A Summer STEM Success Academy at New Jersey City University

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NJCU STEM Students (2018)

	NJCU*	STEM
African-American	23%	21%
American Indian	<1%	1%
Asian	8%	14%
Hispanic	40%	40%
Unknown/2 or More	8%	7%
White	20%	16%
N	6503	1288
*80% receive Financial Aid		

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NJCU STEM Retention (2016)

N = 2553	Transfer Destination			Retained
	Other STEM	Non-STEM	Left NJCU	
Biology	25	282	209	675
Chemistry	16	23	25	103
Computer Science	7	52	142	260
Geosciences	1	19	46	86
Mathematics	9	53	156	282
Physics	6	11	21	61
Total	64	440	599	1467
% Total	3%	17%	23%	57%
NJCU				77%

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NJCU STEM Graduation (2016)

	4-Yr. FTFT Grad	6-Yr. FTFT Grad	3-Yr. Transfer Grad
Biology	16%	35%	42%
Chemistry	0%	14%	43%
Comp. Science	0%	31%	18%
Geoscience	0%	33%	25%
Mathematics	8%	25%	40%
Physics	0%	0%	0%
Total STEM	**9%**	**28%**	**36%**
Total NJCU	**5%**	**30%**	**50%**

	FTFT Students	Transfer Students
STEM	**5.66 years**	**3.13 years**
Non-STEM	**4.98 years**	**2.98 years**

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Proyecto STEM:

Evidence-Based Approaches to STEM Enrollment, Retention and Graduation at an Urban Public Hispanic-Serving Institution

- 2016–2021 US ED Title III Part F “HSI-STEM and Articulation” Grant #P03C160155

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STEM Success Academy

- "Gateway" STEM courses
  - Precalculus
  - Computer As a Tool for STEM
  - Preparation for Chem/Physics
- 10 weeks: Mon–Thurs, 9:30 am to 3:00 pm
- Fee: $450
- Completion bonus: $450 book voucher

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STEM Success Academy

- Textbooks & laptops provided
- Supplemental Instruction
- Peer mentoring
- Full-time College Life Coach
- STEM Scholars community & faculty access

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STEM Success Academy

- ***Gamified orientation***
- ***Career Directions in STEM***
- “Soft skills”
- Intentionality
- “Growth mindset”
- Practicing Professionals

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STEM Success Academy Objectives

- 5% Increase in A/B grades in STEM courses among SSA alumni
- 2% Increase in academic standing among SSA alumni
- 2% Increase in retention among SSA alumni

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STEM Success Academy Evaluation

- Dr. Sue Gerber (PI), Director of Institutional Effectiveness, NJCU
- Dr. Monica Devanas, Center for Teaching Advancement & Assessment Research, Rutgers University
- Dr. Linden Higgins, Department of Biology, University of Vermont

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STEM Success Academy Evaluation

- Numbers & Demographics vs. Non-Participants
  - Retained in STEM majors
  - Enrolled in STEM majors
  - Completing Gateway Courses
  - Good Academic Standing
  - On track to graduate
  - Graduating with STEM degrees

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STEM Success Academy Students

2017 & 2018 SSA Demographics	
African-American	28%
Asian	16%
Hispanic	39%
Unknown/2 or more	9%
White	9%
Female	63%
Transfer students	3%
Average Age	21.9
Average GPA	2.75
N	57

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STEM Success Academy Outcomes

Course	SSA 2017				SSA 2018		
	Average Grade	% A-B-C	Fall 2017 Retention	Fall 2018 Retention	Average Grade	% A-B-C	Fall 2018 Retention
Prep for Chemistry	0.97	35%	96%	85%	1.09	53%	93%
Precalculus	2.57	75%			2.28	77%	
Prep for Physics	3.22	100%			2.27	73%	
Computer as a Tool	2.57	85%			2.28	70%	

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STEM Success Academy Outcomes

SSA 2017					SSA 2018		
Spring 2017	Summer 2017	Fall 2017	Spring 2018	Good standing	Spring 2018	Summer 2018	Good standing
2.88	2.80	2.74	2.75	89%	2.72	2.62	80%

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STEM Success Academy Outcomes

Grades in Fall 2017 STEM Courses			
Course	*N*	% A-B-C SSA	% A-B-C Non-SSA
Prep for Chemistry	7	85%	60%
Chemistry I	9	78%	68%
Precalculus	3	100%	63%
Calculus I	11	55%	63%
Prep for Physics	2	50%	79%
Physics I	1	100%	80%

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STEM Success Academy Outcomes

Participant Feedback
"I like that it's in the summer. Instead of taking the couple of months off and forgetting what I learned it keeps my mind running and active."
"It made me open my eyes to how much work it is attaining a STEM degree, nonetheless they're [*sic*] resources out there to help you and that you are not alone."
"Although I have slacked, it has taught me something: time management, responsibility, work ethic. Now I will be ready for the next semester with the new study habits I have learned."

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STEM Success Academy Outcomes

Challenges	Program Modifications
• Differential results by GPA ± 2.50 • Fatigue • Low SI participation • Sustaining community • Recruitment • Sustained participation	• Reduction by one course for GPA < 2.5 • Shorter days • College Life Coach intervention • Post-program cohort meetings • Modified curriculum • SI Leaders & research internships

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Orientation and Gamification

Shown to improve retention & success
(Tinto, 1997; 2001)

Shown to improve motivation & engagement
(Grimes, Kantroo, & Grinter, 2010)

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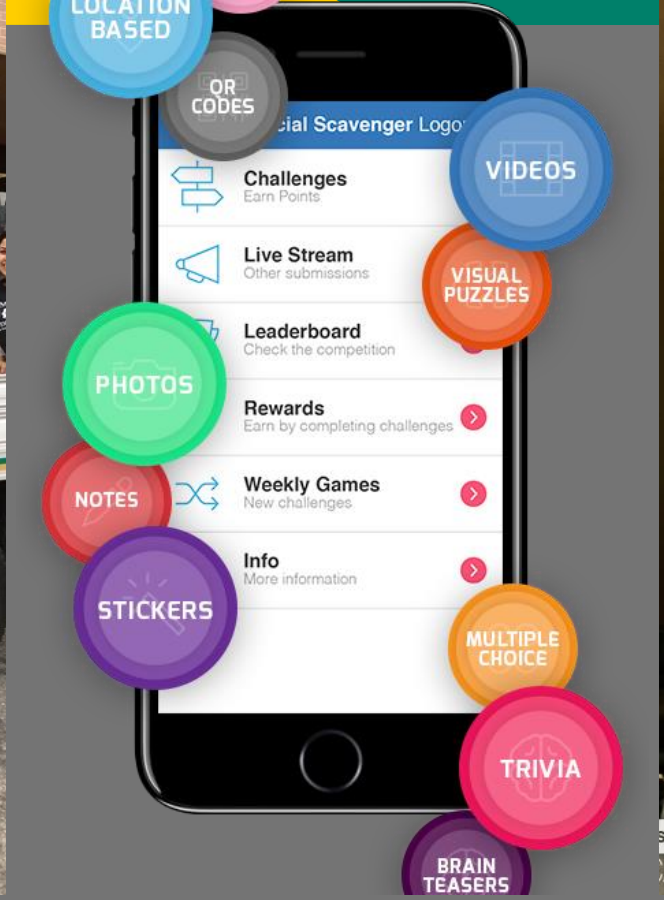

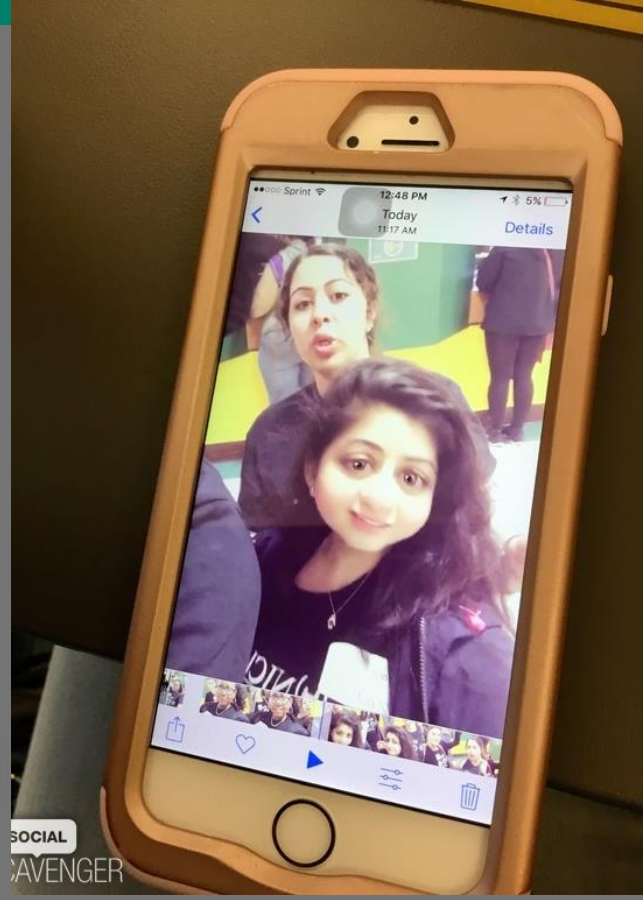

Social Scavenger App

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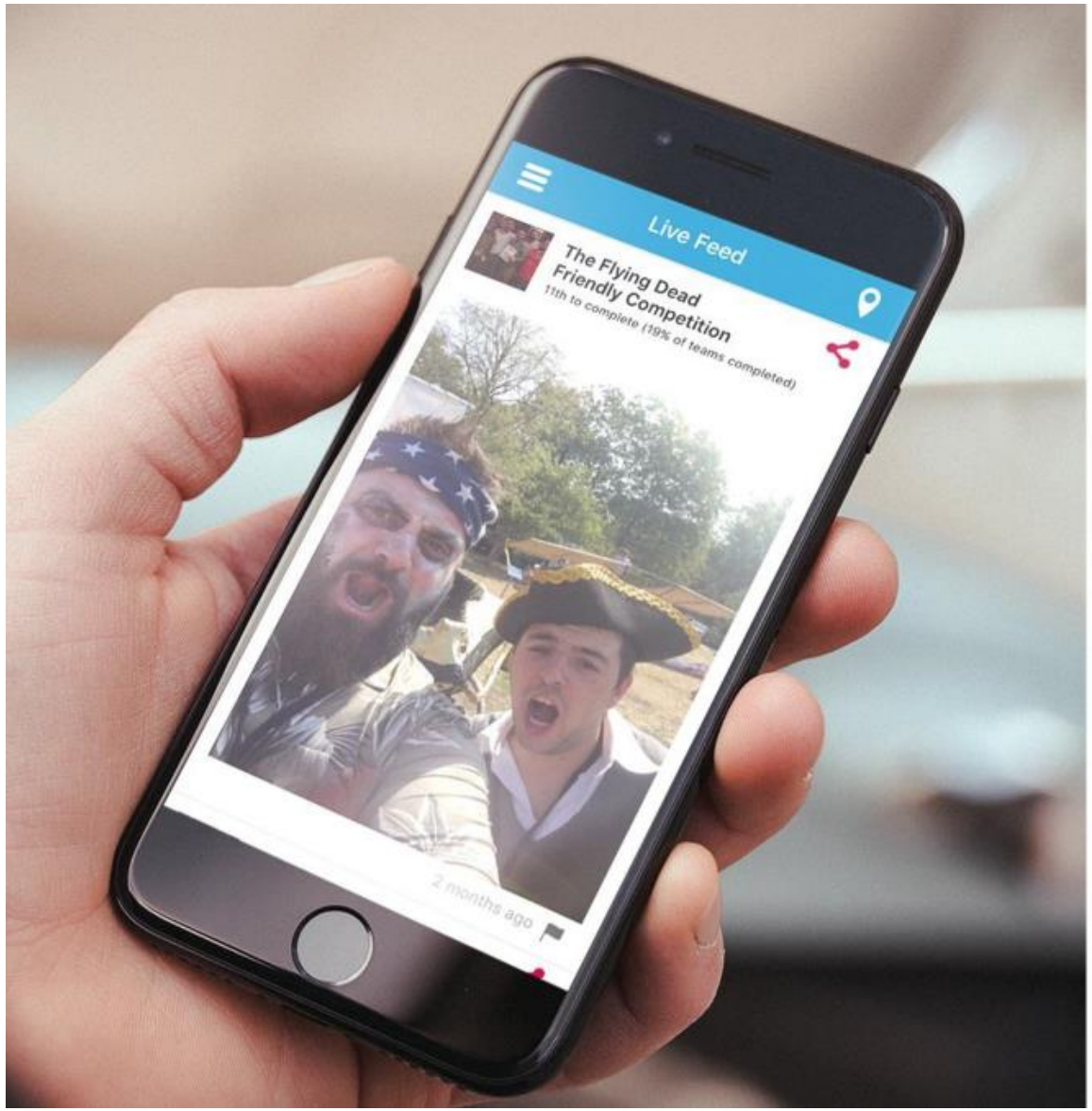

PLAYING GAMES IN BRIEF

1 - Players can download the app for iOS or Android

2 - Players enter the game with a password provided by your admin

3 - Once players enter your game they complete challenges which are automatically streamed live and update the leaderboard

4 - Challenges can be of many types from videos to photos to trivia and much more

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BUILDING & MANAGING GAMES

Your game builder is a web based tool that allows anyone to build, run and manage your game(s).

Managing games in real-time is easy. You can auto-approve challenges but keep the flexibility to change point totals, reject challenges and much more.

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PRICING ESTIMATES

Social Scavenger App: $15 / team ($225)

The Social Scavenger app is available to educational institutions at a discounted rate of $15 / team. We recommend teams of approximately 4 players, so for a group of 60 the cost would be $225.

Other Services: TBD

Other services available from Social Scavenger partners include:

- Game Program Development (~$799)
  - We will work with you to understand the space and goals and create a compelling and competitive game.
  - We will build your game into the system and train your group for orientation day .
- Highlight Reel Videos ($199)
  - We will put together a ~2 minute video highlighting the best of the day in videos, photos and set it to music.

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STEM-Based Activities

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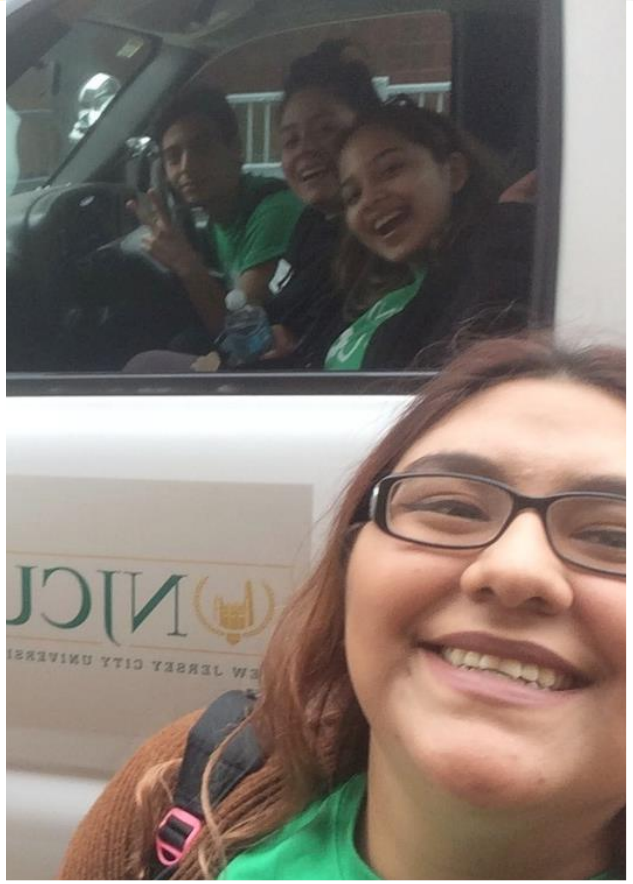

University-Based Activities

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SOCIAL SCAVENGER

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Research Questions

1) What effect do gamified elements in a college orientation program have on student commitment, persistence and retention in an undergraduate STEM program?

2) To what extent do undergraduate STEM students perceive that a gamified orientation positively influenced their commitment, persistence and retention in an undergraduate STEM program?

3) What role does a gamified orientation play in the utilization of institutional learner supports in an undergraduate STEM program?

4) How do students perceive the impact of a gamified orientation on their feelings of social integration, identity and belonging on campus?

5) What is the perceived impact of gamification elements such as a leaderboard, badges, points and rewards, on team-building during the college orientation?

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Category 1:
The gamified orientation is likely to be one piece of the puzzle toward increased retention among URM, STEM students.

Overall:
A gamified orientation program is likely to be a much more effective style of orientation than traditional past practices and should be implemented more often and more broadly in higher education settings.

Category 2:
Formation of communities of practice appears to be the most valuable support for successful integration provided by the gamified orientation.

Category 3:
The gamified orientation facilitated a comfortable relationship with students' life coaches which was helpful to build more meaningful connections later in the semester.

Category 4:
High level of motivation was likely to be caused by internal factors such as a feeling of competition, comradery and fun. External factor most motivating was the leaderboard.

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Gamified Orientation Outcomes

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Projecto STEM

Strategy: High-tech/high-touch advising & mentoring

- Career planning, financial aid, financial literacy, etc., events to motivate students toward careers, financial planning, FAFSA completion, etc.

Approach: STEM Success Academy provides daily sessions with STEM faculty & staff to develop “soft skills”, study skills, career development, and overall self-efficacy among participants.

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Career Directions in STEM

Motivation

- Lack of career goals negatively impacts retention (Tinto 1987; Nutt, 2003)
- Faculty observations of graduating students
  - Large percentage of students seeking a nonintentional “gap year”
  - Student demand for career advising
  - Lack of career planning evident from senior student advising

Graduating student survey

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Graduating Student Survey (Biology)

Results

45 responding students

- Seeking employment alone 11%
- Seeking graduate study 22%
- Work & graduate study 67%

78% seeking employment

- Entering new jobs 11%

89% seeking graduate study

- Healthcare-related areas 69%
- Took placement tests 33%
- Applied to graduate program 33%

Impressions

- Students were unaware of the diversity of caaduate training.
- Students did not carry out steps to prepare for greer possibilities.
- Students did not find jobs linked to their undergrraduate studies.
- Overall: Students leaving with degrees had developed interests in careers but were unprepared to move directly into jobs or post-graduate studies.

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Career Directions in STEM

Goal

1. To improve pre- and post-graduate outcomes by enhancing student:
    - Awareness of diverse career options to match individual interests/strengths
    - Understanding of internal & external resources to promote academic & career-seeking success
    - Knowledge of steps and skills necessary to prepare for post-graduate options
2. To enable students to develop an effective personal career/academic success plan

Goal	Short-term action	Challenges	Resources	Timeline

Year One Career Program

Goals	Topics
Awareness of Self	
What do I like?	Setting Career Goals
What are my strengths?	Skills and Interest Assessment
How do I think about myself?	Introduction to the College Life Coach
What do I want to do or be?	Student mission statements
Awareness of Resources to Promote Success	
Personal	NJCU Academic Resources
Academic	Improving study skills
Financial	Navigating Financial Aid at NJCU
Career	Growth Mindset
	Alumni perspectives
Awareness of Requirements for Career-Seeking Success	
Building my resume	Writing a resume
Awareness of job/graduate requirements	Online branding
Finding employment opportunities	Internships
	Student Leadership/Service
	Advice from a STEM Recruiter

Session	Topic
1 Initial class	Introduction to course
2 Making Your Own Plan	Setting Career Goals
3	Thinking about who you are: Skills and Interest Assessment
4	Introduction to the College Life Coach
5 Personal Success	NJCU Resources: Library and HUB
6	Personal Resources: Improving study skills and time management
7	Navigating Financial Aid at NJCU
8	Growth Mindset
9	Alumni perspectives on navigating NJCU academics
10	Student mission statements
11 Career Preparation	Branding yourself online
12	Writing a resume
13	Making an online resume
14	Work on resumes
15	Building the resume/ What STEM Employers want
16	Building the resume/ Internships
17	Career Preparation: Building the resume/ Leadership and service opportunities at NJCU
18 Wrap up	Work on Career Plans
19	Final Presentations Gallery Walk

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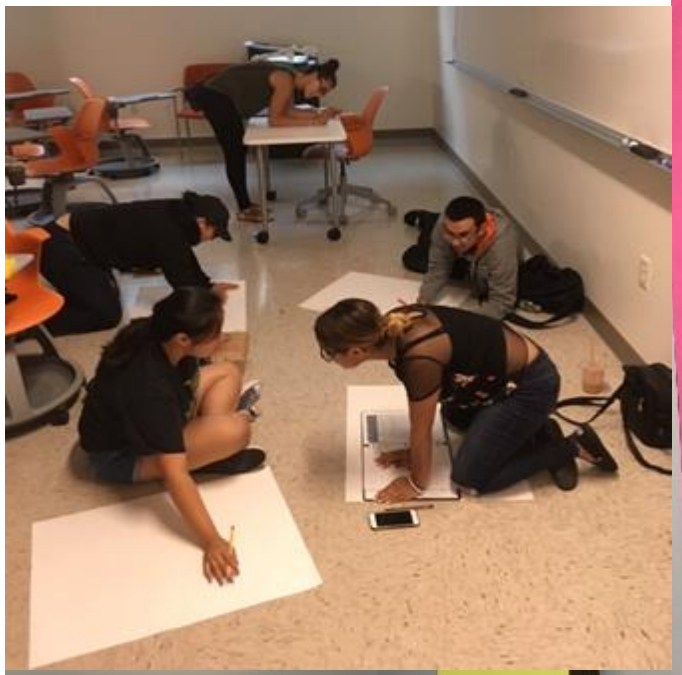
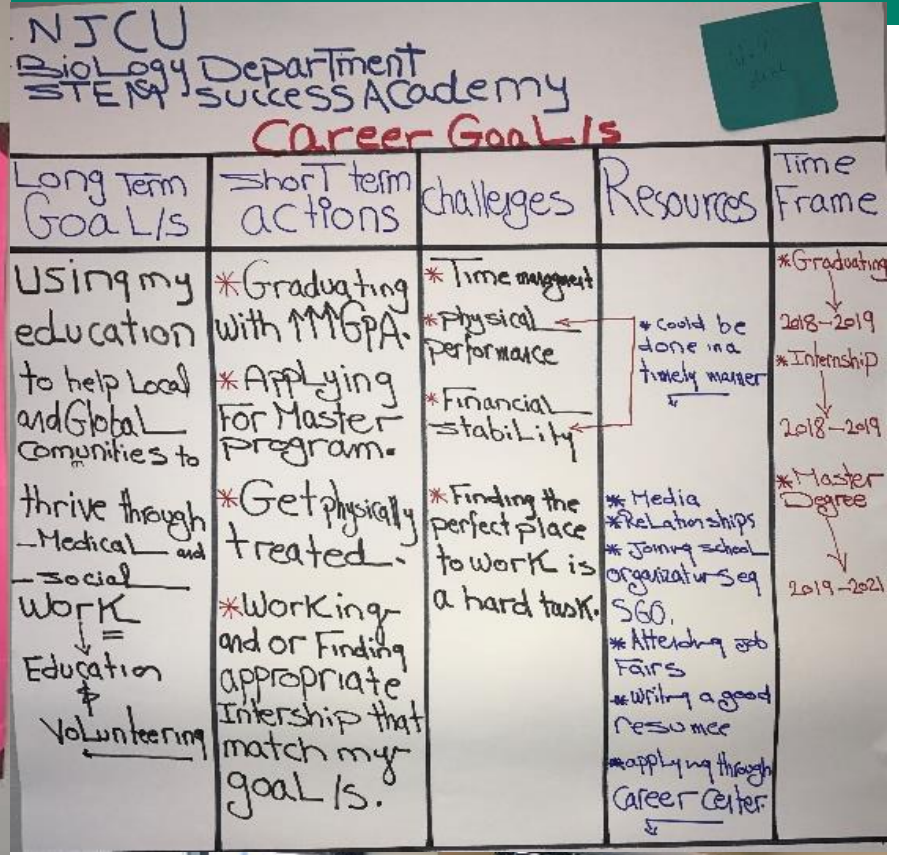
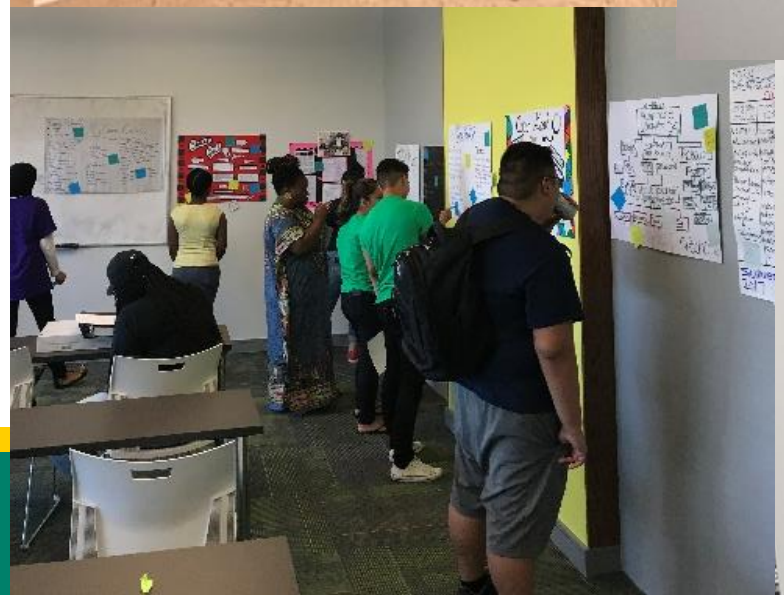
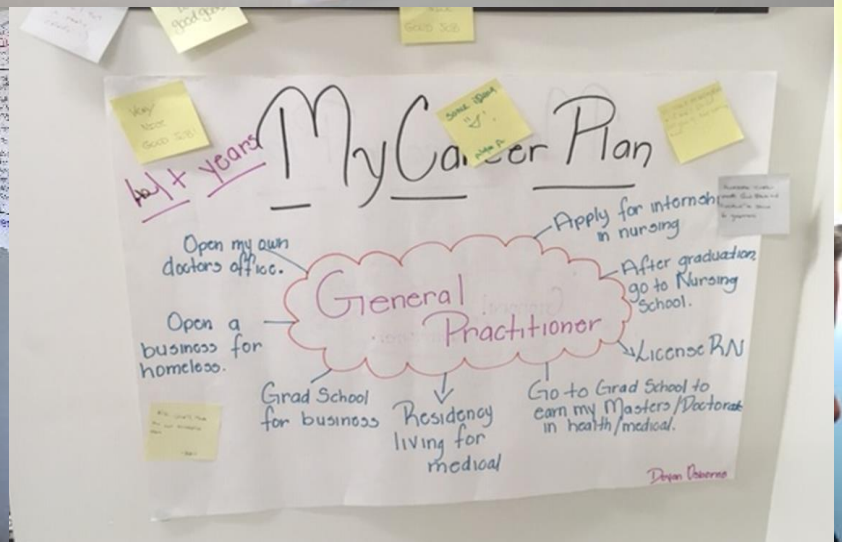
Gallery Walk

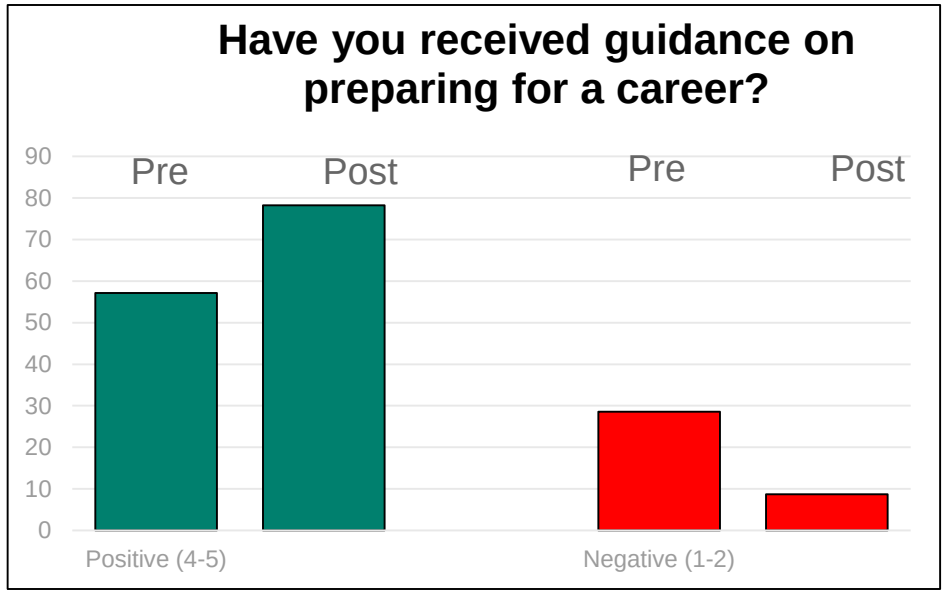


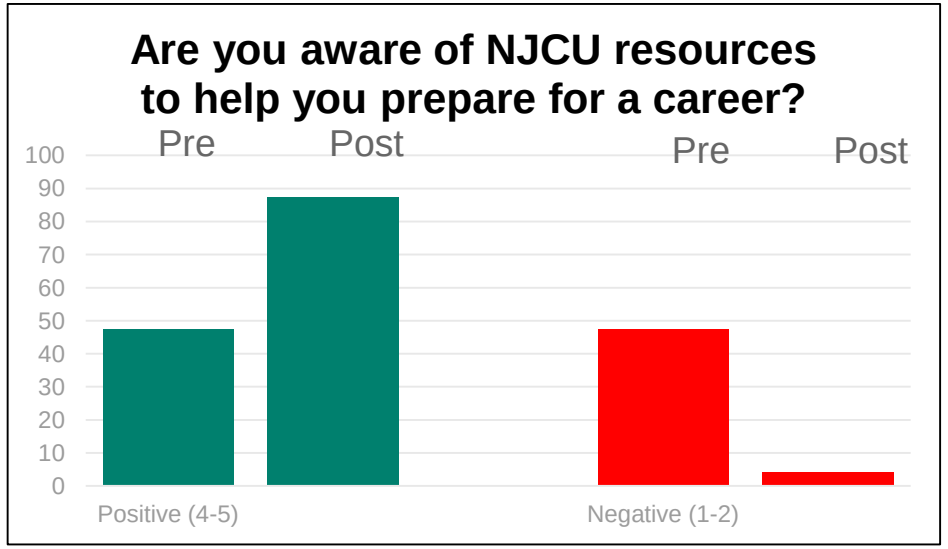


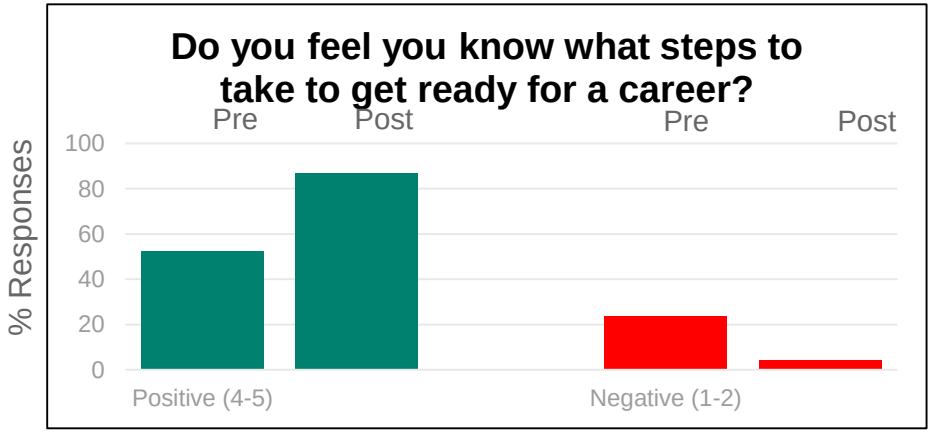


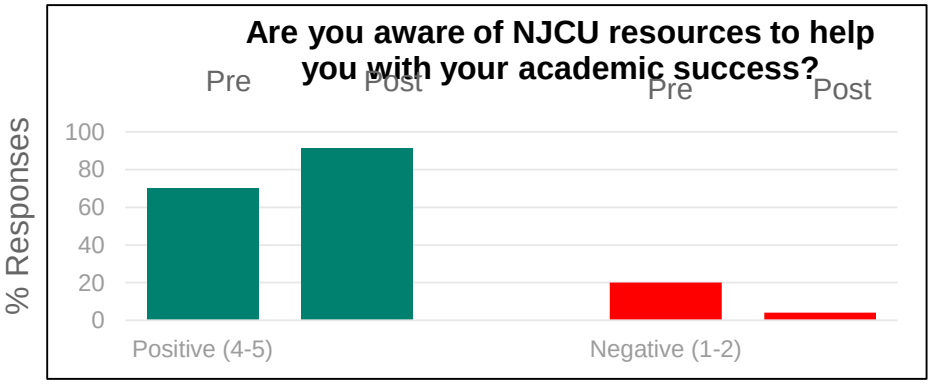


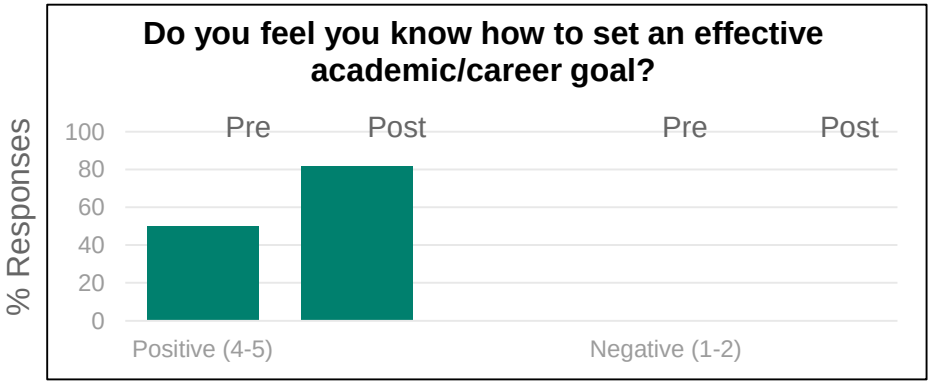
Year One Outcomes *N* = 22











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Year One Observations/Concerns

- Student attendance was irregular and dropped with “program fatigue”
- Students showed mixed levels of engagement in the process

Year Two Redesign

- 1-credit course
- Two 45 minute sessions per week
- Content similar content to Year One
- Additional graded assignments—Integrated in student portfolio

-Strength, weaknesses & skills Inventory
-Goal-setting assignment
-Personal mission statement
-Personal study calendar
-College life coach fact sheet
-Resume draft
-Career plan
-Internship search
-Final poster & gallery walk

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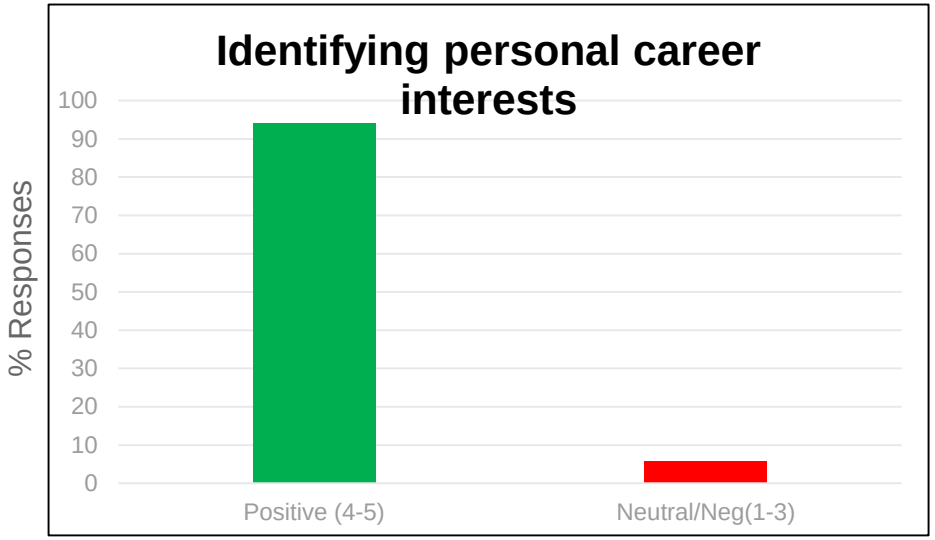
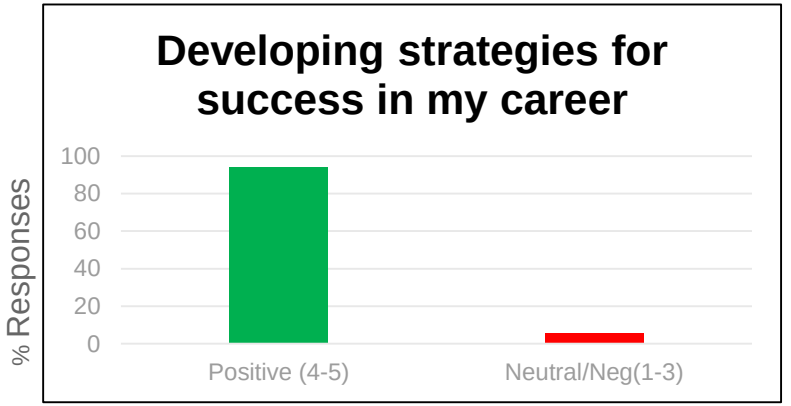
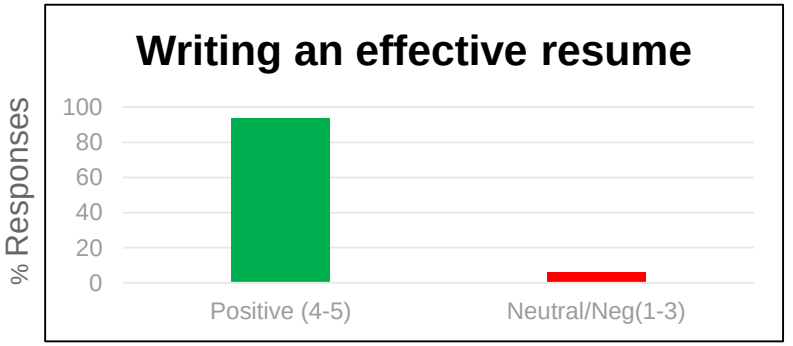
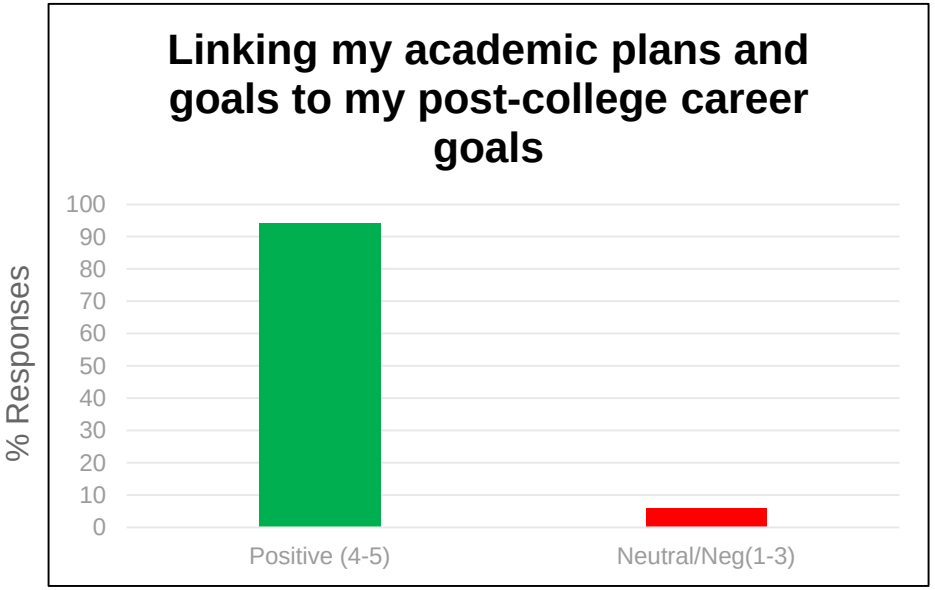
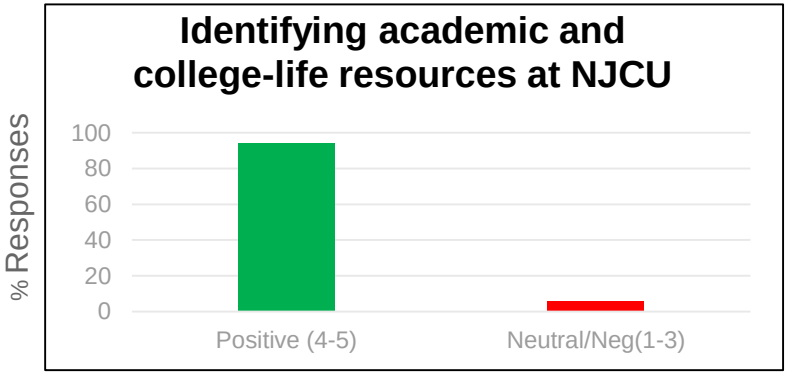
Year Two Outcomes











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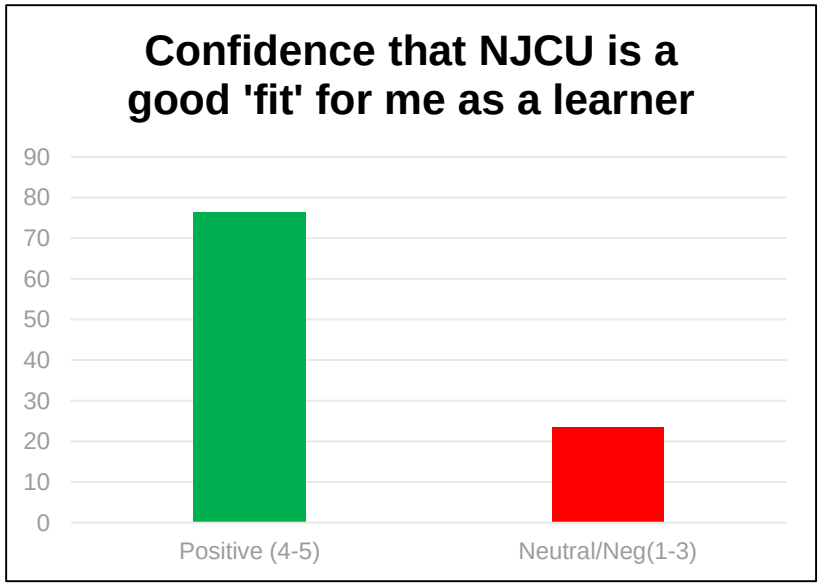
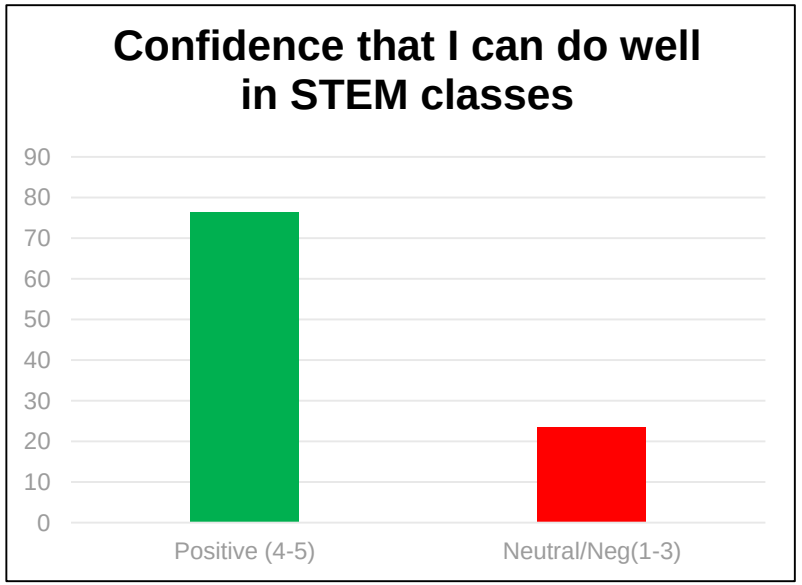
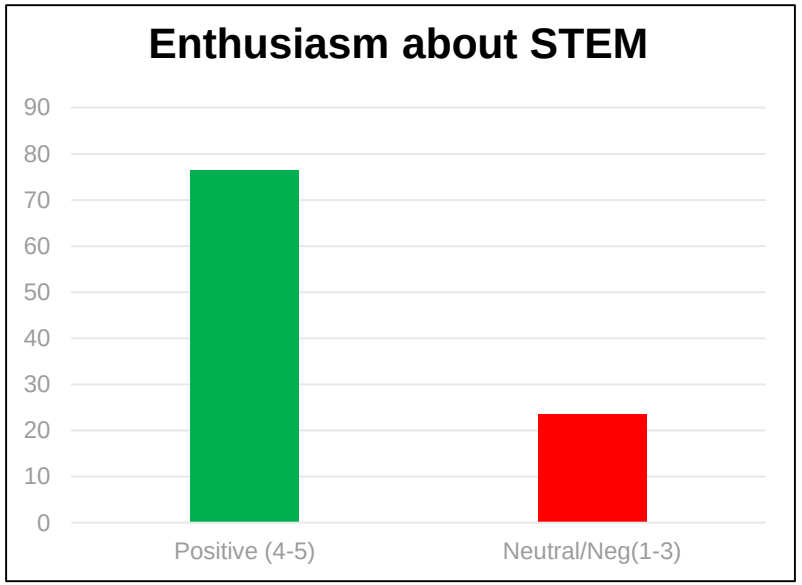
Year Two Outcomes







- **Observations**
  - Attendance still problematic in AM
  - Investment in course highly uneven
    - Students unsure of career path are less engaged/find less benefit
  - High number of subjects & speakers disallowed sufficient student discussion & group work
    - Instructor centered/driven

- **Year Three Redesign**
  - Mid-day sessions
  - Increased group work time
  - Student clustering based on career interests (lack of interest)

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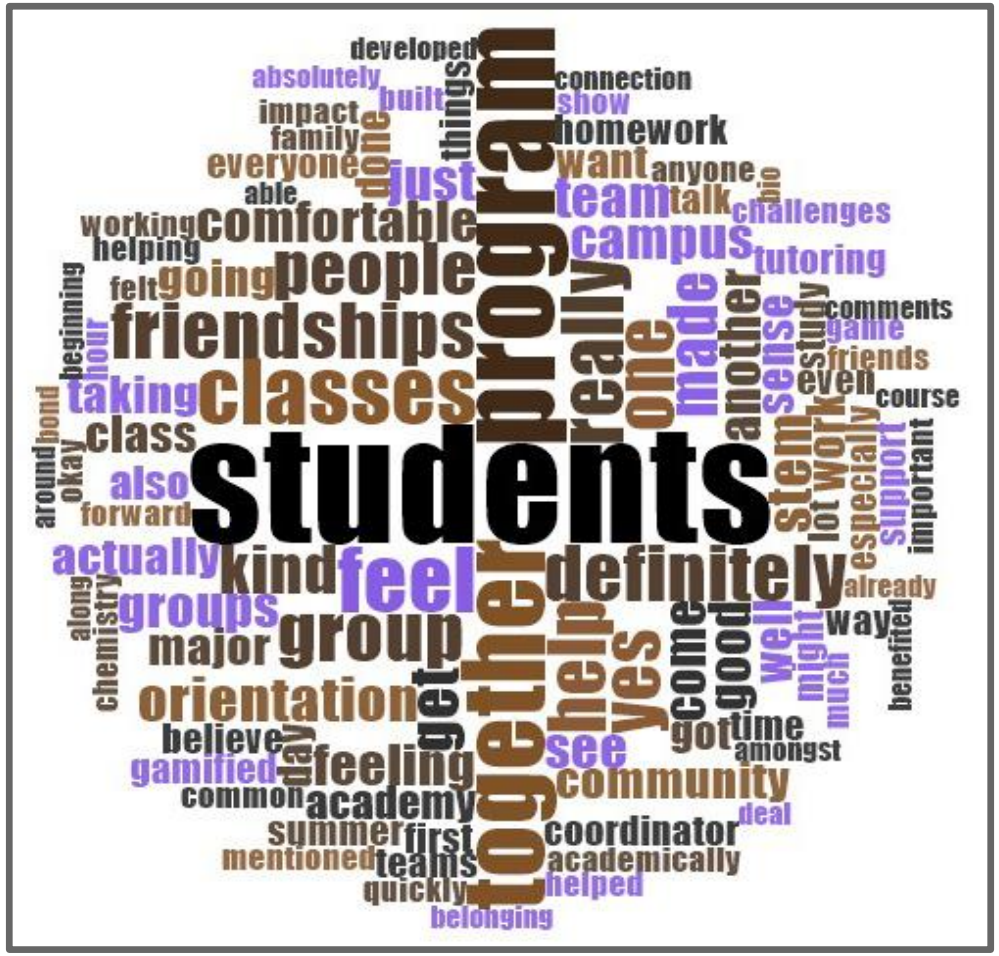
STEM Success Academy Outcomes



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Thank you!

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