Project Aim 2016 Summer Success Program

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Many students entering college require developmental English and math instruction before they can succeed in college-level coursework. For the past 17 years, the Summer Success program has provided incoming students with the academic skills they need to meet the educational challenges ahead. The program also focuses on easing students' transition into college in the fall. In particular, it offers English and math refresher courses to reduce or eliminate the need for developmental courses and academic skills needed to be a successful student. To that end, when they complete the program, students take English and math placement tests. They also fill out a student satisfaction survey.

The summer program has never been evaluated to determine its effectiveness or impact with respect to placement into math and English. The goal of this study was to determine the program's effectiveness. The study's hypothesis was that there would be no significant difference in college placement, as measured by the COMPASS exam, between the treatment and control group of students.

Methodology

In collaboration with high school counselors, students were recruited to participate in the Summer Success program. Summer Success students were required to meet at least one of the following eligibility: 1) low income; 2) first generation (that is, neither parent holds a bachelor's degree); or 3) documented disability

Students took the COMPASS placement test in math and English on the first day. This was considered their pre-test. In order to determine instruction and program impact, half of the students were placed into the English refresher course and the other half into the math refresher course thereby creating a treatment and a control group for each subject. After the refresher courses, the two groups were combined to receive sequential academic skills instructions. At the end of the program, the students were given the COMPASS placement exam again as their posttest. The Summer Success program and the College Education Workforce Development (CEWD) also administered student satisfaction surveys. The Holmes-Rahe Life Stress Inventory was also administered to determine students' stress level as they enter college. Additionally, instructors were surveyed about their perceptions and recommendations for the program.

Results

Not all the students took the pre- and post-tests. Only those students who took the pre- and post-test are included in this review. As a result of the pre-test (COMPASS placement exam), 68% of the students placed into developmental math 64% placed into developmental English.

Upon completion of the math refresher course, the treatment group (Table 1) showed improvement in math placement as compared to the control group (Table 2). Table 3 illustrated the compares between the treatment and control groups.



Table 1

Table 2





A two sample t-test paired two sample means was employed, as the subjects were the same for the pre- and post-test (Table 4). The sample mean for pre-test was 37; whereas sample mean for post-test was 45. The mean difference was 8. The sample mean of the pre-test was less than the sample of the post-test. Since the p-value is less than 0.05, the null hypothesis was rejected and the alternative is considered to be true. The paired t-test was performed to determine if the math refresher was effective.

Table 4	Math Treatment Group	
	Pre-Test	Post-Test
Mean	37.1111111	45.11111111
Variance	554.3611111	700.8611111
Observations	9	9
Pearson Correlation	0.983618814	
Hypothesized Mean Difference	e 0	
df	8	
t Stat	-4.45668812	
P(T<=t) one-tail	0.001060185	
t Critical one-tail	1.859548038	
P(T<=t) two-tail	0.00212037	
t Critical two-tail	2.306004135	
- 002		

p=.002

Given the t statistic, -4.45 and p=0.002, there was a very small probability of the result occurring by chance. The null hypothesis was rejected, since p<0.05 (in fact p=0.002).

There is strong evidence to suggest that teaching intervention improved test scores (t=-4.46, p=0.002). The subjects' test scores increased after the intervention.

Although the control group (Table 5) did not receive a math refresher, there were some students whose test scores improved, but they were not statistically significant as noted in the p-value.

Table 5	Control Group	
	Pre-Test	Post-Test
Mean	33.88888889	35.11111111
Variance	178.6111111	398.1111111
Observations	9	9
Pearson Correlation	0.502097608	
Hypothesized Mean Difference	0	
df	8	
t Stat	-0.20860813	
P(T<=t) one-tail	0.419983796	
t Critical one-tail	1.859548038	
P(T<=t) two-tail	0.839967593	
t Critical two-tail	2.306004135	
p=0.84		

With regards to the English refresher, the treatment group (Table 6) showed improvement in English placement as compared to the control group (Table 7). Table 8 compares the treatment and control groups.









A two sample t-test paired two sample means was again employed, as the subjects were the same for the pre- and post-test (Table 9). The sample mean for the pre-test was 1; whereas sample mean for post-test was 2. The mean difference was 1. The sample mean of the pre-test was less than the sample of the post-test. Since the p-value is less than 0.05, again the null hypothesis was rejected and the alternative concluded to be true. The paired t-test was performed to determine if the English refresher was effective. Data indicated that the instruction did have a statistically significant impact on the outcome of the English placement.

Table 9	English Treatment Group	
	Pre-Test	Post-Test
Mean	1.272727273	2.272727273
Variance	1.018181818	0.218181818
Observations	11	11
Pearson Correlation	0.038575837	
Hypothesized Mean Difference	0	
df	10	
t Stat	-3.027650354	
P(T<=t) one-tail	0.006364049	
t Critical one-tail	1.812461123	
P(T<=t) two-tail	0.012728098	
t Critical two-tail	2.228138852	
p=0.013		

Instructors were asked seven questions:

- 1. What are your perceptions of the class?
- 2. What are your challenges?
- 3. What recommendations or feedback would you give us towards improving the program?
- 4. How or what practices did you employ to deliver the lessons?
- 5. Did you give homework to your students?
- 6. If you could have done things differently, what would they be?
- 7. How do you feel your students will do in the Post-test?

Summative content analysis was used to interpret meaning from responses, which was text data format. Words were highlighted and extracted from the text to capture patterns or themes, as shown in Table 10.

Table 10	Tab	ole	1	0
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1. Perception of the class	• Essential for incoming students	
	• Varying abilities	
2. Challenges faced	• Lack of time management (math/English Instructor)	
	 Student lacked priority 	
	• Varying abilities (math/English Instructor)	
	• 80% of the students held a part-time job	
	 Students not completing assignment 	
	Registration process (counselor)	
3. Recommendations toward	• Have students take both math and English refresher	
improvement	courses	
	• Dedicate a day just for registration process	
	 Offer time management skills 	
	• Lengthen the program	
	 Interactive activities between classes 	

	• Include a reading class for poor readers
4. Delivery method	• Group work
	• Online assignments
	• Videos
	 Student engagement activities
	• Guided practices
5. Homework given	• Provided take home assignments
6. What could be done differently?	• Time management for students
	• Time in class for students to complete assignment
	• Not give too challenging math problems
	• More time for registration
7. How well will your students do on	• More confident in taking the placement test
the post-test?	• 50% will improve English scores

The math and English refresher courses are non-credit courses that are processed through the office of Continuing Education and Workforce Development (CEWD). A CEWD survey collected data on students' perceptions of content, instructor, and overall experience of the program. Table 11 summarizes students' perception using this CEWD survey; Table 12 summarizes students' perception using the Summer Success program's survey.

Table 11CEWD Survey

	Math	English	Counselor
	Instructor	Instructor	
Met expectations	4.5	4.2	4.6
Able to apply knowledge	4.7	4.4	4.5
Content was organized and easy to follow	4.4	4.6	4.6
Materials are Pertinent	4.7	4.7	4.6
Instructor Knowledgeable	4.6	5.0	4.7
Quality of Instruction	4.5	4.3	4.6
Participation and Interaction Encouraged	4.1	4.8	4.7
Adequate Time for Q & A	4.4	4.3	4.5
Overall Training	4.2	4.2	4.6

(1 – 5 Likert Scale: 1-Strongly Disagree, 2-Disagree, 3-Neutral, 4-Agree, 5-Strongly Agree)

Tuble 12 Troject Thin Summer Success Survey	
Usefulness of skills	3.5
COMPASS placement experience	3.0
Knowledge gained to meet educational goals	3.4
Math classroom instruction	2.8
English classroom instructions	2.9
Activities with counselor	3.7
Overall rating for 2016 summer program	3.8

 Table 12
 Project Aim Summer Success Survey

(1 – 4 Likert Scale: 1-Poor, 2-Fair, 3-Good, 4-Excellent)

Data from the Holmes-Rahe Life Stress Inventory indicated that 65% of the students reported moderate to high stress-induced life events that may lead to health problems which in turn may affect academic performance.

Discussion

The pre-test showed that placement into developmental math and English was consistent with the college's data on student placement at above 64%. Upon completion of the program, data indicated statically significant improvement in both the English and math treatment groups compared to the control groups. This provides evidence that there is a significant difference in the placement. The intervention (instruction) was effective in its impact on the outcome of the math and English placement. The math t-test analysis indicated significant improvement in the math scores of the treatment group, although only 33% of the students advanced into the next level of higher math. The English t-test also provided significant evidence to suggest that the teaching intervention improved test scores. Fifty-five percent (55%) of the English treatment group advanced into the next level of English.

Students who advanced into the next level math or English were able to save time and money. It would mean one semester of not having to take the lower placement and not have to pay for that course.

The Summer Success scheduled the refresher courses in the first session followed, by the academic skills instructions and then a retention activity. A counselor was assigned to conduct the sequential academic skills instructions, which was deviated from. The purpose of the retention activity was to get to know the students by interacting with them during lunch. Students were engaged in conversation using a set of topics called the five Fs (Family &Friends, From, Favorite, Firsts, and Fun). This approach enabled the students to relate to each other as well as the staff.

Students were generally very satisfied with the program, as indicated in their rating of the overall experience in the program survey (an average of 3.8 out of 4.0) and in the CEWD survey (an average of 4.3 out of 5.0). In both surveys, students indicated they would have liked to have had the English and the math refresher courses in the program. Students also stated the desire for more time to engage with other students.

The instructors' input was an important toward data source for improving the program. Both English and math instructors indicated that students lacked time management and priority-setting skills, noting that many of them did not complete their assignments. Three possible explanations are that 63% of the participants held a part-time, they did not have the support at home to complete assignments, or due to deviation from the academic skills schedule.

The Program Director emphasized, to the instructors and counselor, the importance of providing an engaging learning environment. One example was showing students a video clip on growing their intelligence ("How the Brain Works") to help them understand how the brain works when solving math problems. Another example was providing video clips on what an engaging classroom looks like. Instructors provided take home assignments but, as noted earlier, many of the students failed to complete their assignments.

The instructors in both English and math were confident that their students would be much at ease when taking the post-test. The English instructor commented, "I am hoping that at least 50% of my students of my students improve their scores in the post-test," while the math instructor stated, "They will be more confident...when they encounter math problems." In fact, the results of the post-test showed that 55% of English students and 33% of math student improved their placement.

Entering college may be stressful, especially for at-risk or underprepared students. Students were given the Holmes-Rahe Life Stress Inventory to measure their stress level. The stress scale was used as a predictor of illness. Scores of 300 or more have high risk of becoming ill in the near future. Those of 150 to 299 have a moderate risk, while a score of 149 or less indicates a low risk of stress-induced health breakdown. The data indicated that 65% of the students had a moderate to high risk of becoming ill in the near future. This is an indication of an immediate need for intervention.

Based on all of these findings, the following recommendations are made:

- 1. Offer both the English and math refresher courses to all Summer Success students
- 2. Lengthen the program to a full three weeks of instruction.
- 3. Dedicate days specifically for the Admissions and Financial Aid Office to provide services to students.
- 4. Adhere to the sequential academic skills lessons and implement a pre- and post-test to continue to obtain data on knowledge gained.
- 5. Provide academic counseling services not only in the summer program but throughout the academic year.
- 6. Incorporate a retention activity before and after the refresher courses to increase the level of student engagement.
- 7. Explore mirroring this format for developmental classes (in a daily or condensed format)
- 8. Consider exploring the Carnegie Foundation's alternate math pathways. The Carnegie Foundation's model has two distinct pathways, one statistical and the other related to quantitative reasoning. Its approach integrates developmental and college-level math into the curriculum and addresses the social-emotional and psychological obstacles many students face.
- 9. Explore resources provided by the National Center for Academic Transformation and the work of Michelle Hodara, Improving Students' College Math Readiness (2013), which address similar concerns.
- 10. Continue to monitor student progress and perceptions for actionable opportunities.

- 11. Continue to conduct program reviews to collect data to guide persistence, retention, and completion strategies.
- 12. Continue to provide workshops each semester in managing stress, especially when nearing midterm and finals week.
- 13. Hire a full- or part-time counselor to provide academic, personal, and career counseling to students in the program.

Reference:

Carnegie Foundation for the Advancement of Teaching (2013). *Pathways to Improvement*, from http://www.achievingthedream.org/sites/default/files/resources/PathwaysToImprovement_0.pdf

Hodara, M. (2013). *Improving Students' College Math Readiness: A Review of the Evidence on Postsecondary Interventions and Reforms*, from http://ccrc.tc.columbia.edu/media/k2/attachments/improving-students-college-math-readiness-capsee.pdf

Holes and Rahe Stress Scale, from https://www.mindtools.com/pages/article/newTCS_82.htm

Video on The Learning Brain, from https://www.youtube.com/watch?v=cgLYkV689s4&index=14&list=PL4111402B45D10AFC.

Pedagogy in Action, from http://serc.carleton.edu/sp/library/engagedpedagogies/index.html

Video on Engaging Classroom, from https://vimeo.com/89349344