects of potential academic difficulty that an average incoming Freshman may encounter. Engagement in aligned foundational courses provides a mechanism for the organic development of cohort-based learning communities and a framework for success in JCU's core curriculum and linked courses. Participation in aligned courses is determined by student's responses to CSI indicators of predicted academic difficulty and targets numerous factors that are important for an average student to succeed. Identifying student academic difficulty allows for proactive interventions to ensure greater success.

The objective of the current report is to evaluate the John Carroll University Linked Learning and Early Warning Approach for At-Risk Student Success (LLASS) FITW project. Evaluation is an iterative process with formative evaluation used to provide a mechanism to modify the project as necessary to reach the program goals. Process evaluation was obtained by documentation of student participation and accomplishments, student surveys, and by information from program faculty and staff. Outcome information was obtained with institutional data and by focus groups and interviews with program faculty.

B. Evaluation Progress

There are no delays from the original evaluation plan and the project is on track to maintain the proposed timeline. As previously reported, the original evaluation plan was within the context of a quasi-experimental design with aggregate matching of a non-randomized comparison group similar to the treatment group at baseline. A change was made to use a regression discontinuity design (RDD) and examine the effect of the intervention near the cut-off of the forcing variable. The difference in the regression line for the intervention group and the comparison group at the cutoff value of the forcing variable will be used to estimate of the effect of the intervention.

Students were administered three instruments including the College Student Inventory (CSI), Thriving Quotient (TQ) and the Emotional Quotient (EQ-I) inventory. Data was collected during the pre-intervention time period and at the end of the one-year intervention (post-intervention). Academic data continued to be collected for a second year. Thus far, three cohorts of students have entered the program with cohort 1 entering Fall 2016, cohort 2 entering Fall 2017 and cohort 3 entering Fall 2018. A total of 1811 unduplicated participants are represented in the collective data pool over the course of the project. (Year 1 n = 354 in the intervention group and n = 255 in the comparison group; Year 2 n = 355 in the intervention group and n = 210 in the comparison group; Year 3 n = 401 in the intervention group and n = 236 in the comparison group). The results of the College Student Inventory (CSI) were used to determine the cut-score of "forcing variable" to determine placement into either the intervention or control

group. The Thriving Quotient (TQ) and the Emotional Quotient (EQ-I) inventories were also administered but the EQ-I will only be given as a pre-test measure and will be used for enhanced mentoring of the intervention group.

Outcome measures were obtained from Institutional Academic Records and include:

- Maintain continuous enrollment in the University for two years
- Persistence to Jr. year.
- Cumulative GPA
- Number of credit hours within 2 years of initial participation.
- Maintain continuous enrollment in major was removed as an outcome measure for two reasons including 1) students do not officially declare a major until their junior year and so there is very little data on students' intent to major upon entering the program, and 2) the institutional culture at JCU encourages students to explore options for their ultimate major and does not view major changing as a negative education outcome.

This Development project will continue to meet WWC standards with reservations as proposed. Care has been taken to ensure that the evaluation will occur by What Works Clearinghouse standards.

C. Outcome Summary

The participants for the study was the entire incoming freshman class of a four-year private Liberal Arts institution in Northeast, Ohio with the exception of a few groups that were excluded from the study. Freshmen in either the Arrupe Service Scholars program or the Honors program were not eligible for participation in the project and were not placed into either condition because these programs maintain their own specialized curriculum. Students in the intervention group were identified as having "predicted academic difficulty," as indicated by results of the College Student Inventory (CSI). A regression discontinuity design (RDD) was used to examine the effect of the intervention near the cut-off of the forcing variable. Participation in the intervention and control groups was determined using a forcing variable, "Predicted Academic Difficulty," which is a composite index in the College Student Inventory (CSI) that uses a Stanine scale of 1-9, with 5 as the mean, and standard deviation = 2. The intervention consisted of a series of aligned foundational courses, linked by common themes and assignments. Incoming freshmen are block registered into a pair of aligned foundational courses that are linked by common themes and assignments, thus forming a cohort-based, interdisciplinary learning community.

Progress in Meeting Main Project Goals

The FITW overall project goal is to "mitigate effects of potential academic difficulty that an average incoming Freshman may encounter" and is specified in 3 articulated goals.

Goal 1: Develop and test a linked learning community model that integrates faculty development, student co-enrollment, service learning, and advanced student advising.
Both the development and testing phases of Goal 1 have been met. Example outcomes include:

- Faculty members participated in Professional development and developed and implemented the co-enrolled courses.
- The College Student Inventory (CSI) was used to determine cut-score (4) of the "forcing variable" to determine placement into either intervention or control group.
- A total of 1811 unduplicated participants are represented in the collective data pool over the course of the project.
- Faculty interdepartmental collaboration increased (100% of faculty reported an increase) and faculty reported being part of a linked learning community
- Students in the intervention condition formed cohort-based learning communities.

Goal 2: Identify factors predictive of students' success that inform development of scalable interventions aimed to improve outcomes for undergraduate students at-risk for success in college.

There was mixed success in the outcomes that were predicted for the intervention. Prior to the intervention, students within the intervention were predicted to have less academic success. With a regression discontinuity design, it would be expected for there to be discontinuity in the regression lines for the outcome measures. Although this was not evident, the students in the intervention performed as well as the control students on 2 of the 3 measures. Analysis was conducted with cohort 1 on these factors and it is anticipated that these more marginal successes will be better defined with the additional cohorts.

- Outcome 1: There will be discontinuity in regression lines for GPA at the cutoff: The intervention subjects will have higher scores than predicted. Outcome 1 was not obtained as there was no discontinuity at the cut point.
- Outcome 2: There will be discontinuity in regression lines for Credit hours obtained at the cutoff: The intervention subjects will have more hours than predicted. Objective 2 appears to have been met in that there was no difference between the groups in terms of the number of credit hours that were obtained. The line is rather flat which may have prevented the detection of any discontinuity, but the two groups had similar success in completing credit hours.
- Outcome 3: Within the bandwidth, intervention subjects will be more likely to maintain continuous enrollment in the University for two years compared to controls.
  Outcome 4: Within the bandwidth, intervention subjects will be more likely to persist to their Jr. year compared to controls.
  There was concern that measures for Outcomes 3 and 4 which are both measures of persistence were too similar, so these outcomes have been redefined as having not withdrawn prior to their Junior year. There was no difference between the groups in terms of the number of students who withdrew within the bandwidth.

Goal 3: Use predictive statistical models and data techniques to track and model students' progress through an "early alert" advising system.

Goal 3 has been partially meet and is in progress.

- Meetings between faculty and administrators began during year 2 to plan for the logistics involved with an expanded early alert advising system. (See Appendix 2: Faculty/Staff Qualitative Evaluation Survey Interviews and Focus Group)
- Discussion is ongoing on how the data will be shared with the community including outcome data and data from the instruments that will be important to mentoring/advising the students. (See Appendix 2: Faculty/Staff Qualitative Evaluation Survey Interviews and Focus Group)
- Planning is underway to develop avenues of providing additional support services to students based on their identified needs such as their various levels of readiness and items such as Receptivity to Institutional Help and items related to financial aid that have already been identified as being important. Areas of support might include enhancement of current processes such as:
    - Living learning community advising in dorms
    - Graduate student academic coaches
    - Support for personal problems
    - Self-selected programs for STEM students
- A tremendous amount of progress has been made with using data techniques to track and model student progress students for an early alert system The GlyphEd program has been utilized to do explore individual and group data graphically for use in an advising system.
    - The data is presented with various shapes and colors in a 3 dimensional Glyph that are different for each component of the student data.
    - Each student is represented by a unique 3 dimensional Glyph.
    - It is possible to visualize 3 variables at a time in order to identify patterns.
    - One pattern that has been identified is that students who withdrew from JCU had high perceptions of financial cost.
    - One challenge with the program is having it interface properly with the university computer system.

II. Evaluation Findings

A. Intervention and Comparison Condition

1. Intervention

a. Key Intervention Activities

Aligned Learning Communities and Collaborative Course Development: The intervention consisted of a series of aligned foundational courses, linked by common themes and assignments. Incoming freshmen are block registered into a pair of aligned foundational courses that are linked by common themes and assignments, thus forming a cohort-based, interdisciplinary learning community. One course was typically content-based (science, math) and the other an application course (writing, speech). These courses were developed during a series of faculty workshops conducted prior to implementing the intervention. An example of this alignment is the Biology and Oral Communication pair, where the common assignments includes each student demonstrating skills with a series of presentation styles, such as informative, or persuasive. A goal of this set of aligned courses is to prepare students in natural science courses to more effectively communicate to diverse audiences, and in diverse settings.

The Linked Courses Model provides a shared experience for freshmen that focused on a content-based course that was actively supported by a skills course. The aligned courses were designed to mitigate effects of potential academic difficulty that an average incoming freshman may encounter. The faculty of each course may have taught independently or together and coordinated syllabi and assignments so that the classes complement each other. Engagement in aligned foundational courses provides a mechanism for the organic development of cohort-based learning communities and a framework for success in core curriculum and linked courses. The catalog of aligned courses includes Biology, English, Oral Communication, Theology and Religious Studies, and Economics.

b. Intervention Participants

The participants for the study was the entire incoming freshman class of a four-year private Liberal Arts institution in Northeast, Ohio with the exception of a few groups that were excluded from the study. The university has an approximate undergraduate enrollment of 3,000 students. Freshmen in either the Arrupe Service Scholars program or the Honors program were not eligible for participation in the project and were not placed into either condition because these programs maintain their own specialized curriculum. Since these students are not anticipated to be in the group of interest for intervention, "the murky middle", it is not anticipated that excluding them from the project will impact the number of students in the intervention.

Students in the intervention group were identified as having "predicted academic difficulty," as indicated by results of the College Student Inventory (CSI) (See Assignment to Intervention and Comparison Group below. Thus far, three cohorts of

students have entered the program with cohort 1 entering Fall 2016, cohort 2 entering Fall 2017 and cohort 3 entering Fall 2018. A total of 1811 unduplicated participants are represented in the collective data pool over the course of the project. (Year 1 n = 354 in the intervention group and n = 255 in the comparison group; Year 2 n = 355 in the intervention group and n = 210 in the comparison group; Year 3 n = 401 in the intervention group and n = 236 in the comparison group).

2. Comparison

a. Comparison Group Activities

Freshmen are enrolled in foundational courses under the standard or "business as usual" model. Students in the comparison group were not identified as having "predicted academic difficulty," as indicated by results of the College Student Inventory (CSI) (See Assignment to Intervention and Comparison Group below).

b. Comparison Group Did Not Receive

Comparison group did not receive aligned foundational courses and so faculty teaching these courses did not explicitly collaborate.

B. Study Design and Measures

1. Assignment to Intervention and Comparison Group

a. Method of Assignment

A regression discontinuity design (RDD) was used to examine the effect of the intervention near the cut-off of the forcing variable. Participation in the intervention and control groups was determined using a forcing variable, "Predicted Academic Difficulty," which is a composite index in the College Student Inventory (CSI) that uses a Stanine scale of 1-9, with 5 as the mean, and standard deviation = 2. The use of the original Stanine scores were used to approximate the "murky middle" from a theoretical perspective and the fuller data with the raw scores were used for the project evaluation.

A student is considered "average" or "near the mean" if the Stanine score is 4,5, or 6. After careful consideration, the researchers chose "4" as the cut-score because our study also is informed by the literature on the "murky middle," which suggests that 45% of total drop-outs nationwide finish a year of college and with a grade-point average between 2.0 and 3.0 (Venit – Educational Advisory Board – The "Murky-Middle Project," 2014). The project used a "sharp" regression discontinuity design (RDD). Recognizing that the WWC standard for RDD indicates that there must be four values on each side of the cut-score, the raw scores were used rather than the Stanine scores for the

final design since the requirement of four discrete values on each size of the cut-point could be satisfied by using the raw scores that were used to derive the Predicted Academic Difficulty Stanine scale (Porowski, 2016).

b. Unit of Assignment

Individual students were assigned to the Intervention or Comparison Group based on their Predicted Academic Difficulty score on the CSI.

c. Timing of Inclusion

Students were administered the College Student Inventory (CSI) after accepting JCU and prior to entering college during the pre-intervention time period at New Student Orientation. This instrument was used to determine the cut-score of "forcing variable" to determine placement into either the intervention or control group.

d. Integrity of Forcing Variable

i. *Institutional Integrity*: There was no systematic manipulation of the CSI "forcing variable," which is, as discussed above, a standardized measure. Scorers have no opportunity nor incentive to manipulate CSI scores. No scores were changed from their true values to influence treatment assignments, and the researchers, prior to administration of the CSI survey determined the "cut value."

ii. *Graphical Integrity*: This was presented in last year's report and has been updated based on feedback based on feedback from the FITW TA recommendations. The updated graphical analysis is included in Appendix 5.

2. Baseline and Outcome Measures

a. College Student Inventory (CSI)

i. *Description of Measure*: The CSI is comprised of Likert-type items consisting of 19 independent scales. Each item uses a Likert scale of 1 to 7 with 1 equaling "Not At All True" and with 7 meaning "Completely True." The 19 scales of the College Student Inventory are designed to identify those predispositions and precollege experiences and attributes, which may subsequently influence the student's ability to succeed and persist in college. The major scales of the CSI include: receptivity to academic assistance, academic confidence, attitude toward educators, career closure, receptivity to

career counseling, desire to finish, desire to transfer, family emotional support, receptivity to financial guidance, opinion tolerance, receptivity to social enrichment, self-reliance, study habits, sociability, math and science confidence, verbal and writing confidence.

ii. *Reliability:* The CSI compares favorably to several well-respected personality inventories. Jackson's Personality Research Form (PRF Form E, 16 items per scale, N=84) obtained an average homogeneity coefficient of .72. The Meyers-Briggs Type I indicator, used by many college counseling centers, has an average coefficient alpha reliability of .81, while the California Psychological Inventory (CPI), respected by psychologists, has an average coefficient alpha reliability of .72 (USA Group Noel-Levitz, 1993). With this solid homogeneity as a base, the CSI's stability (test-retest reliability) is also quite good (USA group Noel-Levitz, 1993).

iii. *Face Validity:* The Predicted Academic Difficulty score on the CSI is clearly defined, and the content assessed by the measure aligns with its definition.

iv. *Over-Alignment:* The CSI is not aligned with the intervention and is used to assign students to the intervention and comparison groups.

v. *Consistently Collected in Both Conditions:* The CSI was administered to students during New Student Orientation prior to assignment to condition.

b. Thriving Quotient (TQ)

i. *Description of Measure:* The TQ measures academic, social, and psychological aspects of a student's college experiences that is most predictive of academic success, institutional fit, satisfaction with college, and ultimately graduation. The 25 items on the TQ cluster onto 5 scales: 1) Engaged Learning – a measure of the degree to which students are meaningfully processing what happens in class, energized by what they are learning, and continuing to think about it outside of class, 2) Academic Determination – a measure of students' goal-directedness, investment of effort, and regulation of their own learning and use of time, 3) Positive Perspective – a measure of students' optimism, and explanatory style, 4) Social Connectedness – a measure of students' involvement in healthy relationships and social support networks, whether on or off campus; and 5) Diverse Citizenship – a measure of students' desire to make a difference in the community around them, as well as their openness to differences in others.

ii. *Reliability:* The five scales of the TQ are highly reliable, with internal consistency estimated as Cronbach's alpha = .91. Each scale also meets national standards of reliability: Engaged Learning ($\alpha = .85$), Diverse

Citizenship (α = .80), Academic Determination (α = .83), Positive Perspective (α = .83), and Social Connectedness (α = 81).

iii. *Face Validity*: The TQ is clearly defined, and the content assessed by the measure aligns with its definition.

iv. *Over-Alignment*: The TQ is not aligned with the intervention

vi. *Consistently Collected in Both Conditions:* The TQ was administered to students during New Student Orientation prior to assignment to condition and during Spring semester of their Freshman year.

c. Emotional Quotient Inventory (EQ-I)

i. *Description of Measure:* The EQ-I measures five domains of emotional intelligence including Intrapersonal, Interpersonal, Stress Management, Adaptability, and General Mood with 15 subscales. It is designed to help students understand how their emotional and social functioning impact their academic, professional and personal performance.

ii. *Reliability:* The final 133-item version of the EQ-i boasts a normative database of nearly 4,000 participants, ranging widely in age and ethnicity.

iii. *Face Validity:* The EQ-I is clearly defined, and the content assessed by the measure aligns with its definition.

vii. *Over-Alignment:* The EQ-I is not aligned with the intervention. It was only given as a pre-test measure and will ultimately be used for enhanced mentoring of the intervention group.

viii. *Consistently Collected in Both Conditions:* The EQ-I was administered to students during New Student Orientation prior to assignment to condition.

d. Baseline Academic Measure: Standardized College Admission Test Verbal scores

i. *Description of Measure*: The SAT and ACT are both national standardized college admission tests. All of the students took at least one of the tests. If the student took either test more than once, the highest score obtained was utilized. All SAT scores were converted to ACT scores using the SAT conversion table.

ii. *Reliability*: The SAT and ACT are nationally normed tests that have undergone extensive reliability testing.

iii. *Face Validity:* The SAT and ACT are national standardized tests that are predictive of student success in college.

iv. *Over-Alignment*: The SAT and ACT are not aligned with the intervention and were only used to establish baseline Academic equivalency.

v. *Consistently Collected in Both Conditions:* The students took the SAT and ACT tests under standardized conditions prior to applying to JCU.

e. Baseline SES/Demographic Measure: Pell Eligibility

i. *Description of Measure:* Pell Eligibility refers to students who qualify to receive a Pell grant as part of their federal financial aid award.
ii. *Reliability:* Pell Eligibility is determined by the federal government using standardized requirements.
iii. *Face Validity:* Pell Eligibility is a direct measure of a family's ability to pay for college.
vi. *Over-Alignment* Pell Eligibility is not aligned with the intervention and was only used to establish baseline SES/Demographic equivalency.
vii. *Consistently Collected in Both Conditions:* The students applied for federal financial aid online prior to the beginning of the project.

f. Outcome Measures: Institutional Academic Records

i. *Description of Measure:* The following academic data will be used to measure the program outcomes: Maintain continuous enrollment in the University for two years; Persistence to Jr. year; Cumulative GPA; and Number of credit hours within 2 years of initial participation. Maintain continuous enrollment in major was removed as an outcome measure for two reasons including 1) students do not officially declare a major until their junior year and so there is very little data on students' intent to major upon entering the program, and 2) the institutional culture at JCU encourages students to explore options for their ultimate major and does not view major changing as a negative education outcome.
ii. *Reliability:* The academic outcome measures are obtained directly from Institutional Records.
iii. *Face Validity:* The academic outcome measures are direct measures of student academic success.
iv. *Over-Alignment*: The academic outcome measures are not aligned with the intervention as students were assigned based on their Predicted Academic Difficulty score on the CSI.
v. *Consistently Collected in Both Conditions:* The academic outcomes are obtained from institutional records from the Registrar's Office for both conditions.

g. Faculty/Staff Surveys Interviews and Focus Group

i. *Description of Measure:* Evaluation was performed by use of survey questions, a focus group, and structured interviews of the faculty and staff to assess program progress, impact on their departments, and state of the collaboration.
ii. *Reliability:* Inter-rater reliability ranged from 100% to 85% agreement.
iii *Face Validity:* The questions on these instruments are straightforward and their purpose is transparent to the participants.
iv: *Over-Alignment:* The questions are not aligned with the intervention.
v. *Consistently Collected in Both Conditions:* The questions are about the entire program and so both conditions are represented in one series of questions.

h. Outcome evaluation: Student Focus Group

i. *Description of Measure:* Students participated in a focus group to assess program progress, impact on their learning, and formation of a community of learners.
ii. *Reliability:* Inter-rater reliability ranged from 100% to 87% agreement.
iii *Face Validity:* The questions on these instruments are straightforward and their purpose is transparent to the participants.
iv: *Over-Alignment:* The questions are not aligned with the intervention.
v. *Consistently Collected in Both Conditions:* The questions were asked by the same evaluator in the same location at nearly the same time to both groups.

C. Analytic Approach

1. WWC Standards

The project team consulted with our TA, Allan Porowski, to ensure that the analysis methods meet the WWC standards.

The project will meet the four items necessary to be eligible for review. Items B "the forcing variable is ordinal and includes a minimum of four or more unique values below the cutoff and four or more unique values above the cutoff" necessitated careful consideration, but has been meet as described above. To partially satisfy the standard, we plan to fully satisfy standard 1, and 2; partially satisfy standard 4; and anticipate that standard 5 will be waived because we are performing a sharp (rather than fuzzy) RDD. In a sharp RDD, all intervention group members receive intervention services and no comparison group members receive services. In a FRDD some intervention group members do not receive intervention services or some comparison group members receive embargoed services, but there is still a substantial discontinuity in the probability of receiving services at the cutoff.

We reviewed the criteria within Standard 4 and anticipate that it will be partially satisfied. To partially satisfy standard 4 the study will satisfy criteria A, B, and E.

- Criterion A will be satisfied in that the local average treatment effect for an outcome will be estimated using a statistical model that controls for the forcing variable. Local linear regression models were run for which statistically the data file will be "split" and separated by group with academic outcomes as the dependent variable.
- Criteria B will be satisfied by setting the bandwidth around the cutoff value so that there is an appropriate range of the forcing variable values for selecting the sample. The study has provided evidence for a justified bandwidth including:
    - The band has to be symmetrical about the cut point. In our case the cut point is 4.00.
    - We have chosen a bandwidth that has one full segment on each side (which includes 3.01-3.99 on one side of the cut point; and 4.01-4.99 on the other side of the cut point).
    - A local linear regression is estimated, within one bandwidth on each side of the threshold.
- Criterion E will be satisfied by including a graphical analysis (Appendix 5) that displays the relationship between the outcome and forcing variable, including a scatter plot and a fitted curve. The graphical analysis was consistent with the bandwidth.

2. Statistical Model for Estimating Impacts

The current report focuses on cohort 1's outcome data since it is the only cohort includes sophomore level data.

The primary analysis to measure the treatment effect:

Dependent variable = intercept + B1(treatment indicator) + B2(forcing variable centered at 0) + error term

The treatment coefficient (B1) will be the difference between treatment and comparison groups at the cut point.

3. Approach to Handling Missing Data

We have followed the FITW TA team recommendation and exclude cases from the analytic samples that have missing outcome data or missing baseline data. It should be noted that variables within the persistence domain cannot have missing data for the outcome data. The revised guidance allows for the use of analytic samples with missing data and so we will revise this approach if the FITW TA team changes their recommendation in response to the revised guidance.

4. Approach for Establishing Baseline Equivalence

Baseline equivalence was established as part of the year 2 report and has been updated based on feedback from the FITW TA recommendations. As reported in year 2, the Academic measure that was used for establishing baseline equivalence is the ACT verbal score. Since some students took both SAT and ACT standardized tests prior to college admission; we first assessed our data to identify which test students took. Additionally, if students took either test more than once, we used the highest score in our assessment. Then, using SAT conversion table, we transformed all SAT scores to ACT equivalent scores.

As reported in year 2, the Demographic measure that was used for establishing baseline equivalence is Pell Eligibility which is a Dichotomous Indicator of Socio-Economic Status (SES).

a. Statistical Model for Baseline Equivalence

Baseline equivalence for the Academic measure was limited to the band of interest (Stanines 3-4) and determined using a model-based local linear regression

b. Calculation of Baseline Mean Difference

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.079[a]	.006	.003	4.22909

a. Predictors: (Constant), Predicted Academic Difficulty (raw)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	31.370	1	31.370	1.754	.186[b]
	Residual	5007.850	280	17.885		
	Total	5039.220	281			

a. Dependent Variable: NEW_VERBAL

b. Predictors: (Constant), Predicted Academic Difficulty (raw)

Table 1: Baseline Equivalence of ACT Verbal scores within the Bandwidth.

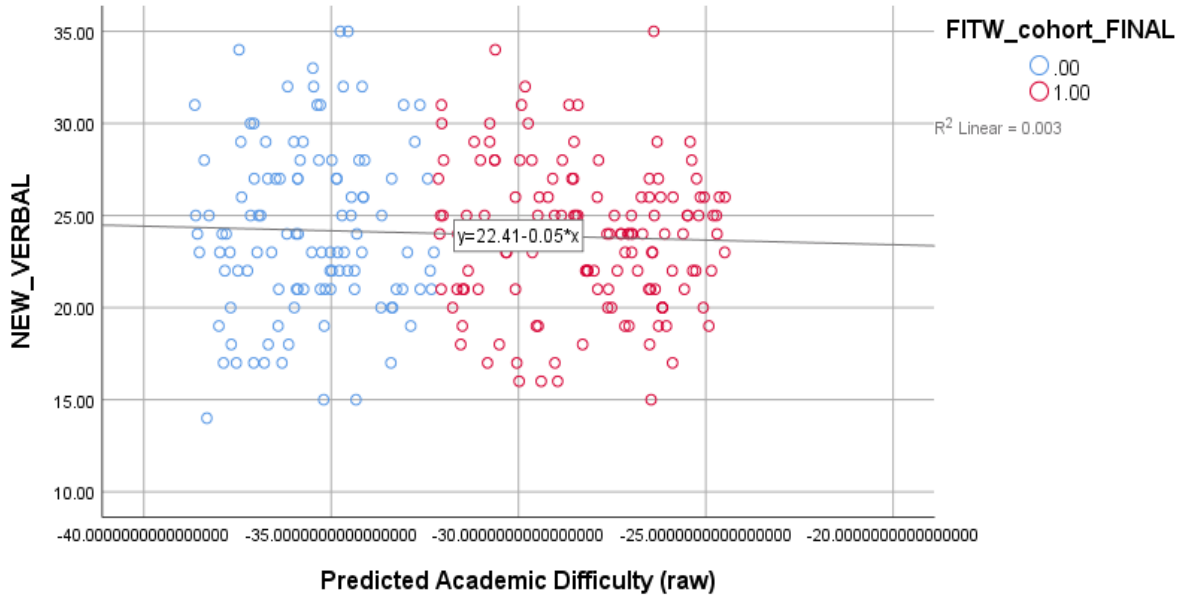

Figure 1: Baseline Equivalence of ACT Verbal scores within the Bandwidth. Linear Fit of the Regression Line showing no discontinuity at the cut point.

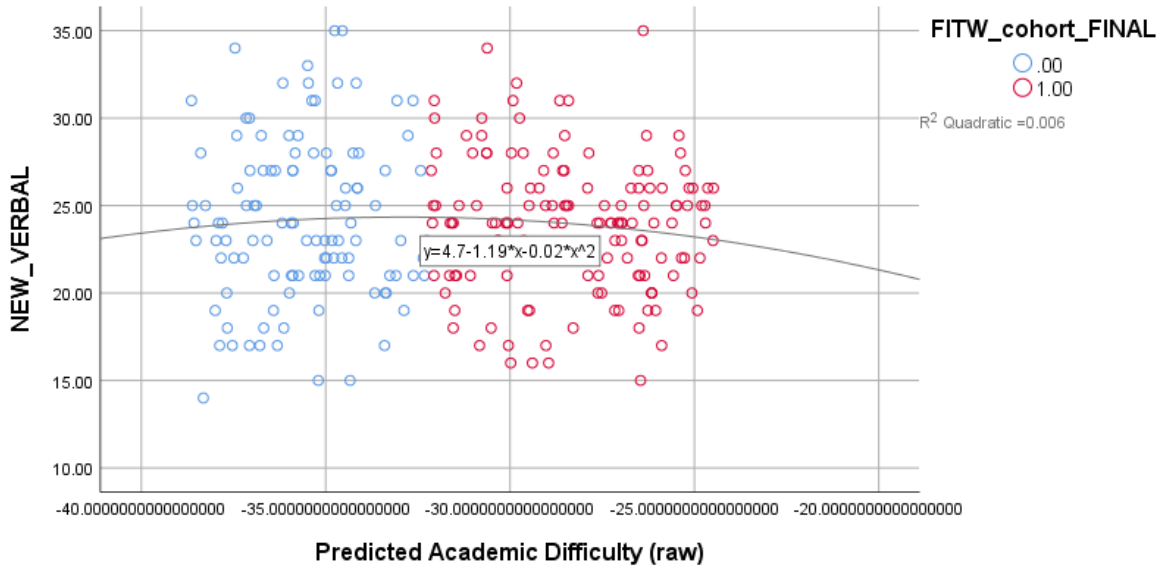

Figure 2: Baseline Equivalence of ACT Verbal scores within the Bandwidth. Quadratic Fit of the Regression Line showing no discontinuity at the cut point.

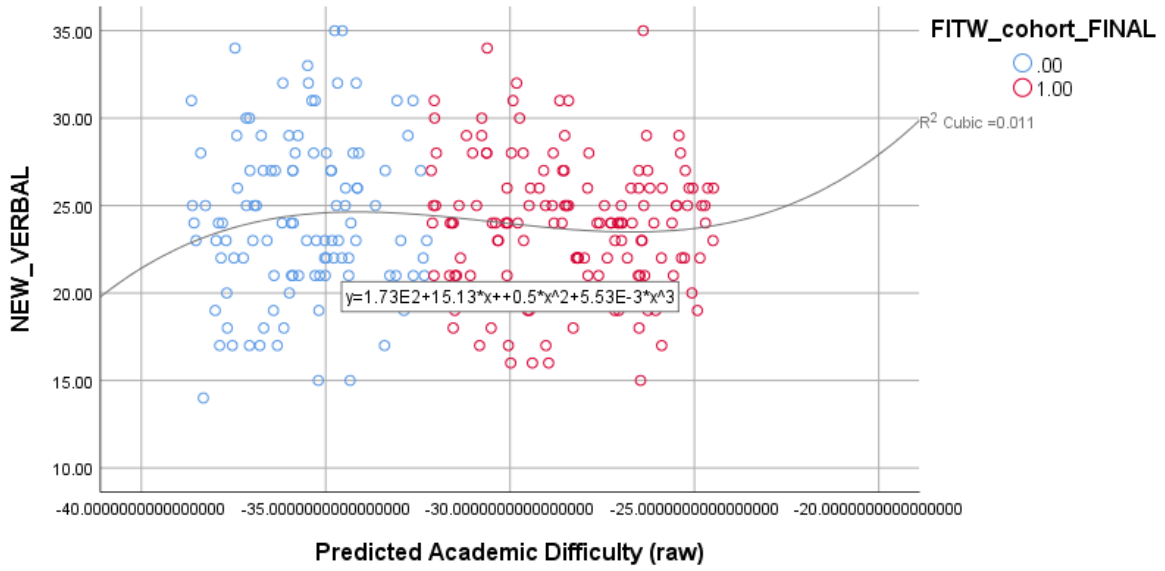

Figure 3: Baseline Equivalence of ACT Verbal scores within the Bandwidth. Cubic Fit of the Regression Line showing no discontinuity at the cut point.

The graphical analysis replicates the regression analysis and there is clearly no discontinuity as the cut point such that there is baseline equivalence of the verbal ACT scores.

Calculation of the Pell eligibility baseline equivalence is conducted using Hedge's *g* calculation for binary variables. We determined the mean (proportion) of Pell eligible students in the intervention (0.21, SD= .410, n=151) and comparison group (.28, SD= .449, n=116) at the bandwidth (3-4). The result is a relative effect size g = -0.163, with correlation coefficient r=-0.081, suggesting there is a small or trivial difference in Pell eligibility among students in the treatment and comparison groups. An analysis similar to the ACT scores can be run by using the predicted value of Pell grant eligibility at the cut point for each group and then calculate the intercept at the cut point set to zero for each group. The raw proportions are then used to calculate a Cox Index which would provide an even closer equivalence than the .21 and .28 comparison.

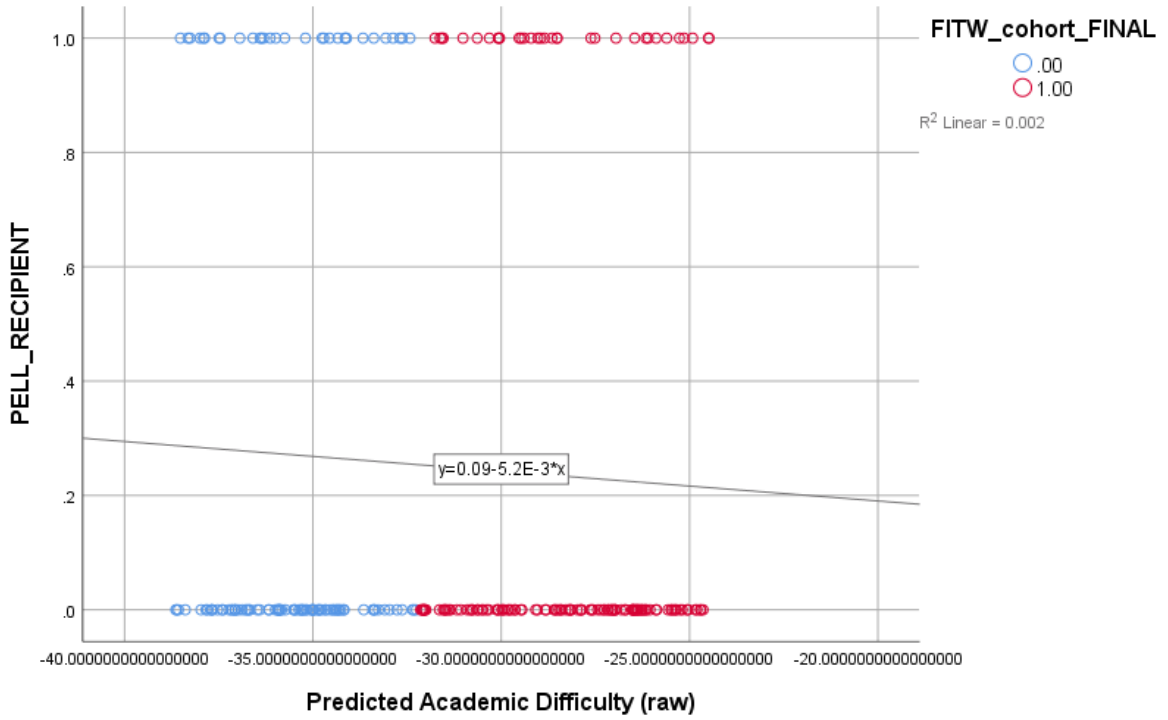

Figure 4: Baseline Equivalence of Pell Reipients within the Bandwidth. Linear Fit of the Regression Line showing no discontinuity at the cut point.

D. Findings: Progress in Meeting Main Project Goals

The FITW overall project goal is to "mitigate effects of potential academic difficulty that an average incoming Freshman may encounter" and is specified in 3 articulated goals.

Goal 1: Develop and test a linked learning community model that integrates faculty development, student co-enrollment, service learning, and advanced student advising.

a. Development: Goal 1 has been meet.

- Faculty members participated in Professional development and developed and implemented the co-enrolled courses.
- Results of the College Student Inventory (CSI) was used to determine cut-score (4) of the "forcing variable" to determine placement into either intervention or control group.
- A total of 1811 unduplicated participants are represented in the collective data pool over the course of the project. Year 1 n = 354 in the intervention group and n = 255 in the comparison group; Year 2 n = 355 in the intervention group and n = 210 in the comparison group; Year 3 n = 401 in the intervention group and n = 236 in the comparison group.

- Intervention cohorts were co-enrolled in foundational writing or oral communication courses linked by a common theme; control cohorts followed the normative enrollment pattern of enrolling into discrete non-linked writing and oral communication courses.
- Intervention cohorts participated in service learning projects as a component of the pairing.
- JCU has institutionalized the methods of assigning students to linked courses.
- The JCU FITW project has resulted in broad institutional changes across multiple administrative and student support areas including: Center for Digital Media, Information Technology Services Group, The Center for Service and Social Action, Academic Advising, Registrar's Office, Admissions and Enrollment, Office of Student Engagement, Office of Sponsored Programs, Business and Finance, and Provost's Office of Budget Management.

b. Testing: Goal 1 has been meet.

- Faculty interdepartmental collaboration increased (100% of faculty reported an increase) and faculty reported being part of a linked learning community (See results in Appendix 2 Faculty/Staff Qualitative Evaluation Survey Interviews and Focus Group).
- Faculty teaching linked co-enrolled courses reported consulting with each other about students who could benefit from advanced advising (See results in Appendix 2 Faculty/Staff Qualitative Evaluation Survey Interviews and Focus Group).
- Baseline equivalency was demonstrated for academic achievement (SAT/ACT scores) and student socio-economic status (Pell Grant eligibility). (See section I1. C. 3 Approach for Establishing Baseline Equivalence for a full description).
- Results of the College Student Inventory (CSI) was used to determine a cut-score (4.00) of "forcing variable" to determine placement into either intervention or control group. Students who scored low on Predicted Academic Difficulty (approximated by stanines 1-3) were in the control condition; and students who scored in the middle (approximated by stanines 4-6) or who scored low (approximated by stanines 7-9) were place in the intervention condition. The CSI uses a continuous measure based upon a 1-9 stanine scale. The mean score for the CSI is 5; and the standard deviation is 2. (See section II.B.1 Assignment to Intervention and Comparison Group for a full description.). WWC requirements for balance on each side of the cut-score will be met since the raw scores, rather than the Stanine score, was used for Predicted Academic Difficulty.
- Students in the intervention condition formed cohort-based learning communities. Engagement in aligned foundational courses provided a mechanism for the organic development of cohort-based learning communities and a framework for success in JCU's core curriculum and linked courses. (See results in Appendix 3: Student Focus Group).

Goal 2: Identify factors predictive of students' success that inform development of scalable interventions aimed to improve outcomes for undergraduate students at-risk for success in college.

Participation in aligned courses was determined by student's responses to CSI indicators of predicted academic difficulty and targets numerous factors that are important for an average

student to succeed. Identifying student academic difficulty allowed for proactive interventions to ensure greater success. There was mixed success in the outcomes that were predicted for the intervention. Prior to the intervention, students within the intervention were predicted to have less academic success. With a regression discontinuity design, it would be expected for there to be discontinuity in the regression lines for the outcome measures. Although this was not evident, the students in the intervention performed as well as the control students on 2 of the 3 measures. Analysis was conducted with cohort 1 on these factors and it is anticipated that these more marginal successes will be better defined with the additional cohorts.

Cohort 1:

Cohort 1 were assigned to control or intervention conditions with 255 control students and 354 intervention students Total n=609. Outcomes are presented for Cohort 1 based on sophomore year data.

	Cohort 1 Gender			
	Male	Female	Prefer Not to Respond	Total
Control	116	137	2	255
Intervention	210	142	2	354
Total	326	279	4	609

Table 2: Cohort 1 Gender

	Cohort 1 Race/Ethnicity								
		Amer. Indian or Alaskan	Asian or Pacific Islander	Black/ African-American	Hispanic or Latino	Multiracial	Prefer Not to Respond	White/ Caucasian	Total
Control	5	1	8	6	3	7	4	221	255
Intervention	9	0	8	26	19	16	6	270	354
Total	14	1	16	32	22	23	10	491	609

Table 3: Cohort 1 Race and Ethnicity

Outcome 1: There will be discontinuity in regression lines for GPA at the cutoff: The intervention subjects will have higher scores than predicted. Outcome 1 was not obtained as there was no discontinuity at the cut point.

	FITW_cohort_1	N	Mean	Std. Deviation	Std. Error Mean

CUM_GPA	Control	100	3.23063	.571672	.057167
	Intervention	125	2.99339	.705230	.063078

Table 4a: Cohort 1 Cumulative GPA of the Control and Intervention conditions around the cut-point within the bandwidth.

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means			
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference
UM_GPA	Equal variances assumed	1.293	.257	2.723	223	.007	.237238
	Equal variances not assumed			2.787	222.956	.006	.237238

Table 4 b: Cohort 1 Cumulative GPA of the Control and Intervention conditions around the cutpoint within the bandwidth. Test of Equality of Variances

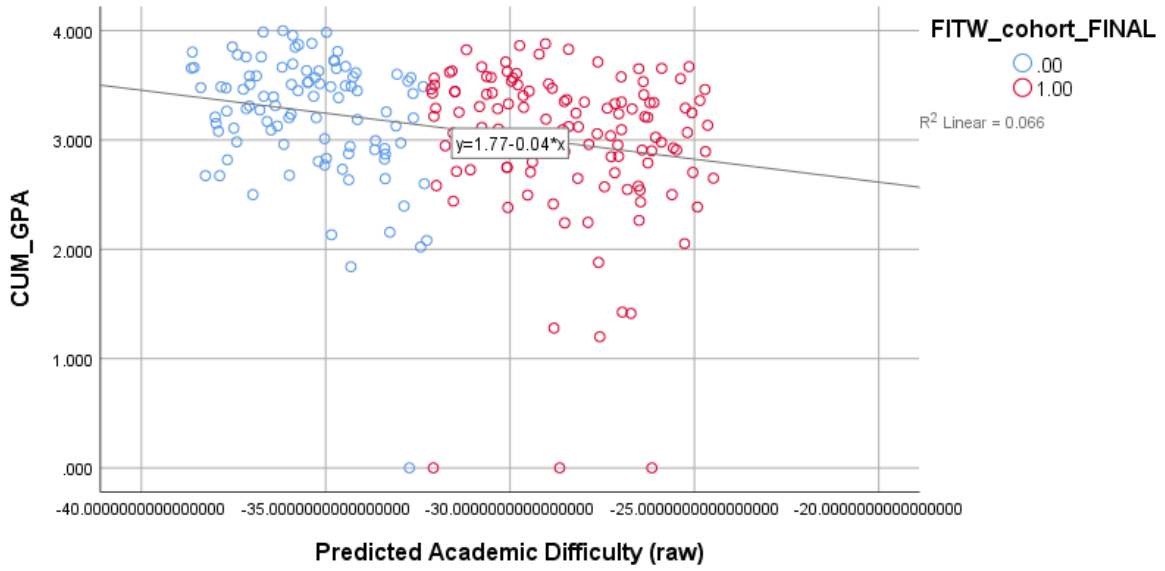

Figure 5: Cohort 1 Cumulative GPA of the Control and Intervention conditions around the cut-point within the Predicted Academic Difficulty.

Outcome 2: There will be discontinuity in regression lines for Credit hours obtained at the cutoff: The intervention subjects will have more hours than predicted.

Objective 2 appears to have been met in that there was no difference between the groups in terms of the number of credit hours that were obtained. The line is rather flat which may have prevented the detection of any discontinuity, but the two groups had similar success in completing credit hours.

	FITW_cohort_1	N	Mean	Std. Deviation	Std. Error Mean
EARNED_HOURS_SP2018	Control	100	59.92000	18.390643	1.839064
	Intervention	128	54.79855	21.267485	1.879798

Table 5a: Cohort 1 Earned Credit Hours of the Control and Intervention conditions around the cut-point within the bandwidth.

Independent Samples

		Levene's Test for Equality of Variances				
		F	Sig.	t	df	Sig. (2-tailed)
EARNED_HOURS_SP2018	Equal variances assumed	2.217	.138	1.913	226	.057
	Equal variances not assumed			1.947	223.637	053

Table 5b: Cohort 1 Earned Credit Hours of the Control and Intervention conditions around the cut-point within the bandwidth. Test for Equality of Variances

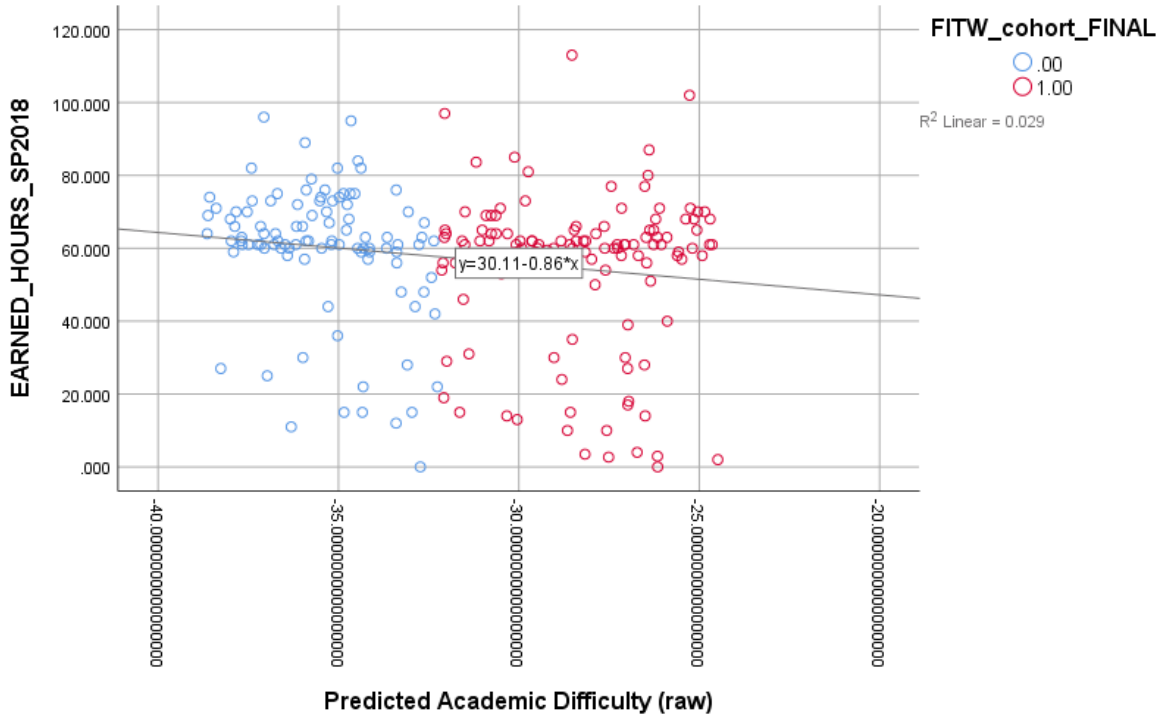

Figure 6: Cohort 1 Earned Credit Hours of the Control and Intervention conditions around the cut-point within the Predicted Academic Difficulty.

Outcome 3: Within the bandwidth, intervention subjects will be more likely to maintain continuous enrollment in the University for two years compared to controls
And
Outcome 4:
Within the bandwidth, intervention subjects will be more likely to persist to their Jr. year compared to controls.

There was concern that measures for Outcomes 3 and 4 which are both measures of persistence were too similar, so these outcomes have been redefined as having not withdrawn prior to the Junior year. There was no difference between the groups in terms of the number of students who withdrew within the bandwidth.

stayeduntiljr * FITW_cohort_1 Crosstabulation

Count

		FITW_cohort_1		
		.Control	Intervention	Total
stayeduntiljr	Withdrew	15	26	41
	Maintained Enrolement	100	118	218
Total		115	144	259

Table 6a: Cohort 1 Persistence of the Control and Intervention conditions around the cut-point within the bandwidth.

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	1.205[a]	1	.272		
Continuity Correction[b]	.859	1	.354		
Likelihood Ratio	1.222	1	.269		
Fisher's Exact Test				.307	.177
Linear-by-Linear Association	1.201	1	.273		
N of Valid Cases	259				

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 18.20.

b. Computed only for a 2x2 table

Table 6b: Cohort 1 Persistence of the Control and Intervention conditions around the cut-point within the bandwidth. Chi-Square

Symmetric Measures

		Value	Asymptotic Standard Error[a]	Approximate T[b]	Approximate Significance
Nominal by Nominal	Contingency Coefficient	.068			.272
Interval by Interval	Pearson's R	-.068	.061	-1.096	.274[c]
Ordinal by Ordinal	Spearman Correlation	-.068	.061	-1.096	.274[c]
N of Valid Cases		259			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

Table 6c: Cohort 1 Persistence of the Control and Intervention conditions around the cut-point within the bandwidth. Symmetry.

Cohort 2:

Cohort 2 were assigned to control or intervention conditions with 210 control students and 355 intervention students Total n=565. Proposed outcome data for Cohort 2 is outside of this reporting cycle.

		Cohort 2 Race and Ethnicity							
		Amer. Indian or Alaskan	Asian or Pacific Islander	Black/ African-American	Hispanic or Latino	Multi-racial	Prefer Not to Respond	White/ Caucasian	Total
Control	0	1	2	3	3	3	1	200	210
Intervention	5	10	16	17	10	10	1	296	355
Total	6	5	11	18	20	13	2	496	565

Table 7: Cohort 2 Race and Ethnicity

Cohort 3:
Cohort 3 students were assigned to control or intervention conditions with 236 control students and 401 intervention students Total n=637. Outcome data for Cohort 3 is outside of this reporting cycle.

		Cohort 3 Gender			
		Female	Male	Other	Total
Control	0	109	126	1	236
Intervention	1	145	255	0	401
Total	1	254	381	1	637

Table 8: Cohort 3 Gender

	Cohort 3 Race and Ethnicity								
		Amer. Indian or Alaskan	Asian or Pacific Islander	Black/ African-American	Hispanic or Latino	Multi-racial	Prefer Not to Respond	White/ Caucasian	Total
Control	1	1	5	5	6	3	1	214	236
Intervention	5	0	12	15	27	9	1	332	401
Total	6	1	17	20	33	12	2	546	637

Table 9: Cohort 3 Race and Ethnicity

Goal 3: Use predictive statistical models and data techniques to track and model students' progress through an "early alert" advising system.

Goal 3 has been partially meet and is in progress.

- Meetings between faculty and administrators began during year 2 to plan for the logistics involved with an expanded early alert advising system. (See Appendix 2: Faculty/Staff Qualitative Evaluation Survey Interviews and Focus Group)
- Discussion is ongoing on how the data will be shared with the community including outcome data and data from the instruments that will be important to mentoring/advising the students. (See Appendix 2: Faculty/Staff Qualitative Evaluation Survey Interviews and Focus Group)
- Feedback from Faculty/Staff focus groups and interviews suggests that training is needed for faculty to be able to utilize the data from program instruments. Planning is underway to develop training on advisement. (See Appendix 2: Faculty/Staff Qualitative Evaluation Survey Interviews and Focus Group)
- Planning is underway on how to continue to capture student data as well as how to work with students on their understanding of their individual data.

- Planning is underway to develop avenues of providing additional support services to students based on their identified needs such as their various levels of readiness and items such as Receptivity to Institutional Help and items related to financial aid that have already been identified as being important. Areas of support might include enhancement of current processes such as:
    - Living learning community advising in dorms
    - Graduate student academic coaches
    - Support for personal problems
    - Self-selected programs for STEM students

1. Data Techniques:

A tremendous amount of progress has been made with using data techniques to track and model student progress students for an early alert system

- The GlyphEd program has been utilized to do explore individual and group data graphically for use in an advising system.
    - The data is presented with various shapes and colors in a 3 dimensional Glyph that are different for each component of the student data.
    - Each student is represented by a unique 3 dimensional Glyph.
    - It is possible to visualize 3 variables at a time in order to identify patterns.
    - One pattern that has been identified is that students who withdrew from JCU had high perceptions of financial cost.
    - One challenge with the program is having it interface properly with the university computer system.
    - This work has begun to be disseminated nationally by the PI in collaboration with GlyphEd.
    -

2. Statistical Modeling

- Appendix 7 contains an example model of how the CSI data could be utilized for predicting student success and for suggesting student level individual interventions.
- In addition to literature based modeling originally proposed, the data techniques above will provide guidance for additional modeling. Appendix 4 Provides a description of the relevant variables and how they will be used in the models.

III. Response to Feedback from FIPSE Consultant

The changes suggested in the feedback below was implemented and are noted throughout the evaluation report. *(Note: all of the values in this report made use of the raw scores within the bandwidth as requested.)*

A. Feedback received 12/22/2017 from Allan Porowski

The regression model you presented looks good. The model uses the ACT verbal score as the dependent variable and includes the CSI pretest (pre_cut), centered at the cut point, along with a treatment indicator as independent variables. The treatment indicator (-.127) appears to be small (as confirmed by the non-significant p-value of .903), and indicates that at the cut point, the intervention and comparison groups have similar baseline ACT scores. The only change I would

make to the specification of the model is to use the same construction of the forcing variable (CSI) that you will use in the analysis, which is the raw score – not the stanines.

You are correct that if we back out the standard deviation from the standard error (SD=SE*sqrt[n]), then we get an approximate standard deviation of 17.0279, which translates into an effect size of less than .01. That indicates very good balance at the cut point. And since you limited the bandwidth to stanines 3-4, then we have pretty good assurance that constraining the analysis to that bandwidth will hold up to scrutiny…at least for the ACT. It will also be necessary to test baseline equivalence of the Pell grant measure, so you'll need to estimate a predicted value at the cut point for the treatment and comparison groups, and then compare those differences. The effect size calculation can then be computed using the Cox index by plugging in those percentages into the Excel spreadsheet I sent earlier.

So in short, everything looks good!

B. Feedback received 12/29/2017 from Allan Porowski

Enclosed you will find my comments embedded within the findings you sent me. Overall, it looks like you are making some great progress, and all indications (as far as I can tell from looking at the data) are that you have a smooth forcing variable-outcome relationship (including at the cut point), and baseline equivalence on key covariates. Some adjustments to the analysis are needed, but these should be pretty straightforward.

Embedded comments

- This is the critical piece of information: establishing that the cut value was established prior to the administration of the CSI. It would also help to build off the first sentence to indicate that scorers would have no opportunity or incentive to manipulate CSI scores. It would also help to provide a rationale for the cut point itself (i.e., the murky middle argument).
- This looks like a decently clear and steady downward sloping regression line between GPA and the forcing variable. To see this relationship more clearly, consider selecting a bin width (e.g., 3 points, or a fraction of a stanine); that will reduce noise in the data.
- Is this treatment effect or baseline equivalence? The fact that you're using fall semester GPA as the dependent variable suggests that you're testing the treatment effect, but I just want to make sure (i.e., high school GPA is also listed in your analysis plan as a covariate).
- More precisely, the differences in predicted outcomes at the cut point is the treatment effect.
- The primary analysis to measure the treatment effect should look like this:
- Dependent variable = intercept + B1(treatment indicator) + B2(forcing variable centered at 0) + error term
- The treatment coefficient (B1) will be the difference between treatment and comparison groups at the cut point.
- The running of separate models to calculate a treatment effect isn't necessary for the primary outcome analysis; however, if you are running baseline equivalence on binary

covariates, you do need to estimate the effect separately of the treatment and comparison groups at the cut point.

- The final analysis model should:
    - Be tested with multiple functional forms (e.g., linear, quadratic); given a quick look at your scatterplot, it looks like you have a linear relationship here, which makes things simple.
    - Be used to test baseline equivalence of the covariates.
- This looks like pretty convincing evidence that there's no discontinuity in the forcing variable at the cut point.
- If you do limit the analysis to Bandwidth 3-4: All analyses (including baseline equivalence) should be tested using a local linear regression. This is slightly more complex, and you lose some statistical power, but you would be able to answer a more nuanced research question.
- Again, if this is an outcomes analysis, you just need to run a local linear regression since you're constraining the analysis to a bandwidth.
- This looks perfect. You don't need to include the "without blocking" qualifier since assignment was at the individual level.
- It would help to specify whether this is using all data or whether you limited the analysis to Stanines 3-4. The baseline analysis will have to mirror the final outcome analysis – but for an initial progress report, I would imagine this will show very good progress, and provide assurance that you have baseline equivalence on key covariates at the cut point.
- This should be the predicted value of Pell grant eligibility at the cut point for each group. This is where you can run an analysis similar to the one you did above (i.e., calculate the intercept at the cut point set to zero for each group separately). The raw proportions should then be used to calculate a Cox Index. The Cox index for the difference between .21 and .28 is g=-.23, but those means should be much closer at the cut point.

IV. References Cited

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IV: Appendixes

Appendix 1: Faculty Survey Results

Appendix 2: External Qualitative Process Evaluation: Year 3 Faculty/Staff Survey Interviews and Focus Group

Logistical Issues; Challenges; Positive Outcomes; Collaborations; Planning; Changes; Selected Faculty Quotes

Appendix 3: Student Focus Group

Impact on Learning; Community of Learners; Concerns

Appendix 4: Variables for Analysis

Appendix 5: Graphical Integrity of Forcing Variable

Appendix 6: Revised Logic Model

Appendix 7: Desire to Finish College: Example model of how the CSI data could be utilized for predicting student success and for suggesting student level individual interventions

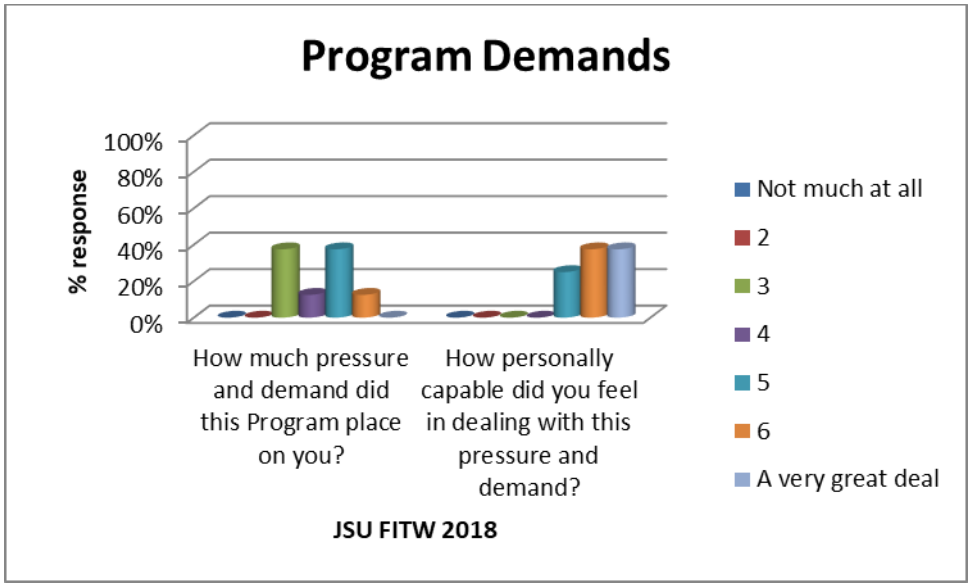
Appendix 1: Faculty Survey Results

John Carroll University – FITW Grant # P116F150059
Linked Learning and Early Warning Approach for At-Risk Student Success (LLASS)

Faculty were asked a series of evaluation questions about the FITW program. The results of this survey are presented below.

Please indicate if you have served as an instructor or support individual in the FITW program and in which year(s) you have participated.	
I am a teaching faculty member but have not participated in FITW in any capacity (please skip to end)	0.0%
I am Support staff/administrator but have not participated in FITW in any capacity (please skip to end)	18.2%
FITW Instructor 2017-2018	63.6%
FITW Instructor 2016-2017	45.5%
FITW Support faculty/staff/administrator 2017-2018	18.2%
FITW Support faculty/staff/administrator 2016-2017	18.2%
FITW Support faculty/staff/administrator 2015-2016	18.2%

Appendix 1: Table 1: Participation in FITW program



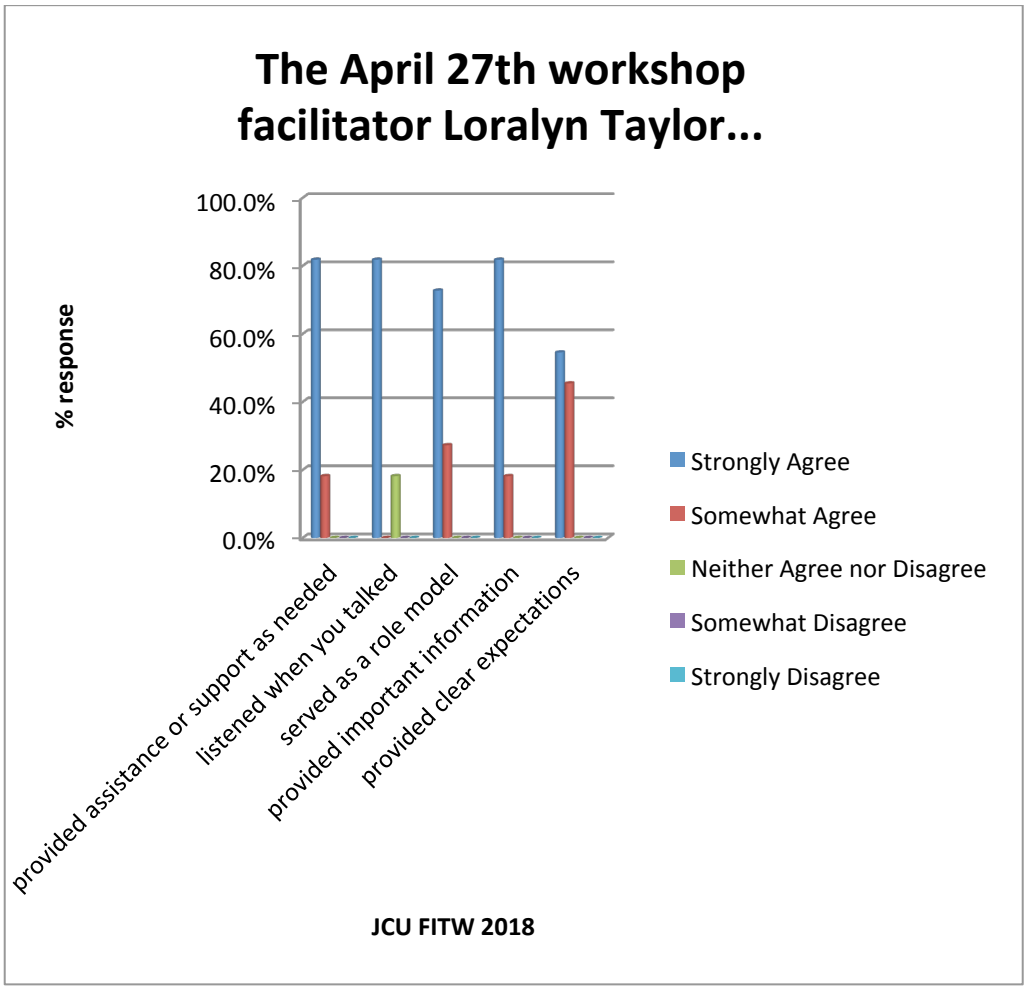
Appendix 1: Figure 1: Program Demands. Faculty were asked to answer based on a 7 point Likert scale that varied from Not much at all to A Very Great Deal

While serving in the FITW program, I…	Strongly Agree	Somewhat Agree	Neither Agree nor Disagree	Somewhat Disagree	Strongly Disagree
gained knowledge in student learning styles	33.3%	44.4%	11.1%	11.1%	0.0%
gained knowledge in supporting various student learning styles	33.3%	33.3%	22.2%	11.1%	0.0%
received support to teach my classes effectively	33.3%	22.2%	22.2%	22.2%	0.0%
received support to be a better adviser.	33.3%	0.0%	33.3%	11.1%	22.2%
received support to integrate my class with my teaching partner.	25.0%	0.0%	37.5%	37.5%	0.0%
participated in professional development groups.	55.6%	33.3%	11.1%	0.0%	0.0%
networked with fellow instructors.	44.4%	44.4%	11.1%	0.0%	0.0%
received advice about how to help students with academic setbacks.	55.6%	11.1%	11.1%	22.2%	0.0%
received advice about how to help students cope with stress.	11.1%	44.4%	0.0%	44.4%	0.0%
have had the opportunity to participate in a learning community.	33.3%	44.4%	22.2%	0.0%	0.0%
feel that I have become a member of the FITW learning community.	33.3%	11.1%	33.3%	22.2%	0.0%
have become a better instructor.	44.4%	22.2%	22.2%	11.1%	0.0%
worked as part of a teaching team.	25.0%	37.5%	25.0%	12.5%	0.0%
was able to integrate my class with my teaching partner.	37.5%	25.0%	12.5%	25.0%	0.0%

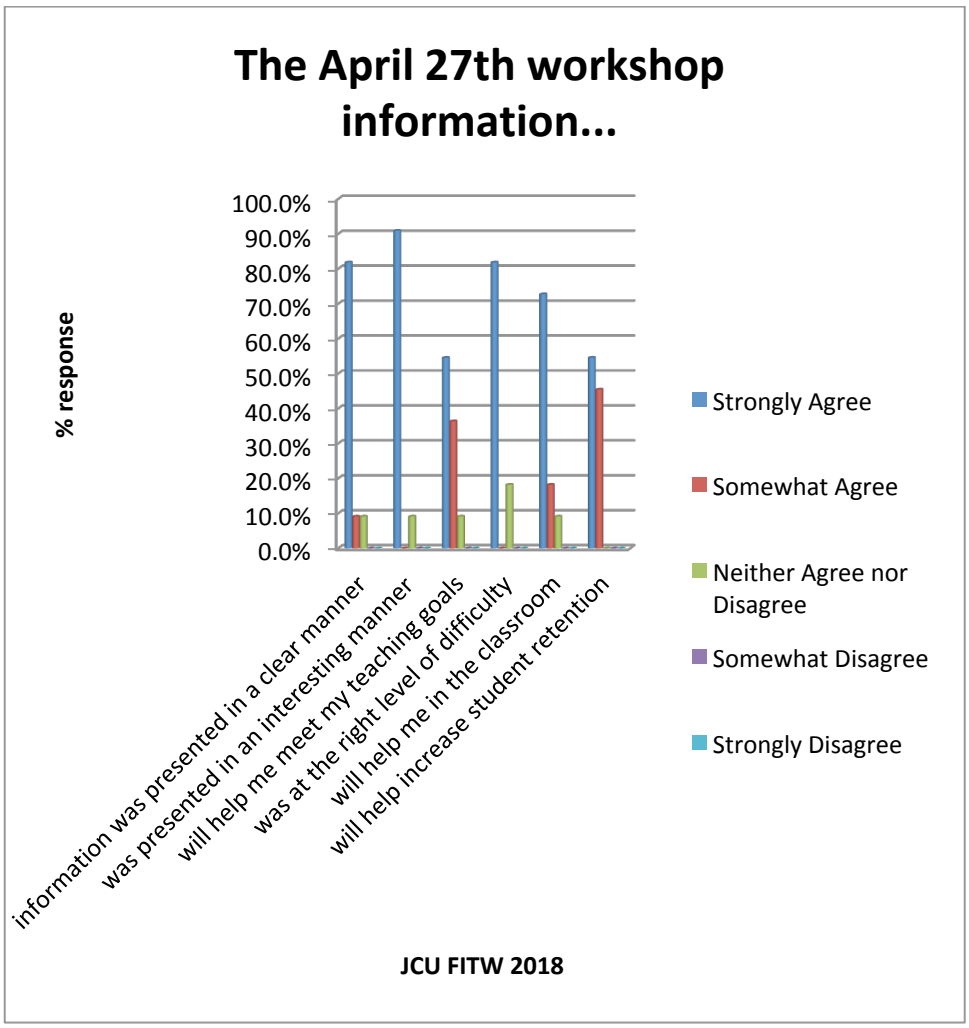
Appendix 1: Table 2: Faculty Support and Professional Development Opportunities Faculty were asked to answer based on a 5 point Likert scale that varied from Strongly Agree to Strongly Disagree.

As shown in Appendix 1, Table 2, the majority of faculty agreed with 11 of the 14 statements concerning receiving support or gaining professional development on a variety of factors.

Faculty participating in a faculty development workshop organized by the FITW program were also asked to evaluate the workshop presented on April 27th by Loralyn Taylor. The results of this evaluation are presented in Appendix 1 Figures 2 and 3 below.



Appendix 1 Figure 2: Evaluation of Workshop Facilitator: Faculty were asked to answer based on a 5 point Likert scale that varied from Strongly Agree to Strongly Disagree.



Appendix 1 Figure 3: Evaluation of Workshop Information: Faculty were asked to answer based on a 5 point Likert scale that varied from Strongly Agree to Strongly Disagree.

Appendix 2: Faculty/Staff Qualitative Evaluation Survey Interviews and Focus Group

John Carroll University – FITW Grant # P116F150059
Linked Learning and Early Warning Approach for At-Risk Student Success (LLASS)

A Process Evaluation was performed by use of open ended survey questions, a focus group, and structured interviews of the faculty and staff to assess program progress, impact on their departments, and state of the collaboration. This data is presented in aggregate to maintain the anonymity of faculty/staff.

A. Logistical Issues: Faculty/staff were asked a number of questions which relate to the logistical issues with the overall program.

- None of the faculty/staff reported that their teaching load or other responsibilities affected their ability to perform the project.
- As in year 2, the vast majority of the faculty/staff reported that the time that they committed to the project was in line with what they anticipated.
- Additional funding would be useful for the following: increased travel funds to attend conferences, consultants for professional development, providing stipends to part-time faculty for extra effort.
- "It appears that the departments put a great deal of importance on the average of each class's final grade, and then the grade average of all the classes together. Are the FITW sections included in the average of the combined sections? If so, maybe they shouldn't be."
- "I also think this program should be implemented by department chairs and/or full-time faculty. They are the ones who need to buy into these ideas and interventions. They are the ones who can impact student retention. Adjunct faculty members have no control over their own futures -- they are concerned about their own retention rates. In the past 3 years, in our department, it has become clear to the adjuncts that we are being phased out. So we are not necessarily motivated. "
- Some faculty would like the option to pair with a particular subject or particular faculty member based on prior pairings in the program and to have the pairing last longer.

B. Challenges

1. Communication: The following challenges are broadly related to challenges with communication.

- Some faculty suggested having access to the three inventories and their results in the aggregate will/could be helpful to make better decisions on how to advise students.
- More structured communication with the paired faculty member - at least one required face to face meeting, and ideally more than one paired assignment.
- Some faculty suggested information should be shared more broadly within the JCU community including a more concise articulation of the program goals and objects. Broader communication may be helpful but it was noted that they have to balance the interest and needs of John Carroll in getting the data and the robust requirements of meeting WWC criteria.

- "I'd have preferred a more open environment, including having both professors address the class together, making clear that the classes are paired and expressing the purpose of that pairing."

2. Course Alignment: The following challenges are generally related to challenges with course alignment.

- It would be helpful to allow faculty greater say in teaching partners.
- Consistency of the intervention across classes in the project in how the linkages and courses and assignments occur across classes.
- Some faculty have philosophical or ideological differences within their pairs and some faculty are not as comfortable changing their syllabus from what they normally do.
- More participation among full-time faculty and pre-semester planning.
- "Having (the workshop) earlier in the semester so that we would have more time to implement some of the strategies."
- "Incorporating a discussion of specific reporting methods at JCU (into the workshop) and how they might be improved. For example, how could or should faculty report an early pattern of absences or missed work?"

C. Positive Outcomes

- Faculty reported that the part-time faculty have become integrated into the life of the University. Professional development is being offered to part-time faculty on a consistent basis.
- Collaboration formed with Gliff Ed provided opportunities to visualize the data in unique ways and has resulted in presentations at national meetings for dissemination.
- Professors have developed a cohort/learning community mentality and have demonstrated a willingness to engage in programmatic activities which has contributed positively to the university.
- The vast majority of the faculty/staff rated the success of the program as either very or somewhat successful. Reasons given for this rating include:
    - Meeting project goals and timelines
    - Have been invited to present findings to other organizations
    - The processes have become institutionalized
    - Provided venue for engagement of part-time faculty
- All of the faculty/staff reported that the trajectory of the program was moving in the right direction with the vast majority reporting that it was definitely moving in the right direction. Reasons given for this include:
    - Project is meeting goals and timeline
    - Students and faculty are exposed to a learning community and are understanding the importance of having a learning community
    - The university has been forced to think about data driven approaches to understanding the freshmen class and the use of institutional data in the project has increased the interest by faculty and administrators in a variety of student and institutional data
    - The team has been successful in working together

D. Collaborations

- All of the faculty/staff reported that they found working in a group with their John Carroll University colleagues to be extremely useful which is in agreement with year 2.
- Faculty/staff reported that the project enhanced (either greatly or somewhat) their personal interdepartmental collaborations as well as inter-departmental collaborations in general.
- Benefits of collaborations included:
    - The processes were institutionalized early in the program and support faculty/staff such as registration are integral to the program.
    - Faculty have had the opportunity to know faculty from other departments which has facilitated greater collaboration and student support across departments
    - It was not initially clear as to the extent of the reach of the project and the ways it influenced enrollment management, block registration and new student orientation. During year 1, partners were identified in academic advising, student affairs and the registrar's office who have continued in years 2 and 3. Partners on the project have extended well beyond what was written into the grant and the project was effectively institutionalized in year 1.

E. Planning

- Most of the faculty/staff have considered avenues for dissemination including specific meetings that would be relevant for dissemination of specific outcomes
- The PI has been actively presenting the project to other organizations and to JCU faculty and staff as well as disseminating findings at national meetings.
- A faculty teaching one of the courses has disseminated findings at PKAL
- Discussion is ongoing on how the data will be shared with the community including outcome data and data from the instruments that will be important to mentoring/advising the students. Planning is underway to develop training on advisement.

F. Changes

- There have been no substantive changes from years 1 or 2.
- A collaboration was developed with Gliff Ed in year 2 that has been extended in year 3 to allow for the visualization of the data in unique ways

G. Selected Faculty Quotes from the Faculty Survey

- "The FITW program created an enrichment for my classes. Interacting with Biology Professors we could compare notes on students and tweak our lessons with each other in mind for good effect to our students."
- "I recognize the benefits of two classes linking their assignments together."
- "I enjoyed being part of a learning community and adding to my experiences as an instructor."
- "Sometimes, however, the students seemed quiet as they already had discussed various issues in their other class."
- "The bonding experience of the classroom provided the opportunity to enhance the depth of student learning by building on the other course's content."

Appendix 3: Qualitative Outcome Evaluation: Year 3 Student Focus Groups

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Students participated in a focus group to assess program progress, impact on their learning, and formation of a community of learners. This data is presented in aggregate to maintain the anonymity of participants. Focus groups contained students from only one condition at a time so that there were separate focus groups for students in the intervention versus not in the intervention. Excluded students were not included in invitations to participate in a focus group.

A. Impact on Learning

- Most students reported that JCU provides adequate support services but some students reported now knowing how to access the services or that the services did not meet their specific needs for specific classes.

- Students in the linked classes reported a number of benefits to the linked classes including:
  - Assisted in forming friendships/social groups
  - Facilitated learning by having someone to discuss with, explain, and share resources.
  - Conversations continued outside of the classes

B. Community of Learners

Freshmen Students

- Students reported additional community of learners such as sororities, sports, and majors.

- Students in the linked classes reported that they could form a study group more quickly since they may not have otherwise known other students.
  - "It is tough being a college student as even being a freshman is more difficult than your past academics and it helps you learn more being in a group and having people to bounce ideas off of."
  - "People help you learn more, more than just memorize."
  - "If you do not understand there is someone who does and you can discuss it and they can help explain something to you and later you can for them so everyone helps each other in class."

Sophomore Students

- Some students in linked classes reported maintaining membership in electronic groups from their freshman year even though no one has commented in them for a year.

- Students in both the blue and gold groups reported that they were members of a community of learners by their sophomore year and did not differentially report being in a community of learners their freshman year.

- Both groups reported benefiting from participating in community of learners that were related to either sports or clubs on campus with some sport teams requiring students to attend collective study periods.

- Both groups reported that having upperclassmen within their community of learners was helpful as they could provide advice and support to the underclassmen.

- Both groups reported that by their sophomore year they felt a member of their major's community of learners and that had more classes in common as they progress through their major.

- Some students reported that the business school was more successful in developing a community of learners and that this school emphasized networking more than the sciences.

C. Concerns

- No specific concerns were raised about the FITW program.

- While this is outside of the scope of the grant or specific evaluation questions, when community of learners was asked about, some students expressed concerns that they had difficulty getting into core classes because of JCU giving special priority scheduling to certain groups of honors students.

Appendix 4: Variables for Analysis

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Variable #	Description Identifying variables
1	Banner ID internal only to match other info by.
601	FITW_cohort_final for our grouping variable for the intervention (also in a few other places, 47, 137, 586, 600 but this one is best choice)

Variable #	Description From CSI: Only using this to set the cutoff for the intervention
95	PAD predicted academic difficulty percentile
96	PAD predicted academic difficulty raw
97	PAD predicted academic difficulty stanine

Variable #	Description Demographic Information as covariants
48	Gender (it is also in var 138 but this is the better choice)
68	Ethnicity labeled as Hispanic (also in a few other places, 40, 81, 100 but this one is best choice)
93	Pell Recipient (need this for baseline equivalence SES factor)
99	Race (also in a few other places, 15, 16,100, 115, 136 but this one is best choice)
44	First Gen potential to look in models as covariant
76	High school type potential to look in models as covariant
115	Resd.Code potential to look in models as covariant

Variable #	Description Academic Pre or Descriptive Data
Calculated	ACT/SAT composite score (for baseline equivalence academic factor)

Variable #	Description Outcome Data
591	Cum_GPA (also in a few other places, 277, 280, 284,587, 588, 589, 590 but this is best one)
598	Earned hours sp 2018 (credit hours are in a few other places, 587-599, 276, 279, 283 but this is best one)
285	Withdrew measure of persistence to jr year
3	Early Alert JCU data that we might want to look at compare to the other alert variable
271	Withdraw reason potential for mechanism
599	Attempted hours sp 2018 potential (credit hours are in a few other places, 587-599 275, 278,281, 282 but this is best one)

Variable #	Description Data collected from Project Instruments Use to address 3rd research question: To what extent do academic, intrapersonal, and interpersonal indicators of thriving predict college students' academic success and retention, after controlling for institutional and student characteristics?
	TQ pre and post potential to use in models as covariant or as outcome data
Calculated	TQ total and 5 subscales pre
Calculated	TQ total and 5 subscales post
	EQ pre-Data below potential to use in models
312	TOT_T TOTAL EQ SCORE
313	SP_T EQ SELF PERCPTION COMPOSITE SCORE
317	SE_T EQ SELF-EXPRESSION COMPOSITE SCORE
321	IS_T EQ INTERPERSONAL COMPOSITE SCORE
325	DM_T EQ DECISION MAKING COMPOSITE SCORE
329	SM_T EQ STRESS MANAGEMENT COMPOSITE SCORE
387	EQ alert

Appendix 5: Graphical Integrity of Forcing Variable

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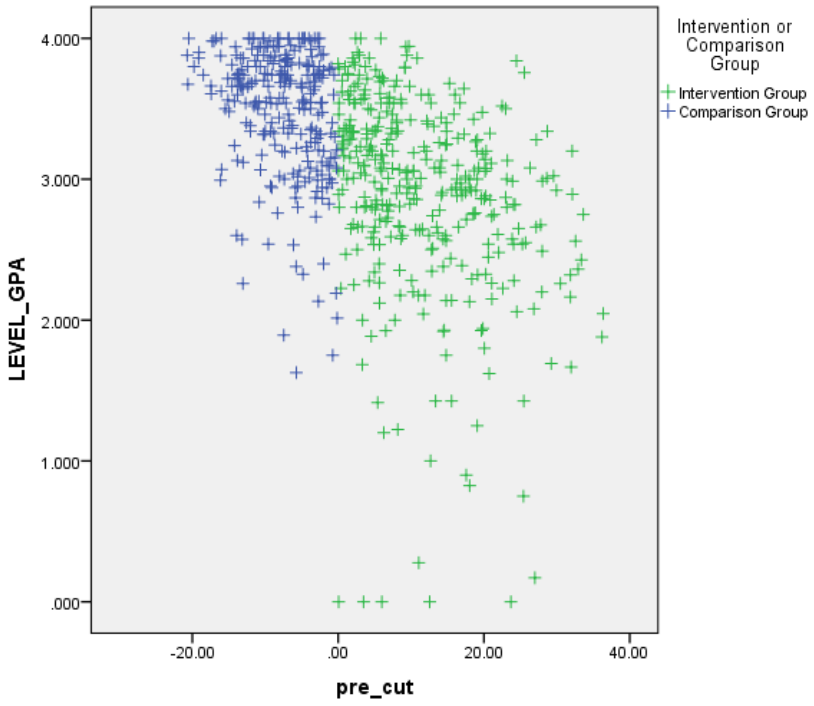
Participation in the intervention and control groups was determined using a forcing variable, "Predicted Academic Difficulty," which is a composite index in the College Student Inventory (CSI) that uses a Stanine scale of 1-9, with 5 as the mean, and standard deviation = 2. The use of the original Stanine scores were used to approximate the "murky middle" from a theoretical perspective and the fuller data with the raw scores were used for the project evaluation. After careful consideration, the researchers chose "4" as the cut-score because our study also is informed by the literature on the "murky middle," which suggests that 45% of total drop-outs nationwide finish a year of college and with a grade-point average between 2.0 and 3.0 (Venit – Educational Advisory Board – The "Murky-Middle Project," 2014). The project used a "sharp" regression discontinuity design (RDD). Recognizing that the WWC standard for RDD indicates that there must be four values on each side of the cut-score, the raw scores were used rather than the Stanine scores for the final design since the requirement of four discrete values on each size of the cut-point could be satisfied by using the raw scores that were used to derive the Predicted Academic Difficulty Stanine scale (Porowski, 2016).

Graphical Integrity: This information was presented in last year's report and has been updated based on feedback based on feedback from the FITW TA recommendations

Figure 1, Appendix 5: Discontinuity Scatter Plot at Full Bandwidth (1-9)



Using the procedure outlined by, Trochim (2002), we compute generalized linear regression models to assess the treatment effect for the full bandwidth of the data (Stanine 1-9), as well as for the limited bandwidth (Stanine 3-4). The dependent variable was the outcome measure, Level_GPA (JCU fall semester GPA), and the independent variable was pre_cut, which was constructed using raw score (raw scores -32.138) to set forcing variable to zero by subtracting the lower interval value of the raw scores from the full scale. The data file was split into intervention and comparison group data, for which separate regression models were run for each group to determine whether there were different slopes. For each group regression model, we added the coefficients for the constant + precut. Then, the difference in predicted outcomes at the cut point is the treatment effect.

Table 1, Appendix 5: Regression Model #1 to Determine Treatment Effect using Bandwidth 1-9

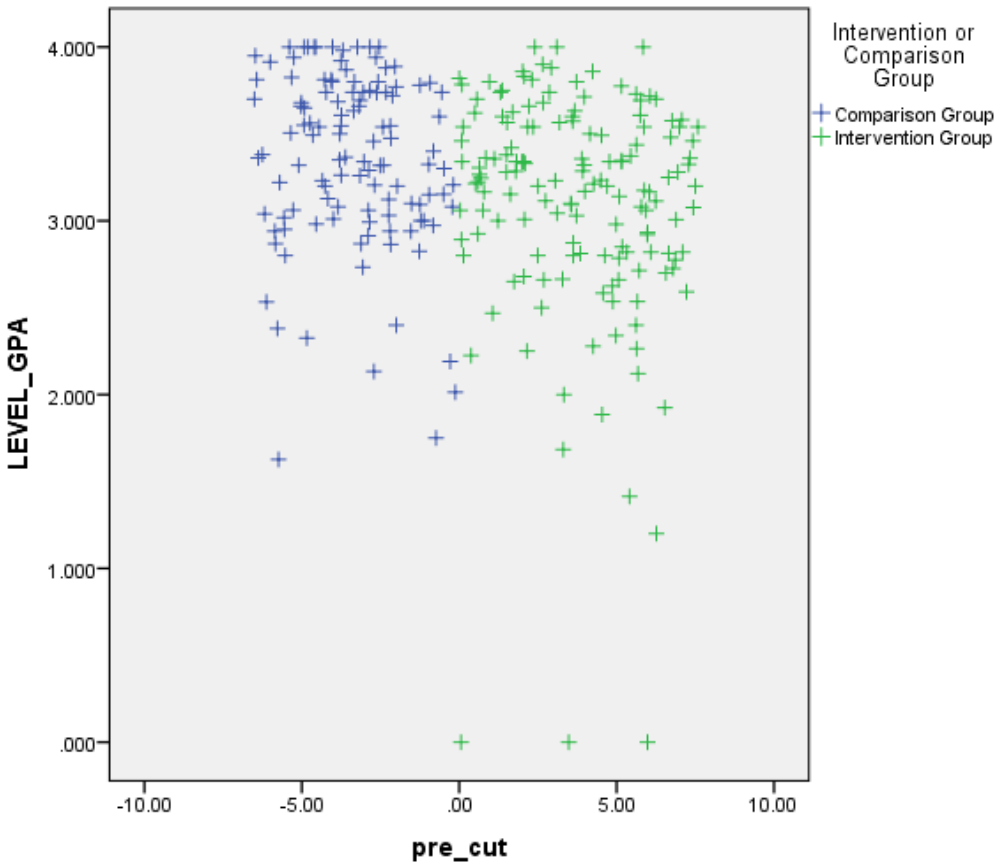
Comparison Group Coefficients – R^2 = .081						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.287	.051		64.581	.000
	pre_cut	-.027	.006	-.285	-4.781	.000

Table 2, Appendix 5: Regression Model #2 to Determine Treatment Effect using Bandwidth 1=9

Treatment Group Coefficients – R^2 = .092						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.179	.061		51.987	.000
	pre_cut	-.025	.004	-.303	-5.993	.000

Determining the treatment effect at Stanine 1-9 bandwidth: Comparison Group = (3.287 - .027) = 3.260. Treatment Group = (3.179-.025) = 3.154. Then, the treatment effect at bandwidth 1-9 = (3.260-3.154) = 0.106

Figure 2, Appendix 5: Discontinuity Scatter Plot at Bandwidth (3-4)



As Demonstrated in Figure 2, Appendix 5, There is no discontinuity in the forcing variable at the cut point. Analysis will be limited to Bandwidth 3-4 and tested with a local linear regression.

Table 3, Appendix 5: Local Linear Regression Model #1 to Determine Treatment Effect Using Bandwidth 3-4

Treatment Group Coefficients – R^2 = .015						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.200	.103		30.926	.000
	pre_cut	-.047	.027	-.157	-1.700	.092

Table 4, Appendix 5: Local Linear Regression Model #2 to Determine Treatment Effect Using Bandwidth 3-4

Comparison Group Coefficients - R^2 = .025						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.234	.110		29.434	.000
	pre_cut	-.038	.025	-.123	-1.506	.134

Determining the treatment effect at Stanine 3-4 bandwidth: the Comparison Group = (3.20-.047) = 3.153. The Treatment Group = (3.234-.038) = 3.196. Then, treatment effect at bandwidth 3-4 = (3.196-3.153) = 0.043**.**

Appendix 6: Revised Logic Model

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Linked Learning and Early Warning Approach for At-Risk Student Success (LLASS)

Inputs	Activities	Short Term Outcomes	Intermediate Outcomes
John Carroll Key Personnel John Carroll support staff • *Center for Digital Media* • *Information Technology Services Group* • *The Center for Service and Social Action* • *Academic Advising* • *Registrar's Office* • *Admissions and Enrollment* • *Office of Student Engagement* • *Office of Sponsored Programs, Business and Finance* • *Provost's Office of Budget Management* First-year students who have not yet successfully completed their foundational writing and oral communications courses excepting Arrupe Service Scholars or Honors	20 faculty members participated in Professional development and in the development and implementation of the linked learning community and co-enrolled courses. Results of the College Student Inventory (CSI) were used to determine cut-score (4) of "forcing variable" to determine placement into either intervention or control group. The CSI uses a continuous measure based upon a 1-9 stanine scale. The mean score for the CSI is 5; and the standard deviation is 2. Intervention cohorts were co-enrolled in foundational writing or oral communication courses linked by a common theme; control cohort followed the normative enrollment pattern of enrolling into discrete non-linked writing and oral communication courses Focus Groups	Regression discontinuity design (RDD)assigns 1811students to intervention or control conditions Students will form cohort-based learning communities Develop a low-cost "early alert" strategy using predictive analytics to improve student progress Advanced student advising in the linked learning community Baseline equivalency, will be obtained for academic achievement (SAT/ACT scores) and student socio-economic status (Pell Grant eligibility) Dissemination to broader educational community: a. Webinar presented as part of "Spotlight on First in the World grantees" b. Webinars presented on retention and enrollment	There will be discontinuity in regression lines for GPA at the cutoff: The intervention subjects will have higher scores than predicted. There will be discontinuity in regression lines for Credit hours obtained at the cutoff: The intervention subjects will have more hours than predicted. Within the bandwidth, intervention subjects will be more likely to maintain continuous enrollment in the University for two years compared to controls Within the bandwidth, intervention subjects will be more likely to persist to their Jr. year compared to controls.

Program students. Grant Funds External Evaluator Professional Development Consultants Surveys:(College Student Inventory (CSI); Thriving Quotient (TQ); The Emotional Quotient (EQ-I) Baseline Academic Measure: SAT/ACT scores Baseline SES Measure: Pell Eligibility Demographic data Institutional Academic Records: enrollment, GPA, # credit hours.	Interviews Pre and Post Testing Service Learning Advisement Presentation to JCU faculty	management sponsored by Ruffalo Noel Levitz, and GlyphEd c. Dissemination by Presentation at national meetings	

Population

Target population is first-year students who have not yet successfully completed their foundational writing and oral communications courses excepting Arrupe Service Scholars or Honors Program students. Sample estimates at 95% confidence level, and +/- 4% margin of error suggests a sample of n=376 in each group/year. The actual sample size was slightly lower (Year 1 n = 354 in the intervention group and n = 255 in the comparison group; Year 2 n = 355 in the intervention group and n = 210 in the comparison group; Year 3 n = 401 in the intervention group and n = 236 in the comparison group). A total of 1811 unduplicated participants are represented in the collective data pool over the course of the project. Three cohorts of students participate for one year beginning fall 2016, Fall 2017, and Fall 2018 with recruitment occurring during the summer prior to their participation. Outcome data is based on two years of academic performance.

Theoretical basis for the intervention

Learning communities, in their most basic form, begin with co-registration or block scheduling that enables students to take courses together that are linked by a common organizing theme, which gives meaning to their linkage. The purpose of doing so is to engender a coherent interdisciplinary or cross-subject learning that is not easily attainable through enrollment in unrelated, stand-alone courses (Tinto, 2003; 1997; 1995). Typically, learning communities have three things in common: shared knowledge, shared learning, and shared responsibility.

i. Shared knowledge. By requiring students to take courses together and organizing those courses around a theme, learning communities seek to construct a shared, coherent curricular experience that is not just an unconnected array of courses.

ii. Shared learning. By asking students to construct knowledge together, learning communities seek to involve students both socially and intellectually in ways that promote cognitive development as well as an appreciation for the many ways in which one's own knowing is enhanced when other voices are part of that learning experience.

iii. Shared responsibility. Learning communities ask students to become responsible to each other in the process of trying to know.

Tinto (2003; 1997; 1995) outlines a number of substantive findings on the effectiveness of linked learning communities. *First*, students in learning communities tended to form their own self-supporting groups, which extended beyond the classroom. *Second*, learning community students became more actively involved in classroom learning, even after class. *Third*, participation in the learning community enhances the quality of student learning. *Finally*, collaborative learning settings foster what could be called "the norms of educational citizenship," promoting the notion that individual educational welfare is tied inexorably to the educational welfare and interests of other members of the educational community (Tinto, 2003; 1997; 1995).

The linked learning will integrate the principals of student development and thriving in an intentional manner, building the curriculum from this student-centered perspective.

Expected causal mechanisms by which the intervention should work; Intervention's content and organization, its duration, the amount required for each activity, intervention procedures, etc.
Three cohorts of students participated for one year beginning fall 2016, Fall 2017, and Fall 2018 with recruitment occurring during the summer prior to their participation.

Treatment group students co-enrolled in foundational writing or oral communication courses linked by a common theme, service learning, and advanced student advising (an early alert system).

The early alert system was only accessible to treatment group students.

Linked learning courses had a standardized early assessment mechanism built into each target course to develop an "early alert system" with targeted advising to those students who have lower than a 3.0 GPA.

Comparison group students enrolled in discrete non-linked writing and oral communication courses.
The faculty received linked learning professional development and were trained to train other faculty in linked learning approaches, so all instructors were exposed to PD.
Hypothesized connections between activities and intended outcomes

The intervention was a set of linked theme-based first-year courses in foundational writing or oral communication in which the intervention groups was co-enrolled. These first-year courses were linked to another general studies course in the humanities, social sciences, or natural sciences to form the linked pair, while the control groups followed a normative enrollment pattern by taking discrete, non-linked writing and oral communication courses during the first year of enrollment. For the intervention groups, the program will be attentive to withdrawal from one of the linked courses. A dichotomous dummy variable will be constructed to capture withdrawal from a set of linked courses.

The project emphasized interdisciplinary instruction-level approaches of project-based and adaptive-learning strategies that will help transform students from passive receptors of information to collaborator in the educational process. Curriculum of linked courses was integrated with critical student support and development structures. This innovative combination creates a focused system to address the development needs of at-risk students. The linked learning intervention was institutionally integrated and coordinated across multiple institutional entities (e.g., Registrar, Enrollment Management, Student Affairs, Assessment and Institutional Effectiveness, Academic Administration, Information Technology, and Instructional Design).

Appendix 7: Desire to Finish College: Example model of how the CSI data could be utilized for predicting student success and for suggesting student level individual interventions

John Carroll University – FITW Grant # P116F150059
Linked Learning and Early Warning Approach for At-Risk Student Success (LLASS)

First In the World, October 2018 Report Submission
Tina M. Facca Miess, PhD

Desire to Finish College

In the fall of their freshman year, Cohort 1 students responded to the CSI survey, and in the following spring semester, the MYSA survey. In both the non-intervention (Blue) group as well as in the intervention (Gold) group, students rated their desire to finish college significantly lower than at the start of their freshman year. This is validated with paired samples t-tests, with the non-intervention control group at $t = 6.32$, $p < .001$, $df = 130$, and the intervention $t = 6.14$, $p < .001$, $df = 152$. However, neither group evidences a difference regarding desire to transfer between early in the academic year compared to spring. Significantly more credits are attempted than earned in both groups during both semesters.

For the intervention group, to understand the predictors of *desire to finish college*, we build a stepwise multivariate regression model, significant at $p < .001$, explaining over 50% of the variance in first year students' *desire to finish college. Attitude toward educators* explains over a third of the variance ($R^2 = .34$). The second and most significant predictor, *study habits* ($t = 4.86$, $p < .001$) brings the variance explained to 47%, followed by *sociability* and *family emotional support* for total variance explained of 53% (Table 1).

Intervention Group Significant Predictors of Desire to Finish College	**R^2**	***t* statistic**	***p* value**
Attitude toward educators	.34	4.39	<.001
Study habits	.47	**4.86**	<.001
Sociability	.51	3.05	<.01
Family emotional support	.53	2.58	<.01

Table 1 Intervention group, *Desire to Finish College;* Model significance $F = 41.42$, $p < .001$

For the non-intervention (Blue) group, the first and most significant predictor in the model is *study habits*, followed by *family emotional support* and *opinion tolerance*, for a total variance explained of 43% (Table 2).

Non-Intervention Group Significant Predictors of Desire to Finish College	**R^2**	***t* statistic**	***p* value**

Study habits	.29	**5.54**	<.001
Family emotional support	.38	4.20	<.001
Opinion tolerance	.43	3.18	<.01

Table 2 Non-intervention group, *Desire to Finish College;* Model significance F = 31.73, $p < .001$

Credits Earned Year 1

For the intervention group, regressing the same MYSA variables on *credits earned year 1*, reveals *family emotional support* as the sole predictor (Table 3), whereas no significant predictors surface for the non-intervention group.

Intervention Group Significant Predictors of Credits Earned Year 1	**R^2**	***t* statistic**	***p* value**
Family emotional support	.30	**2.67**	<.05

Table 3 Intervention group, *Credits earned year 1;* Model significance F = 7.14, $p < .05$

In an effort to uncover a predictive model for the non-intervention control group, we use *desire to finish college* in the independent variable set. The intervention group model is the same (Table 3), yet for the non-intervention group *desire to finish college* is the sole predictor of *credits earned year 1*, accounting for nearly 80% of the variance in *credits earned year 1* (Table 4).

Non-Intervention Group Significant Predictors of Credits Earned Year 1	**R^2**	***t* statistic**	***p* value**
Desire to finish college	.78	**3.73**	<.05

Table 4 Non-intervention group, *Credits earned year 1;* Model significance F =13.92, $p < .05$

Synthesizing these models, for the intervention group we see the significant impact of *family emotional support* on both *desire to finish college* and even more substantially, *credits earned year 1. Study habits* are the most significant predictor of *desire to finish college* for both groups.