Final Evaluation Report
The Animation Project

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Executive Summary

Objective

The Animation Project (TAP) provides opportunities for young people in NYC to develop skills in digital animation, with a path toward a career in the industry. According to the Bureau of Labor Statistics, employment in the animation sector is expected to grow by 4% between 2018 and 2028, and animators made a median salary of $72,520 in 2018.[1] In addition to skills training, TAP supports program participants through access to social-emotional resources and professional development opportunities. Participants can get involved through a program in their school or through an internship.

Over the 2018–2019 school year, Spark partnered with the Made in NY Animation Project and the Mayor's Office of Media and Entertainment (MOME) to gather data and evaluate the social impact of TAP's in-school program.

Spark's assessment included the following goals:
- Assisting TAP and MOME in better understanding the outcomes of their in-school programs,
- Offering insights and suggestions regarding how to increase their impact in their future, and
- Increasing accountability to and communication with internal and external stakeholders as well as the public.

Methodology

To measure outcomes for in-school TAP programs, Spark developed and administered surveys, which included the following elements.
- ***Stakeholder Involvement in Survey Development:*** Former TAP students and current staff shared their insights and experiences of TAP with the Spark team, who used this information to develop a relevant, focused survey. TAP students were directly involved in designing the survey instruments, contributing to the format, suggesting and editing questions, and helping to set the priorities for the survey.
- ***Participants:*** Survey participants were middle school and high school students from schools in neighborhoods with a Neighborhood Opportunity Network (NeON) site, which are found in areas where a high number of people on probation reside.
- ***Pre- and Post-Testing***: Spark administered the survey to TAP participants prior to them beginning the TAP program and again upon their completion of TAP.
- ***Control Group:*** In addition to TAP participants, groups of non-TAP students also took the survey in order to uncover any extraneous factors that may have impacted the results.

The survey contained four sections, which measured key areas regarding TAP's targeted impacts.
1. ***Social-Emotional Learning (SEL):*** Scale questions to measure participants' self-perceptions of their social support, self-awareness, and other SEL elements. Spark used questions from existing vetted, or "validated," survey instruments whenever possible to measure SEL.
2. ***Technical Questions:*** Multiple-choice questions to measure participants' knowledge of digital animation skills.
3. ***Self-Perception and Professional Goals***: Open-ended questions to explore how participants described themselves as well as their future job expectations and goals.

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[1] Multimedia Artists and Animators. Bureau of Labor Statistics.
https://www.bls.gov/ooh/arts-and-design/multimedia-artists-and-animators.htm

4. *Relationship to a Group:* Open-ended questions to explore participants' perceptions of how they related in groups before and after participating in TAP.

Key Findings

Overall, the survey data showed significant, positive changes for students in four areas following their participation in TAP:
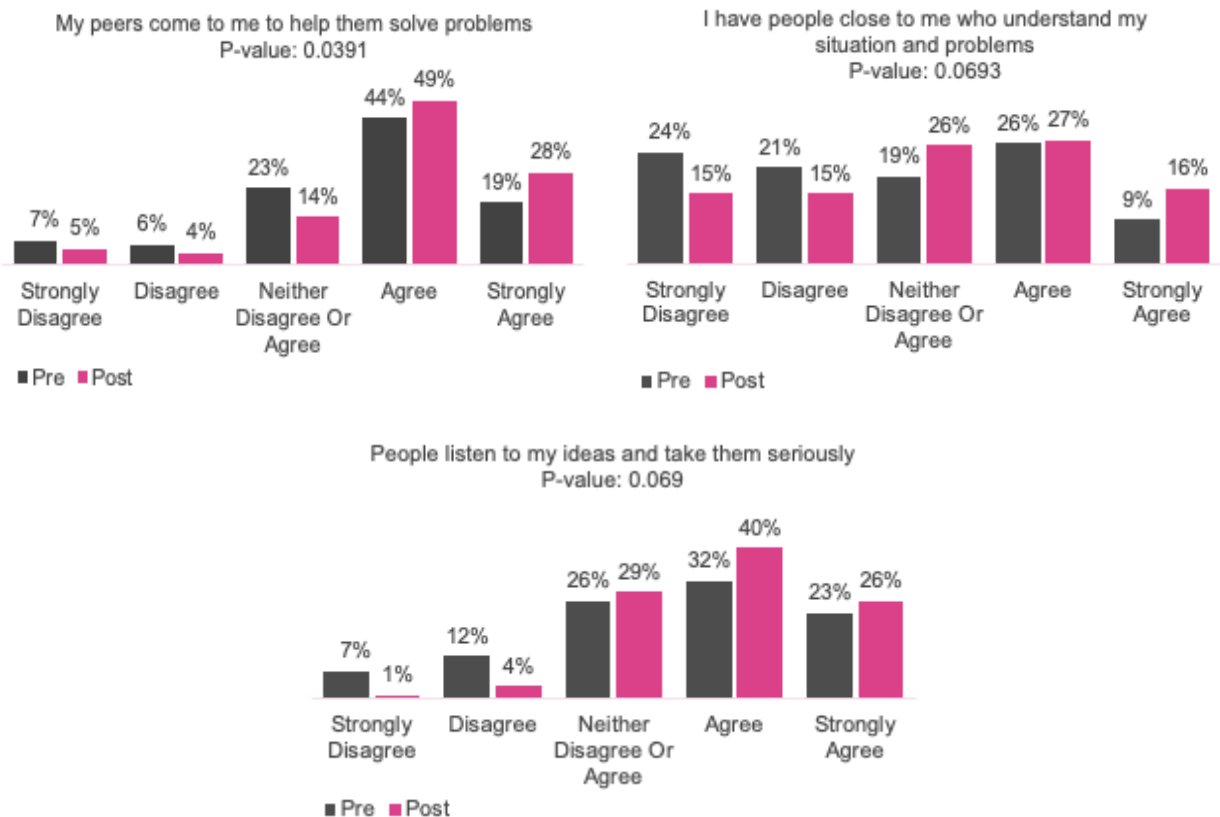
- Community and social support,
- Community and social competency,
- Self-awareness, and
- Teamwork.

Social-Emotional Learning

SEL involves developing interpersonal skills to manage emotions and build positive relationships, which is a key focus for TAP in preparing students to have fulfilling professional and personal lives.

Regarding SEL, participants in TAP showed significant positive change as a result of their participation in the program. These effects included students showing improvement in their social competence and social support, which are both measures of their sense of community. These results suggest that TAP students felt more supported and more heard and validated by those around them after participating in TAP.

Questions with Statistically Significant Changes: Increased Sense of Community

My peers come to me to help them solve problems
P-value: 0.0391

	Strongly Disagree	Disagree	Neither Disagree Or Agree	Agree	Strongly Agree
Pre	7%	6%	23%	44%	19%
Post	5%	4%	14%	49%	28%

I have people close to me who understand my situation and problems
P-value: 0.0693

	Strongly Disagree	Disagree	Neither Disagree Or Agree	Agree	Strongly Agree
Pre	24%	21%	19%	26%	9%
Post	15%	15%	26%	27%	16%

People listen to my ideas and take them seriously
P-value: 0.069

	Strongly Disagree	Disagree	Neither Disagree Or Agree	Agree	Strongly Agree
Pre	7%	12%	26%	32%	23%
Post	1%	4%	29%	40%	26%

Students also showed significant effects regarding self-esteem and reported increased self-awareness. Although increases in agreement with statements like "I feel I am basically no good" or "I wish I had more respect for myself" may not seem positive, these results may derive from

participants' increased candor or their heightened self-awareness of self-critical feelings on the posttest. TAP students' gains in SEL are further supported by the qualitative self-reporting that showed a 7% increase in the use of positive words and a 9% decrease in the use of negative words that students provided when asked to describe themselves.

Questions with Statistically Significant Changes: Increased Self-Awareness
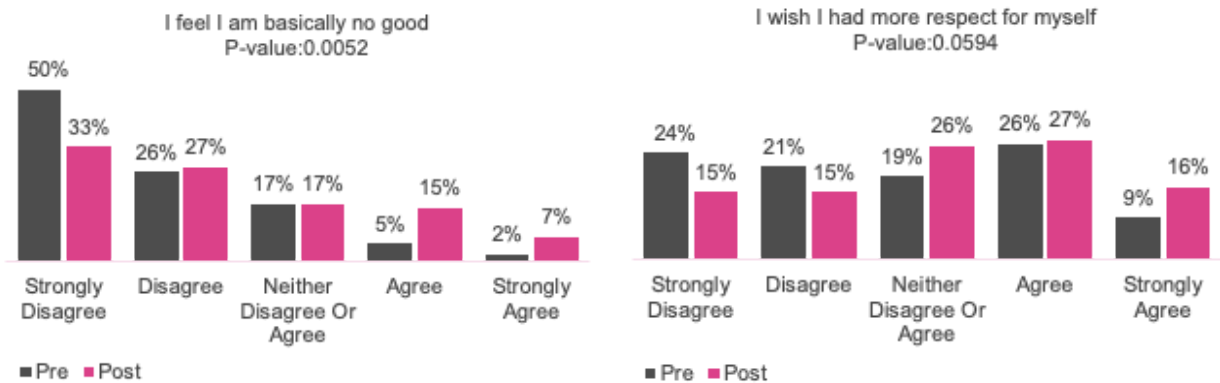
Gender Effects
- Although females showed significant improvement in one SEL measure in self-learning ("I'm good at teaching myself new things"), males drove the increase regarding their sense of community and self-awareness within the cohort.
- Males identified more strongly with questions that emphasized positive views of their sense of community, like "My peers come to me to help them solve problems," and of their self-esteem, like "I have a lot to be proud of." However, they also identified more strongly with the self-critical question "I feel I am basically no good."
- TAP therapists and animators should further explore these patterns of gendered differences in SEL outcomes to determine how best to support SEL learning for participants across genders.

The arrows below identify those indicators with statistically significant positive change.

Statement	Indicator	Full cohort	Male	Female
My peers come to me to help them solve problems	Community: Social competence	↑	↑	
I have people close to me who value me for who I am	Community: Social competence		↑	
I have people close to me who understand my situation and problems	Community: Social support	↑	↑	
It is satisfying to work for a long time to achieve something big	Core competency		↑	
I feel I am basically no good	Self-esteem	↑	↑	

Statement	Indicator	Full cohort	Male	Female
I have a lot to be proud of	Self-esteem		↑	
I wish I had more respect for myself	Self-esteem	↑		
I'm good at teaching myself new things	Self-esteem			↑

Age Effects

- Although survey results for SEL show significant differences between the program effects for middle school students and high school students, the results by grade are not as pronounced as those by gender.
- High school students drove the changes in SEL, with increased identification to five questions, including positive statements like "People listen to my ideas and take them seriously," as well as self-critical ones like "I feel I am basically no good."
- Although middle school students made up the majority of respondents, they showed more limited improvement in SEL, with significant improvement in only two questions: the community-focused "My peers come to me to help them solve problems" and the self-critical "I feel I am basically no good."
- This finding may indicate that the program is more effective in its goal of fostering SEL for high school students than middle school students.

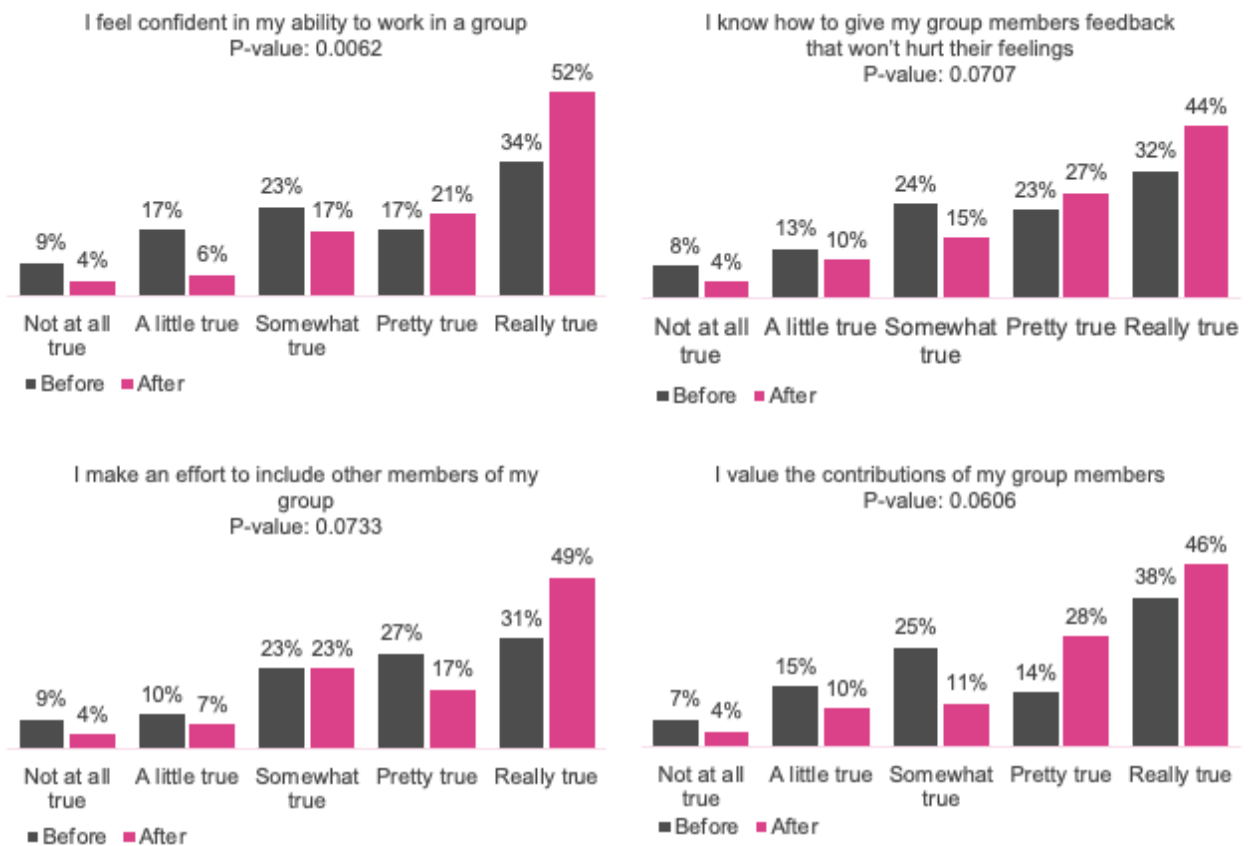The arrows below identify those indicators with statistically significant positive change.

Statement	Indicator	Full cohort	Middle school	High school
My peers come to me to help them solve problems	Community: Social competence	↑	↑	
People listen to my ideas and take them seriously	Community: Social competence	↑		↑
I have people close to me who motivate and encourage me	Community: Social support			↑
I talk with other people about my plans for the future	Community: Social support and Exploration in depth			↑
I feel I am basically no good	Self-esteem	↑	↑	↑
I wish I had more respect for myself	Self-esteem	↑		↑

Teamwork

Teamwork measures focused on how much students valued teamwork, how much students felt valued in teams, and how well they engaged in group work—all skills that are considered critical for success in the digital animation field.

Survey results showed four questions with significant changes for the full cohort regarding teamwork: increased confidence in their ability to work in a group, knowledge of how to give group members feedback that won't hurt their feelings, effort to include other members of their group, and finding value in the contributions of group members.

Questions with Statistically Significant Changes: Before and After TAP on Teamwork

I feel confident in my ability to work in a group
P-value: 0.0062

I know how to give my group members feedback that won't hurt their feelings
P-value: 0.0707

I make an effort to include other members of my group
P-value: 0.0733

I value the contributions of my group members
P-value: 0.0606

Gender Effects
- Unlike SEL, females drove the reported improvements in teamwork, with males showing no significant changes.
- This finding suggests that the methods TAP uses to promote teamwork within digital animation may be more effective for females than males.

Statement	Indicator	Full cohort	Male	Female	Non-binary
I feel confident in my ability to work in a group	Teamwork	↑		↑	
I value the contributions of my group members	Teamwork	↑		↑	

Age Effects
- Unlike SEL (and similar to the reversal seen in gender), middle school students drove the reported improvements in teamwork, showing significant improvement in three questions related to feeling confidence in their ability to work in a group, giving feedback to group members that won't hurt their feelings, and valuing the contributions of group members.
- Regarding teamwork, high school students showed significant improvement in one measure, their confidence in their ability to work in a group.
- According to these results, TAP's methods of promoting teamwork skills may be more effective for middle school students than high school students.
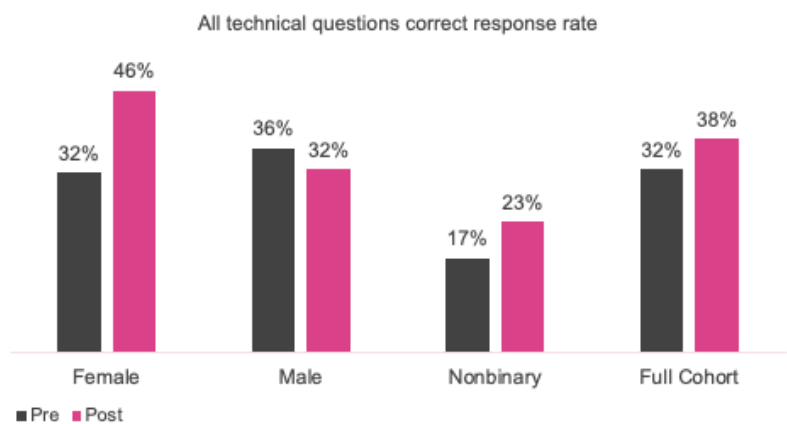
Statement	Indicator	Full cohort	Middle school	High school
I feel confident in my ability to work in a group	Teamwork	↑	↑	↑
I know how to give my group members feedback that won't hurt their feelings	Teamwork, Social competence	↑	↑	
I value the contributions of my group members	Teamwork	↑	↑	

Technical Questions

Overall, students showed a modest 7% improvement in correct answers to technical questions regarding digital animation.

Gender Effects
- Female and nonbinary students (includes respondents who marked prefer not to disclose, other, and those who did not respond) drove the slight improvement in correct responses.
- Males scored slightly worse on the posttest than the pretest.
- In recent discussions with TAP staff, a number of theories were put forward to explain this phenomenon. While these measures were developed with TAP leadership at the beginning of the process, staff felt the measures of technical skill no longer accurately measure the work that is going on in the classroom and that they were too focused on naming tools rather than assessing skills.
- As TAP expands, it will be helpful to establish clearer measures of technical success to ensure ever improving learning outcomes in technical knowledge.

All technical questions correct response rate

Female: Pre 32%, Post 46%
Male: Pre 36%, Post 32%
Nonbinary: Pre 17%, Post 23%
Full Cohort: Pre 32%, Post 38%

■ Pre ■ Post

- Middle school students showed an overall improvement in correct answers.
- High school students (like males) performed worse overall on the posttest.
- As with the results regarding gender for the technical questions, this disparity needs further exploration.

All technical questions correct response rate
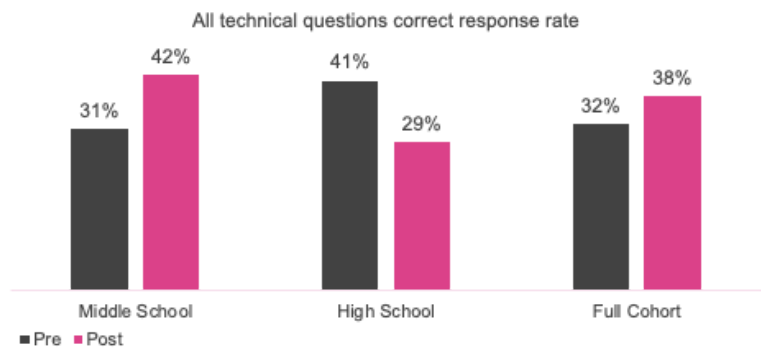
Job Expectations

TAP students were asked to specify what jobs they wanted to have and what job they expected to have in the future. This enables Spark to assess the prestige of their desired versus expected career aspirations, which is one way to assess impacts on professional aspiration in programs like these.
- Although participants did not show an increase in job prestige for their future career goals in the posttest, there was a convergence of prestige levels between the jobs that participants wanted to have in the future and the jobs they expected to have. This means the prestige of students' desired and expected future jobs were closer together after TAP than before.
- This result could stem from participants' increased self-confidence in achieving their desired career goals or could signify a clustering toward jobs they perceived to be realistic.
- TAP participants also showed increased interest in animation-related occupations.

Conclusion

Overall, Spark's analysis showed a positive change in TAP participants' sense of community, self-awareness, and teamwork.
- *Gender*
    - Females showed increases in teamwork, self-learning, and technical knowledge.
    - Males showed increases in self-awareness and a sense of community, which included social support and social competence.
    - Males also showed increased identification with self-critical statements like "I feel I am basically no good" post-TAP. This result and these gendered patterns should be explored further by TAP personnel.
    - Female and nonbinary students showed slight improvement in correct answers to technical questions, while males performed slightly worse on the posttest.
- *Age*
    - Middle school students showed improvement in teamwork and technical knowledge post-TAP.
    - High school students showed an increased sense of community and self-awareness and performed slightly worse on the posttest in technical questions.

Introduction

For the 2018–2019 academic year, the Mayor's Office of Media and Entertainment (MOME), a funder of The Animation Project (TAP), and the Made in NY Animation Project commissioned Spark to assess the social impact of TAP's in-school programming, the Animation Therapy Groups.

Goals of Spark's impact assessment included:
- To assist TAP and MOME in better understanding the outcomes of their in-school programs,
- To offer insights and suggestions regarding how to increase their impact in their future, and
- To increase accountability and communication to internal and external stakeholders as well as to the public.

About TAP

TAP is a therapeutic workforce development training program for youth ages 12 to 24. TAP seeks to provide youth with technical skills, professional development, and emotional resources for careers in the animation sector. Brian Austin, TAP's Executive Director, originated the model while working as an art therapist with adolescents in foster care. He applied his skills as a professional animator to nurture the social, emotional, and cognitive growth of his young clients by teaching animation as the medium by which they could express personal narratives and learn technological skills. Over the past decade, TAP has served thousands of participants across the five boroughs of New York City.

The "Non-Traditional Approach to Criminal and Social Justice" study revealed that 85% of NYS's prison population comes from seven NYC neighborhoods. In partnership with the NYC Department of Probation, TAP has been targeting their programming in these neighborhoods. TAP participants are comprised of a range of ethnic groups, majority low-income male, female, and nonbinary young people, many of whom have been justice involved.

By 2024, NYC is expected to add 3,000 animation industry jobs. TAP's mission is to prepare those who lack access and training for these jobs with the goal of cultivating young adults from all five boroughs to become animators - through software training, professional and personal development, and access to competitive employment opportunities.

TAP's programming is designed to address participant's deficits in technical education, career opportunity, and social capital. The three levels of programming (Animation Therapy Group, Intern Program, and STUDIO) are designed with the knowledge that animation requires a deep level of commitment in order to become proficient. After being introduced to animation in TAP's entry-level program, participants may enter the incentivized internship program, and are then eligible to work in TAP's in-house animation studio (STUDIO), be placed in an external internship, or pursue their career through more education and/or pursue work in the industry.

The sections that follow provide an in-depth look at the social impact of TAP's entry level, in-school program (Animation Therapy Group) based on Spark's year-long research, detailing the methodology used for this study, the schools where assessment took place, and the study's results, with a focus on key findings and insights.

Methodology

Understanding the Program

The process of evaluation design began with understanding the program and a process of learning about what matters to students, program staff, teachers, and funders. In order to do this, we engaged in these processes:

- Information collection: A thorough review of TAPs history, activities, programming, etc. This included program materials, summaries, production schedules, logical framework, and program outcomes, including program products like completed animations.

- Stakeholder mapping: A thorough process of mapping all involved in the project and partnership to help identify and prioritize those stakeholders who should be included in, consulted about, or informed of the process.

- Stakeholder interviews and workshops: In-depth conversations with the stakeholders prioritized during the stakeholder mapping process. The objective of these conversations was to gather insights into what is most important about the program, identify key themes, and learn from participants about what they learned and about what TAP means to them. This element of the process was critical to understand the community's needs and perspectives, and to develop buy-in from some of the most important partners. Through these interviews, we sought to ensure that everyone was clear about the process and its objectives, and that the evaluation would reflect the experience of the students in the program while meeting the broadest needs of the various interested constituencies. We conducted interviews and workshops with:
  - o Former TAP students (currently TAP interns),
  - o TAP senior staff, and
  - o DOE and DOP staff.

Survey Design

With the information collected during the first interviews and workshops, we created the structure of TAP's evaluation and designed the evaluation instrument. Our team conducted extensive research to identify relevant and appropriately targeted questions that could be incorporated (or adapted) for this survey from previously validated survey instruments. Whenever possible we incorporated these questions or based our own on them in order to increase the anticipated validity of our work. In all, ten different instruments were incorporated into the student surveys, which were then revised, refined, and tested with TAP interns and teachers, further piloted with TAP interns, and then further revised. This process is described in greater detail below.

TAP Student Survey Structure

We created a pre and post student survey to be taken by the TAP students at the beginning and end of the TAP course. Through our conversations with the different stakeholders, we identified the following five priority areas that the survey needed to address:

1. Long-term goals;
2. Social skills;
3. Self-worth;
4. Group relations, including the skills needed to work in teams and asking, receiving, and taking help from others; and
5. Specific technical and animation skills of interest to TAP.

Source Surveys

With a clear structure and clearly identified priority areas, we turned our attention to the review of validated survey instruments, questionnaires, and research papers (national and international) in the areas of social-emotional learning, identity development, social functioning, peer relationships, teamwork, and workforce development. Validated survey questionnaires are those with proven high reliability and internal consistency. A questionnaire with a high reliability is one that would get the same answers if applied to the same population again. Internal consistency is measured by comparing the answers to questions measuring the same concepts. Using questions from these questionnaires as a starting point should make our surveys more reliable. We also know that by using previously validated phrasing we begin with wording that was clear and easily understood by the original target population. In the piloting and workshopping phase, we assess what types of changes will be needed to the language to make it relevant and intelligible in the local, current context in which we're operating, and revise accordingly. Full list and description of the validated survey questionnaires used can be found in the Annex.

Survey Revision

Once we had created the first iteration of the survey, we began workshopping it with a group of TAP interns. These students had already successfully completed an Animation Project class or classes and had gone on to become more involved by participating in TAP's internship program. These young people had all been highly involved with TAP for quite some time and so were in a unique position to see TAP's work both from the student/participant perspective and also from the TAP institutional perspective. TAP interns helped to design the survey and provided feedback on the process and survey.

We met and worked with TAP's interns on the survey several times over several weeks. Interns read through the survey independently, made individual comments, suggested edits, and participated in collaborative discussion ranging from broad topics like the purpose of this survey to specific conversations about language, phrasing, and relevance of individual questions or words. As a group, TAP interns also helped rewrite the survey introduction to make sure the language was appropriate and it felt welcoming and not intimidating for students.

This was one of the most critical aspects of the design process. Since the survey was asking students to reflect on their attitudes, hopes, and self-worth, TAP's interns were critical in helping understand the mindset of potential respondents and in ensuring—to the best of our ability—that the survey wouldn't elicit strong negative reactions or create any discomfort for respondents.

Control Group Student Survey

We also created a modified version of the TAP student survey for the control group. We designed this survey to be taken by students at the same schools where TAP operates but who had not been part of a TAP class. This survey asked the same questions as the TAP survey with the exception of the removal of references to TAP in favor of references to the school or semester as appropriate.

For research like this, a control group serves as a counterfactual, allowing researchers to rule out confounding factors in the data. In other words, a control group allows us to be sure that the effects found in the TAP group are due to the intervention, i.e., participating in a TAP course, rather than external or structural factors. Confounding factors could include students being tired at the end of the semester, other programs at the school, and sociopolitical context, amongst others.

Survey Deployment

Surveys were deployed during the 2018–2019 school year at 11 school sites with Animation Groups. TAP students who brought back signed consent forms from parents or guardians were surveyed at the beginning and end of each animation cycle. The length of each cycle varied per school with some schools having a year-long cycle with 1 cohort of students and others having up to 5 animation cycles and 5 cohorts.

School	Borough/ neighborhood	Total cohorts surveyed	Notes
PS-308	Bed Stuy, Brooklyn	4 cohorts	NA
AIM Charter I	East New York, Brooklyn	3 cohorts	Cohorts 2 and 3 ran in parallel during the Spring semester
PS-184	Brownsville, Brooklyn	1 cohort	Full year cycle
Judith Kaye High School	Harlem, Manhattan	1 cohort	Full year cycle
Lanzetta	Harlem, Manhattan	1 cohort	Full year cycle
ReStart Mott Haven	South Bronx, Bronx	3 cohorts	NA
Mott Haven	South Bronx, Bronx	1 cohort	Only participated during the Fall semester (2018)

School	Borough/ neighborhood	Total cohorts surveyed	Notes
Wildcat[2][3]	Bronx	2 cohorts	Full semester cohorts alternating on a weekly basis Only participated during the Spring semester (2019)
MS-358	Jamaica, Queens	5 cohorts	NA
MS-217	Jamaica, Queens	3 cohorts	NA
St. Marks ALC[4]	Staten Island	2 cohorts	Only participated during the Fall semester (2018)

Additionally, pre and post control-group surveys were administered at the beginning and end of the spring semester at:

- AIM Charter I
- MS-217
- MS-358

Some of the TAP interns who participated in the design workshops were later trained in technical and confidentiality procedures to administer the survey. During the fall semester of 2018, surveys were administered by this group of interns, For the spring semester, in conversation with TAP's leadership, it was decided that Spark researchers would replace the TAP interns for survey deployment, and our team did so.

Collection Method

Surveys were administered at schools by a TAP intern or a Spark Impact researcher who visited schools to introduce the survey to students, distribute and collect consent forms, and help answer any questions students might have during the survey.

Students then self-administered surveys using tablet computers. Answers were collected using an offline data collection platform and were then uploaded and stored on a private data server.

In total, across the 11 school sites, 228 surveys were collected, out of which 130 were pre surveys, broken down into 99 TAP student surveys and 31 control group surveys; and 98 post surveys, broken down into 85 TAP student surveys and 13 control group surveys.

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[2] St. Marks ALC was substituted by Wildcat during the Spring semester of 2019.
[3] Cohorts at Wildcat run parallel throughout the semester during alternating weeks.
[4] St. Marks ALC was substituted by Wildcat during the Spring semester of 2019.

School Overview

Each of the 11 schools was selected because of its location in a neighborhood with a Neighborhood Opportunity Network (NeON) site. These neighborhoods have been identified as places in which "large concentrations of people on probation reside," and where the city has intervened to bring various services to support these communities.[5] TAP intentionally chose these schools because they are located in high-need communities with vulnerable populations where the school-to-prison pipeline is the strongest. Additionally, most of the schools surveyed are 'last chance' schools, including transfer high schools and alternative education middle schools. Transfers high schools "are small, full-time high schools designed to re-engage students who have dropped out or fallen behind in credits." Alternative education middle schools are schools and programs designed for middle school students who are older than their assigned grade level and are at risk of not graduating.
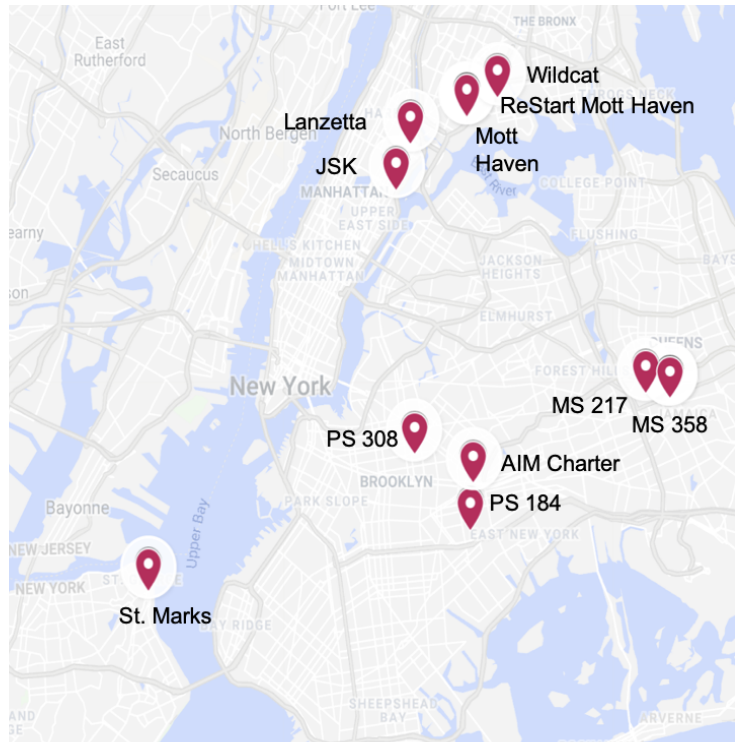
Data on demographics, attendance, and student achievement is provided for each school, as available, and comes from the 2017–2018 School Quality Snapshots compiled by the NYC Department of Education.[6]

Middle Schools

At PS-308, a K–8 school, 76% of students are Black, 18% Hispanic, 3% Asian, and 1% White. English language learners make up 5% of students, and 28% of students have special needs. Student attendance is 87% with 50% of students chronically absent. 76% of former eighth graders had enough high school credit in ninth grade to be on track for graduation.

At PS-184, a K–8 school, 71% of students are Black, 27% Hispanic, and 1% White. English language learners make up 4% of students, and 29% of students have special needs. Student attendance is 89% with 46% of students chronically absent. 87% of former eighth graders had enough high school credit in ninth grade to be on track for graduation.

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[5] Neighborhood Opportunity Network. About NeON. https://www1.nyc.gov/site/neon/about/about.page
[6] NYC DOE. 2017–2018 School Quality Snapshot. https://tools.nycenet.edu/snapshot/2018/

At Lanzetta, a K–8 school, 68% of students are Hispanic, 26% Black, 3% White, and 2% Asian. English language learners make up 21% of students, and 33% of students have special needs. Student attendance is 91% with 36% of students chronically absent. 72% of former eighth graders had enough high school credit in ninth grade to be on track for graduation.

At MS-358, 41% of students are Hispanic, 29% Black, 22% Asian, and 3% White. English language learners make up 16% of students, and 19% of students have special needs. Student attendance is 94% with 19% of students chronically absent, 1 percentage point below the city-wide average of 20%.

At MS-217, 40% of students are Hispanic, 36% Asian, 16% Black, and 4% White. English language learners make up 17% of students, and 16% of students have special needs. Student attendance is 93% with 21% of students chronically absent. 90% of former eighth graders had enough high school credit in ninth grade to be on track for graduation.

Data is not available for ReStart Mott Haven, an alternative middle school, which is housed within Mott Haven Community High School, detailed below. ReStart Mott Haven is one of ReStart Academy's 27 locations across the city which provide "transitional services for students ages 13 through 21 who reside in temporary or involuntary settings."[7]

High Schools

At AIM Charter 1, a transfer and alternative education school, 60% of students are Black, 28% Hispanic, 2% White, and 1% Asian. English language learners make up 4% of students, and 47% of students have special needs. 52% of students in the school are overaged or undercredited. The graduation rate is 27% with 24% of most-at-risk students graduating. The high school persistence rate ("students graduated, earned a High School equivalency, earned an alternative commencement credential, or remained enrolled and attending the school"[8]) is 35%, and 5% graduated and enrolled in college or a comparable program within 6 months.

At Judith Kaye High School, a transfer school, 49% of students are Hispanic, 43% Black, 3% Asian, and 1% White. English language learners make up 5% of students, and 39% of students have special needs. 83% of students in the school are overaged or undercredited. (Data is not available for other measures.)

At Mott Haven, a transfer school, 69% of students are Hispanic, 28% Black, and 3% White. English language learners make up 8% of students, and 31% of students have special needs. The overage/under-credited rate is 56%. The graduation rate is 57% with 48% of most-at-risk students graduating. The high school persistence rate is 61%, and 22% graduated and enrolled in college or a comparable program within 6 months.

At Wildcat,[9] an alternative education school, 55% of students are Hispanic, 40% Black, 2% White, and 1% Asian. English language learners make up 8% of students, and 37% of students have special needs. The overage/under-credited rate is 53%. The graduation rate is 47% with 30% of

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[7] ReStart Academy https://www.restartacademy.org/
[8] NYC DOE. 2017–2018 School Quality Snapshot: New Visions A.I.M. Charter High School I (84K395). https://tools.nycenet.edu/snapshot/2018/84K395/HST/#SA
[9] Data includes Wildcat's Manhattan and Bronx locations; only the Bronx location was surveyed.

most-at-risk students graduating. The high school persistence rate is 57%, and 15% graduated and enrolled in college or a comparable program within 6 months.

Data is not available for St. Marks, an Alternative Learning Center (ALC). ALCs are "instructional, social and emotional program[s] for middle school and high school students on Superintendent's Suspension"[10] which seek to promote 'prosocial beliefs' and help students become more engaged and return to school.

Results

We analyzed TAP student survey responses to find statistically significant changes in student responses before (pre) and after (post) the TAP program. Results were generated by examining the population-level statistics of the survey respondents before and after the program.[11] All results with p-values less than 0.1 are reported. This threshold means that the results reported have at most a 10% chance of being due to statistical noise and are considered statistically significant. Although p-value thresholds of 0.05 or 0.01 are also commonly used, we have decided to use a high threshold and depict the raw underlying data in order to present the most comprehensive analysis possible.

Additionally, we have also analyzed responses for various demographics in order to assess how the program impacts student sub-demographics. The specific demographic groups considered are:

- Gender: male, female, and nonbinary (i.e., other, prefer not to disclose, and unanswered)
- Grade: middle school (6–8) and high school (9–12)

Subpopulations with fewer than 5 responses for any given question were excluded from this analysis.

A small control sample of students who did not participate in TAP was compared to the participating students who participated. For any given question and demographics, statistics of the control population were compared to statistics of the participants. Significant results (p-value < 0.1) found simultaneously in both groups were more likely due to noise or external factors and were removed. Only 1 result was filtered out in this way. This criterion was only applied to the questions on social-emotional learning (SEL), teamwork, and job expectations.

This section of the report contains the following segments:

1. **Full Cohort Effects:** statistical testing and significant results discussion for SEL and teamwork, technical proficiency, job expectations, and program reflection
2. **Demographic Effects by Gender:** breakdown of sample by gender, followed by statistical testing and significant results discussion for SEL and teamwork and technical proficiency

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[10] NYC DOE Info Hub. Alternate Learning Centers
https://infohub.nyced.org/resources/school-programs/alternate-learning-centers
[11] Significance testing is performed using the Kruskal-Wallis test (a non-parametric form of the ANOVA test suitable for categorical answers such as the ones used in this survey).

3. **Demographic Effects by Grade:** breakdown of sample by middle school/high school students, followed by statistical testing and significant results discussion for SEL and teamwork and technical proficiency

1. Full Cohort Effects

1.1 Social-Emotional Learning (SEL) and Teamwork

Overall, the survey data showed significant changes for students in four areas following their participation in TAP: community and social support, community and social competency, self-awareness, and teamwork.

Regarding community, students showed significant changes in social competence and social support. Social competence is defined as "the degree to which youth engage in prosocial behaviors that allow them to successfully create and maintain positive social interactions with others."[12] Perceived social competence has been associated with academic success and higher levels of self-esteem. Social support is defined as "the various types of support (i.e., assistance/help) that people receive from others and is generally classified into two (sometimes three) major categories: emotional, instrumental (and sometimes informational) support."[13,14] Research shows that perceptions of social support are often lower in lower socioeconomic status (SES) neighborhoods, potentially due to factors like financial hardship, increased health issues, and fear of crime.[15] Having adequate social support has been shown to contribute to emotional adjustment and well-being.[16]

Following students' participation in TAP, significant change was also seen regarding self-awareness, specifically in self-esteem. Self-esteem is defined as "an attitude or feeling concerning a sense of worth or one's 'worthiness' as a person."[17] High self-esteem is linked with well-being and happiness, where low self-esteem has been associated with mental health concerns like anxiety and depression, as well as increased anger and loneliness. Meanwhile, self-awareness is "the thinking skill that focuses on a child's ability to accurately judge their own performance and behavior and to respond appropriately to different social situations"[18] and is linked to increased capacity to learn from mistakes, accept criticism, empathize with others, and increased resiliency.[19]

The fourth area with significant change was teamwork, defined as "a youth's ability to collaborate and work with others to achieve a common goal in the group/team context. Specifically, the construct of teamwork involves members of a group/team who are willing to appropriately interact with one each other by demonstrating prosocial behaviors such as problem solving, negotiating, supplying feedback, and illustrating responsibility and accountability."[20] High teamwork skills tend

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[12] Anderson-Butcher, D., Amorose, A.J., Lower, Leeann M., Riley, A., Gibson, A., & Ruch, D. (2014).

The case for the perceived social competence scale II. Research on Social Work Practice, 1–10.

[13] Seeman, T. (2008). Support and Social Conflict.

[14] Emotional support refers to what others do to help someone feel loved or cared for, while instrumental support involves tangible assistance, like when someone is given money or help with housework. Informational support includes ways that other supplying information may help someone feel supported.

[15] Ibid.

[16] Pearson, J.E. (1986). The Definition and Measurement of Social Support.

[17] Mruk, C.J. (2013). Self-Esteem and Positive Psychology: Research, Theory, and Practice (4th ed.).

[18] Learning Works, Improving Your Child's Self-Awareness Skills

[19] Hippe, John (2004) Self-Awareness: A Precursor to Resiliency. Reclaiming Children & Youth Vol. 12 Issue 4.

[20] Youth, Lower, Newman, & Anderson-Butcher. (2015).

to correlate with higher levels of interpersonal trust and is consistently highlighted by TAP as one of the most critical skills needed to work in the animation field.[21]

Survey responses for questions (1–19) regarding SEL, namely [Strongly Disagree, Disagree, Neither Disagree or Agree, Agree, Strongly Agree], were converted to integers [-2, -1, 0, 1, 2]. The Kruskal-Wallis test was then used to determine if the median of the pre and post samples differed significantly. Demographics with fewer than 5 members were excluded from this analysis. Results with a p-value < 0.1 are reported.

A total of 5 questions were found to have statistically significant different response distributions between the pre- and post-survey respondents across the entire cohort. These results are indicative of increased self-awareness coupled with a heightened sense of community.

Regarding their sense of community, post-TAP respondents agreed more with the statements "My peers come to me to help them solve problems," "People listen to my ideas and take them seriously,"[22] and "I have people close to me who understand my situation and problems,"[23] which all indicate increased social competence and support. All three of these significant effects signal an increased sense of belonging to an inclusive and respecting community.

Questions with Statistically Significant Changes: Increased Sense of Community

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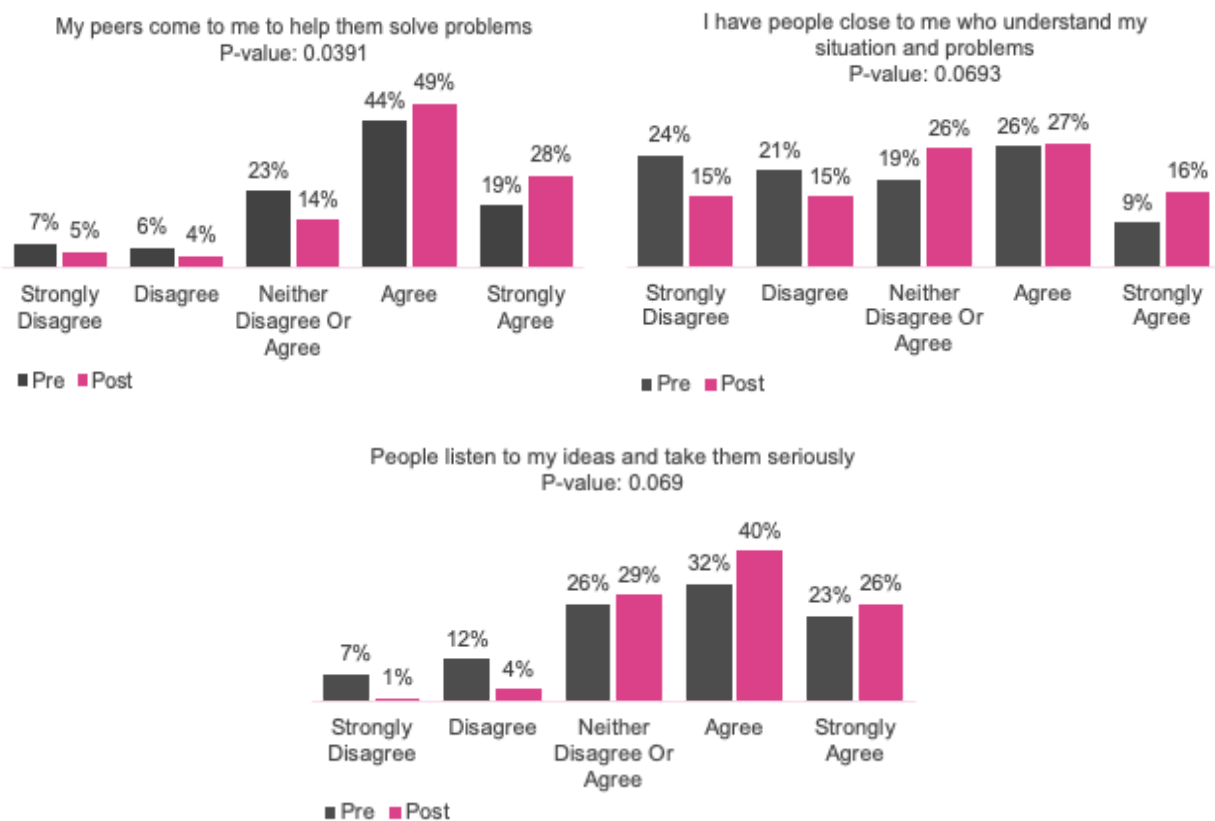
[21] Jones, G.R. & George, J.M. (1998). The Experience and Evolution of Trust: Implications for Cooperation and Teamwork.

[22] "My peers come to me to help them solve problems" and "People listen to my ideas and take them seriously" are measures of social competence from CAYCI Perceived Social Competence Scale II, which measures the level at which youth engage in community-oriented and prosocial behaviors.

[23] "I have people close to me who understand my situation and problems" is a measure of social support from TCU's Social Functioning Form.

Regarding an increased self-awareness, "I am basically no good" and "I wish I had more respect for myself" are both measures of self-esteem.[24] Although an increase in agreement to these statements suggests a decrease in self-esteem, it could also suggest an acknowledgment of the potential for self-improvement. Given the significant, and varied, positive impact of the program on various SEL measures and the qualitative data that supports the evidence of that change, we believe these results most likely reflect either students' 1) growing self-awareness of their internal state of judgment and/or 2) greater comfort in sharing that self-judgment with TAP based on a feeling of trust in, or support and validation by the program. We do not believe the data *overall* would support a conclusion that TAP actually increases negative self-assessment, despite what a first glance at this particular change might suggest.

Questions with Statistically Significant Changes: Increased Self-Awareness
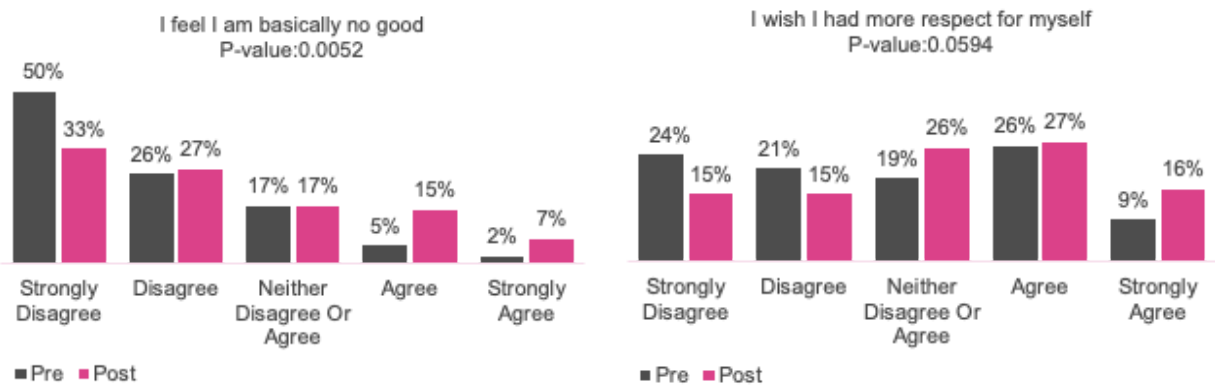
In a series of questions (33–39) related to teamwork, only given at the end of the TAP program, students were asked to rate how they felt about certain statements before and after being part of TAP on a scale of "Not at all true" to "Really true." These qualitative answers were converted to integers between 0 and 4. The distributions of the different demographic cohorts before and after TAP were tested for significance using the Kruskal-Wallis test. Significant changes toward self-assessment of skills involving communication and teamwork were found across four of six questions for the whole cohort.

"I feel confident in my ability to work in a group," "I know how to give my team members feedback that won't hurt their feelings," "I make an effort to include other members of my group," and "I value the contributions of my group members" are all measures of teamwork. Teamwork is defined as a "youth's ability to collaborate and work with others to achieve a common goal in the group/team context. Specifically, the construct of teamwork involves members of a group/team who are willing to appropriately interact with one each other by demonstrating prosocial behaviors such as problem solving, negotiating, supplying feedback, and illustrating responsibility and accountability." [25]

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[24] "I am basically no good" and "I wish I had more respect for myself" are self-esteem measures from TCU's psychological functioning domain which includes measures of self-reported self-esteem, depression, anxiety, and decision-making confidence.

[25] Lower, L., Newman, T., & Anderson-Butcher, D. (2015). Validity and reliability of the teamwork scale for youth. Research on Social Work Practice.

Questions with Statistically Significant Changes: Before and After TAP on Teamwork

I feel confident in my ability to work in a group
P-value: 0.0062

	Not at all true	A little true	Somewhat true	Pretty true	Really true
Before	9%	17%	23%	17%	34%
After	4%	6%	17%	21%	52%

■ Before ■ After

I know how to give my group members feedback that won't hurt their feelings
P-value: 0.0707

	Not at all true	A little true	Somewhat true	Pretty true	Really true
Before	8%	13%	24%	23%	32%
After	4%	10%	15%	27%	44%

■ Before ■ After

I make an effort to include other members of my group
P-value: 0.0733

	Not at all true	A little true	Somewhat true	Pretty true	Really true
Before	9%	10%	23%	27%	31%
After	4%	7%	23%	17%	49%

■ Before ■ After

I value the contributions of my group members
P-value: 0.0606

|	Not at all true	A little true	Somewhat true	Pretty true	Really true
Before	7%	15%	25%	14%	38%
After	4%	10%	11%	28%	46%

■ Before ■ After

Finally, after completing the TAP course, students were asked to choose 3 words they would use to describe themselves before TAP and 3 words they would use to describe themselves after TAP. Combined, this resulted in a data set of 137 words, many of which were repeated by multiple students. In order to simplify this data set, words were clustered into 35 unique groups. This clustering was done using the SciPy hierarchical clustering package with its internal method set to 'complete,' which results in smaller clusters of more closely related words than other frequently used methods. Distances between the two words were computed as the number of synonyms these words have in common divided by the average number of synonyms for the two words. Synonyms were found programmatically using the free Moby online thesaurus. In some cases, words had to be changed by hand in order to find synonyms; for example: "caring" became "care," "scientist" became "scientific," and "hot-tempered" became "bad-tempered." A total of 12 such changes were made by hand. Sets of words which were all close together (based upon the above distance metric) were clustered together by this data pipeline. Thirty-five was selected as the number of clusters from a process of reviewing the clusters produced by the algorithm until they made intuitive sense. A list of all clusters and the words in them can be found in the Annex.

Once clusters were identified, these clusters were further categorized by hand as positive, negative, or neither positive nor negative. Positive clusters included words which would generally be considered positive personality traits like "confident," "intelligent," etc. Similarly, negative clusters included words which are not seen as good traits, like "boring" or "stupid." Clusters which contained more matter-of-fact words, such as "male" or "female" or contained a mix of positive and negative words were categorized as neither positive nor negative. The before and after words were then checked for enrichment in either positive or negative clusters. This analysis found a statistically

significant 9% decrease in negative answers for "words to describe yourself after TAP" compared to "words to describe yourself before TAP" (p = .03 using Fisher's exact test). Similarly, there was a 7% increase in positive answers for "words to describe yourself after TAP" compared to "words to describe yourself before TAP" (p = .17, Fisher's exact test). This increase in positive words is not statistically significant, but in conjunction with the decrease in negative words, it can still be seen as meaningful.

1.2 Technical Proficiency Questions

A number of technical questions (23–28) about animation were included in the survey. Unlike the other questions in the survey, each of these questions has a correct answer. The percent of respondents marking the correct answer was compared in the pre- and post-survey cohorts. When averaging across all 6 questions, there was a modest improvement of around 7%.

Digital Animation Technical Questions Correct Response Rate
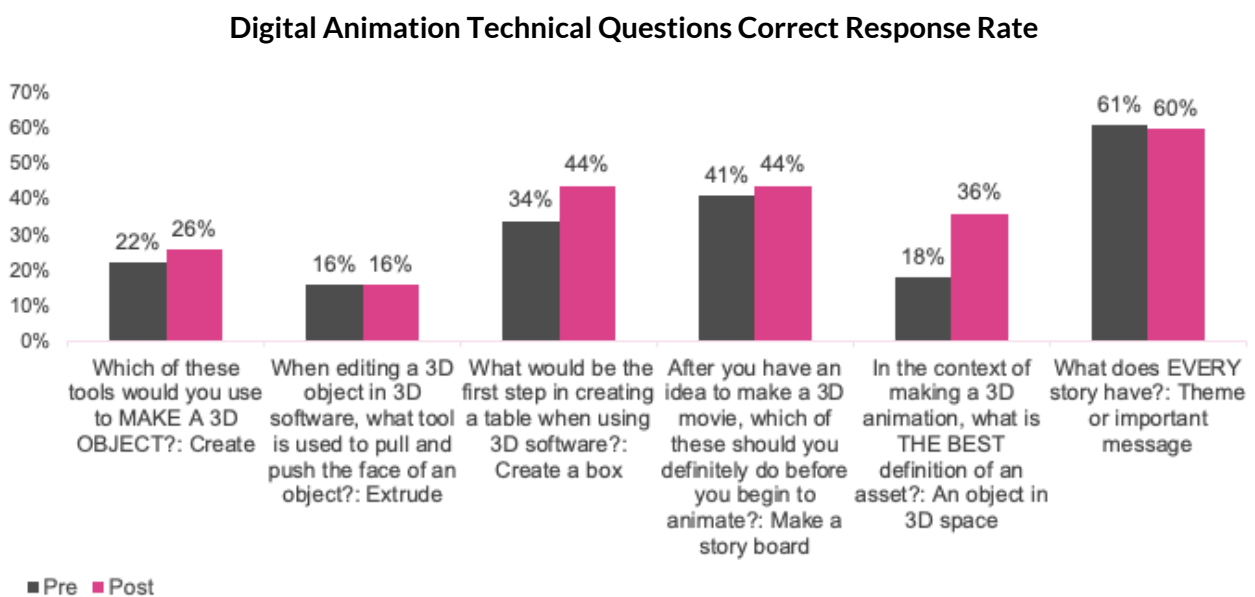
This modest improvement appears in large part to be a result of disparate gender effects on these questions. These effects are discussed in depth on page 24 in the context of the broader demographic and gender related data.

1.3 Job Expectations

Students were asked the following two questions related to their future job expectations:

1. "What kind of job or occupation do you think you'll have when you are 30 years old?"
2. "What kind of job or occupation do you want to have when you are 30 years old?"

For simplicity, question (1) will be denoted "Job Expected" and question (2) "Job Desired."

Students typically answered with 0–2 possible jobs. These jobs were analyzed by mapping them to the prestige score database of different professions. Occupational prestige is a relative measure of the social standing associated with a specific occupation or job and is related to the level of respect associated with the occupation, which has been calculated by the National Opinion Research Center (NORC) at the University of Chicago through national household surveys since 1947. The

latest update to this dataset was done using information from the 2012 General Social Survey (GSS). The study measured occupational prestige for each occupational code in the US Census on a nationally representative sample of adults in the United States. Prestige rankings, or prestige scores, were created on a scale of 0 to 100, with 100 being the highest possible prestige. For example, *Physicians and Surgeons* have a prestige score of 95.42 and *Firefighters* a score of 79.87, while *Telemarketers* have a prestige score of 8.13. The list of the 5 most common occupations mentioned per question and survey can be found in the Annex.

The infographic below shows the most common occupations mentioned by students in both surveys. Most of these occupations can be categorized into community-focused, animation-related, and creative-non-animation occupations. The increase in community-focused occupations and animation-related occupations between pre and post surveys aligns with the community-focused SEL results presented above and the increased exposure to the creative and technical aspects of the animation field through TAP.
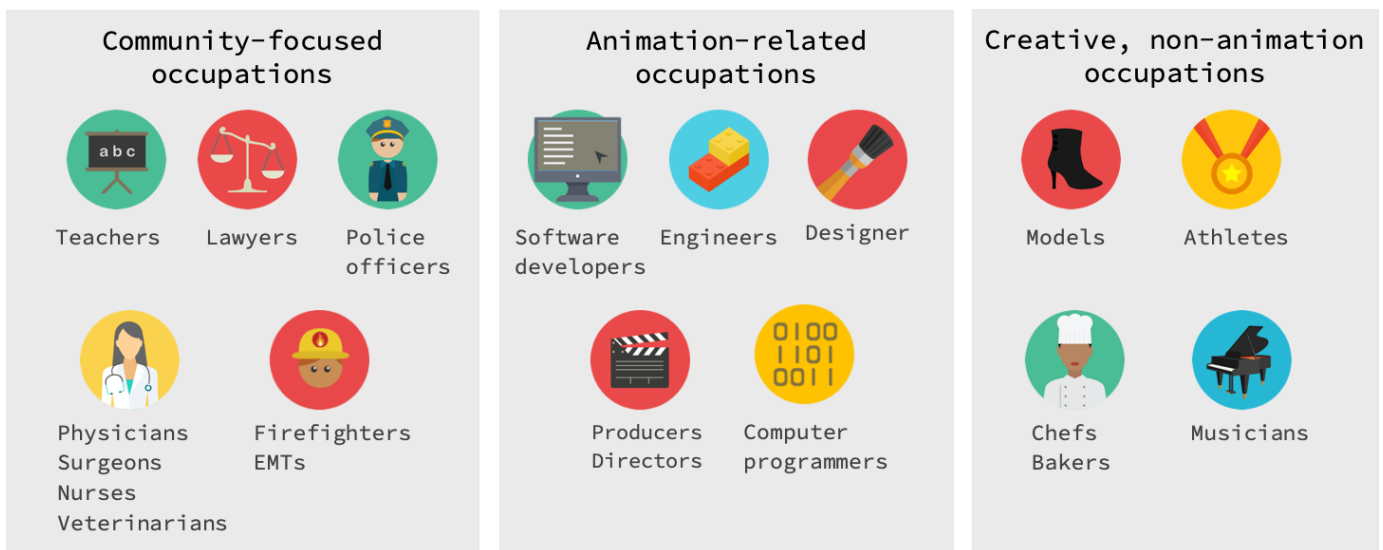
This mapping allowed job preferences and expectations to be analyzed numerically before and after the TAP program, as well as for a small control group. Interestingly, job-expectation prestige and job-desire prestige did not change significantly within pre- and post-TAP cohorts or in any sub-demographics of these cohorts (using a Kruskal-Wallis test for significance). A number of factors could be responsible for this lack of statistical signal. First, this question was often omitted by students completing the survey, with only about a 50% response rate across all cohorts. Additionally, due to the prevalence of middle school students in every cohort, it is not surprising that the most commonly occurring expected jobs and desired jobs were relatively similar and consist of common and high-prestige jobs such as athletes, doctors, and musicians/singers. This lack of result suggests that one area to focus on to strengthen the TAP program is to teach students that animation and other skills they learn in the course can be readily translated to a variety of careers.
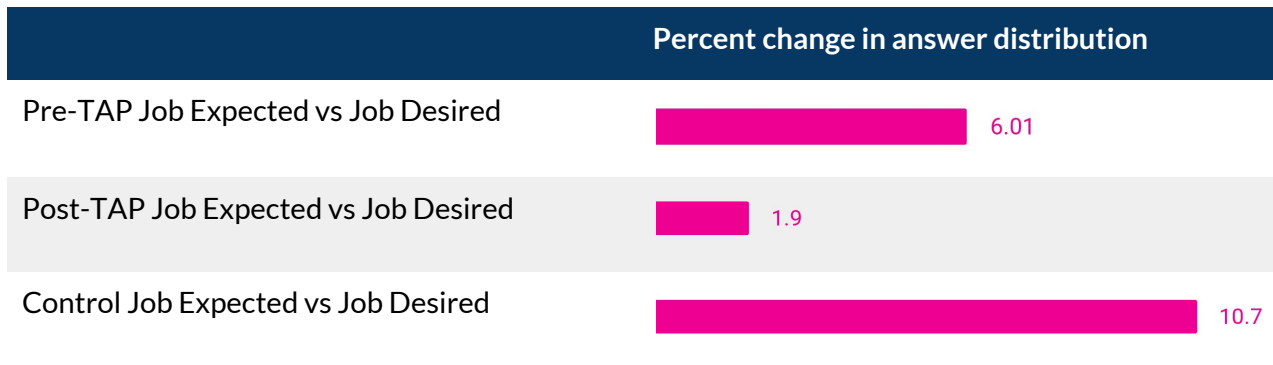
Average Prestige Score

	Pre TAP	Post TAP	Change*
Desire	71.77	74.61	2.84
Expected	67.73	72.78	5.05
Change*	4.04	1.83	-

*Change is not statistically significant

Finally, in order to see if there was any statistical change between the pre- and the post-TAP cohorts with regards to these job questions, distances were computed between the distributions of responses across all job categories in each cohort.[26] This analysis can be thought of as asking the question, "are the responses of two groups different?" This test is similar to the Kruskal-Wallis test used in other analysis, but it differs in that it uses non-numerical categories, does not directly result in a *p*-value for significance testing, and can be clearly interpreted as an effect size, which we are calling *percent change in the answer distribution*. This analysis shows that the distribution of answers between the Jobs Expected and Jobs Desired was lowest for students who participated in TAP and even lower after participating in TAP, possibly suggesting that these students had higher levels of confidence for achieving their dream job and/or more realistic expectations of themselves.

In other words, although there is no significant increase or decrease in the average prestige code between pre and post surveys (for job desired or job expected) we do see students' desires and expectations come closer to convergence after participating in TAP.

	Percent change in answer distribution
Pre-TAP Job Expected vs Job Desired	6.01
Post-TAP Job Expected vs Job Desired	1.9
Control Job Expected vs Job Desired	10.7

1.4 Reflection

In an open-ended question, students were asked what they felt had changed the most in them from their participation in TAP. 72% of respondents answered this question, and their answers can be grouped into animation/technical skills and social-emotional development. These responses are mapped in the word cloud below. This word cloud is a graphical representation of word frequency that gives greater prominence (size) to words that appear more frequently in the survey responses.

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[26] Distances were calculated based on the relative information measure.

The larger the word in the map, the more common the word was in the recorded responses.[27] It is also important to note that 14% of respondents said that nothing had changed as a result of their participation in the program. For simplicity, these responses were not included in the map.

Regarding their technical skills, students highlighted their newfound ability to code, design, create a storyboard, and produce 3D animations. For social-emotional development, answers varied widely, but the most common responses reflected participants' feelings that they'd become more patient, confident, and better able to relate their classmates (e.g., friendships, teamwork, and overcoming shyness). These open-ended responses align with the survey findings of a statistically significant increase in respondents' sense of community. For high school students, confidence in their work was one of the most common responses for this question, which is also one of the areas with a statistically significant change between pre and post surveys (e.g., "People listen to my ideas and take them seriously").

2. Demographic Effects by Gender

The charts below show the number of survey respondents by gender. Although the gender breakdown in the full cohort was quite similar between pre- and post-survey respondents, it is possible that many more males dropped out of the program (or otherwise did not respond to the post-survey) compared to females and nonbinary genders.

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[27] Different colors in the word cloud are added for clarity and ease in differentiating words and do not have any analytical significance.

Gender Breakdown

Pre survey
Total cohort respondents: 99 [Solid]
Total control respondents: 31 [Hatched]

Post survey
Total cohort respondents: 85 [Solid]
Total control respondents: 13 [Hatched]

2.1 Social-Emotional Learning (SEL) and Teamwork by Gender

When analyzing the data by gender, males seem to account for much more of the statistical variation between pre and post cohorts than females (due to low cohort variation) or nonbinary genders (due to small cohort size), suggesting that the aspects of TAP seeking to promote community and self-awareness are more effective in males. Although community and self-awareness variables show greater effect in males, we see more effects for females in variables that measure teamwork. The chart below summarizes the statistically significant effects noted by gender.
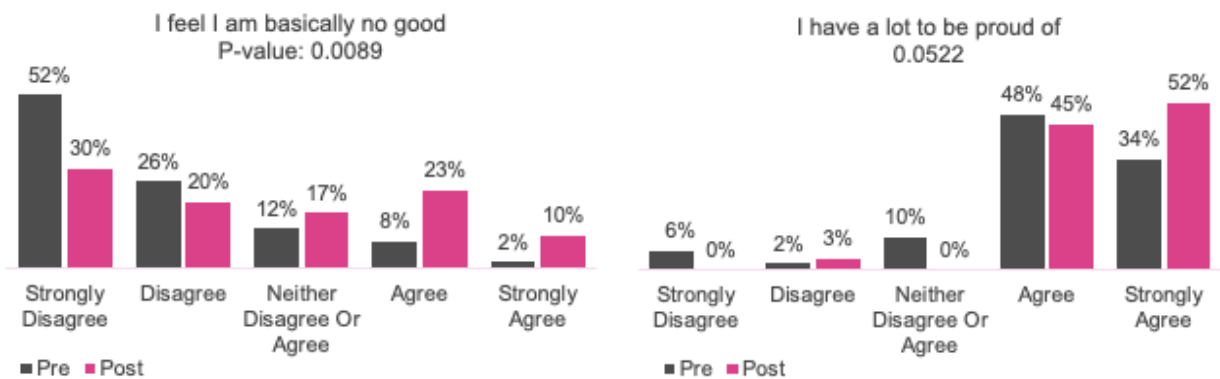
Statement	Indicator	Full cohort	Male	Female	Non-binary
My peers come to me to help them solve problems	Community: Social competence	↑	↑		
I have people close to me who value me for who I am	Community: Social competence		↑		
I have people close to me who understand my situation and problems	Community: Social support	↑	↑		
It is satisfying to work for a long time to achieve something big	Core competency		↑		
I worry about what I want to do with my future	Ruminative exploration				↑
I feel confident in my ability to work in a group.	Teamwork	↑		↑	
I value the contributions of my group members.	Teamwork	↑		↑	
I feel I am basically no good	Self-esteem	↑	↑		

Statement	Indicator	Full cohort	Male	Female	Non-binary
I have a lot to be proud of	Self-esteem		↑		
I wish I had more respect for myself	Self-esteem	↑			↑
I'm good at teaching myself new things	Self-esteem			↑	

Males in the cohort seem to have benefited from an increase in a sense of community as demonstrated by increased agreement with the statements "My peers come to me to help them solve problems," "I have people close to me who value me for who I am," and "I have people close to me who understand my situation and problems." Males also showed seemingly contradictory increased in agreement with both self-esteem measures "I feel I am basically no good" and "I have a lot to be proud of." However, this could be attributed to an increased self-awareness, both of one's own self-perception as well as an awareness of personal growth. That is, with an increase in self-awareness is often an awareness (or acknowledgment) of highly self-critical thoughts like "I feel I am basically no good" that may account for the significant increase in this response. Finally, this demographic seems to have gained considerable perseverance and awareness of the value of long-term focus due to the program, with a very large increase in the number of respondents strongly agreeing with "It is satisfying to work for a long time to achieve something big."

In the 7 questions related to teamwork, males, who seemed to benefit the most in self-awareness and community, did not register any significant changes.
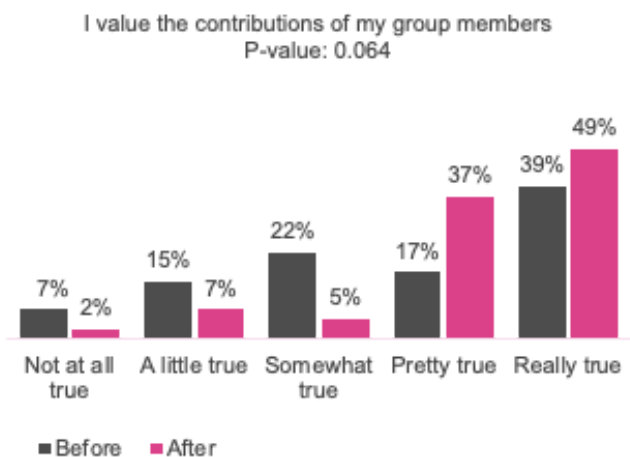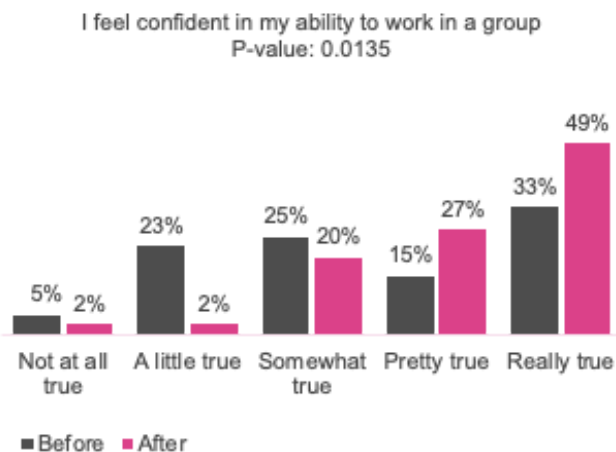
Questions with Statistically Significant Changes: Males

My peers come to me to help them solve problems
P-value: 0.0089

	Strongly Disagree	Disagree	Neither Disagree Or Agree	Agree	Strongly Agree
Pre	10%	4%	26%	44%	16%
Post	7%	0%	3%	52%	38%

I have people close to me who understand my situation and problems
P-value: 0.0089

	Strongly Disagree	Disagree	Neither Disagree Or Agree	Agree	Strongly Agree
Pre	2%	17%	6%	50%	25%
Post	0%	0%	7%	57%	37%

I have people close to me who value me for who I am
P-value: 0.0995

	Strongly Disagree	Disagree	Neither Disagree Or Agree	Agree	Strongly Agree
Pre	8%	0%	12%	44%	36%
Post	3%	0%	7%	37%	53%

It is satisfying to work for a long time to achieve something big
P-value: 0.0411

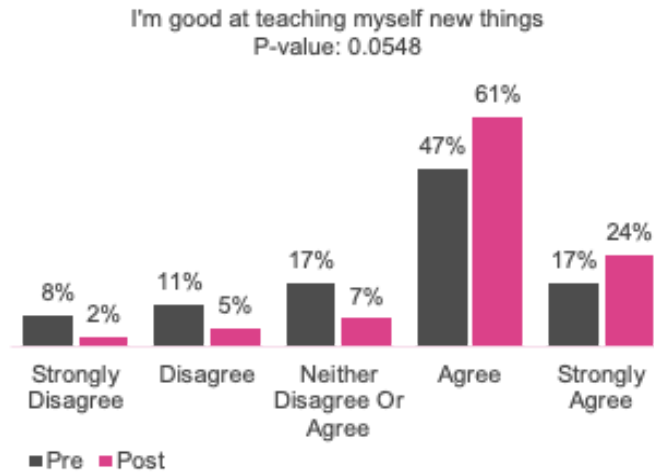|	Strongly Disagree	Disagree	Neither Disagree Or Agree	Agree	Strongly Agree
Pre	6%	0%	10%	45%	39%
Post	0%	3%	3%	31%	62%

There were 3 statistically significant results for females. Increased agreement with the statement "I'm good at teaching myself new things" suggests increased confidence and increased ability to self-teach or an increased self-awareness of this ability. Females also reported increased agreement with "I feel confident in my ability to work in a group" and "I value the contributions of my group members," both measures of teamwork.
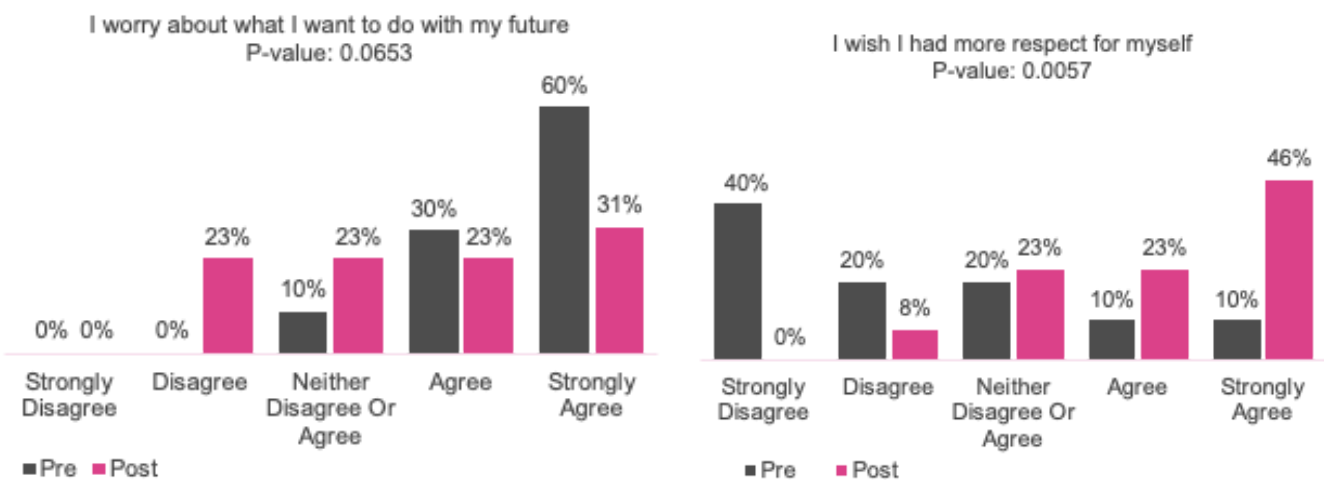
Questions with Statistically Significant Changes: Females

I feel confident in my ability to work in a group
P-value: 0.0135

	Not at all true	A little true	Somewhat true	Pretty true	Really true
Before	5%	23%	25%	15%	33%
After	2%	2%	20%	27%	49%

I value the contributions of my group members
P-value: 0.064

	Not at all true	A little true	Somewhat true	Pretty true	Really true
Before	7%	15%	22%	17%	39%
After	2%	7%	5%	37%	49%

I'm good at teaching myself new things
P-value: 0.0548

	Strongly Disagree	Disagree	Neither Disagree Or Agree	Agree	Strongly Agree
Pre	8%	11%	17%	47%	17%
Post	2%	5%	7%	61%	24%

■ Pre ■ Post

When examining the nonbinary gender demographic, it is important to be aware of the very small sample size of this demographic (10–15 students) and that it is heterogeneous, with responses including "prefer not to disclose," "other," and the question being left blank. However, for this demographic, there was a very strong change in the desire for more self-respect, with a large shift in strong agreement with the statement "I wish I had more respect for myself." Additionally, there is a smaller decrease in agreement with the statement "I worry about what I want to do with my future," which relates to a child or adolescent's identity development, more specifically, ruminative exploration, and could also be indicative of increased self-awareness. Ruminative exploration is a "coping strategy, often associated with depression, that involves an individual focusing on symptoms or causes of symptoms of a problem with no actions aimed at solving the problem."[28] It could also show the beginning of a process of exploration (both in breadth and depth), where students engage in finding viable options for their future and the passive action of *worry* can then turn into an active action of searching for a way forward.

Questions with Statistically Significant Changes: Nonbinary (prefer not to disclose, other, blank)

I worry about what I want to do with my future
P-value: 0.0653

	Strongly Disagree	Disagree	Neither Disagree Or Agree	Agree	Strongly Agree
Pre	0%	0%	10%	30%	60%
Post	0%	23%	23%	23%	31%

■ Pre ■ Post

I wish I had more respect for myself
P-value: 0.0057

	Strongly Disagree	Disagree	Neither Disagree Or Agree	Agree	Strongly Agree
Pre	40%	20%	20%	10%	10%
Post	0%	8%	23%	23%	46%

■ Pre ■ Post

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[28] Redmayne, Kelsey A. (2017) Ruminative Exploration in Late Adolescence and its Relationship to Depression, Self-Esteem, and Parental Autonomy Support.

2.2 Technical Proficiency Questions by Gender

The change in answers to technical skill questions was highly gendered, with the improvement in correct answers to these questions dominated by females and nonbinary students over males, who in fact scored slightly worse. Females showed a consistent increase in correct answers—that is, they demonstrated specific learning of key terms and knowledge—while males showed varied effects, some positive, some negative. This result should also be further explored. While this may be due to changes in TAP's program or a mismatch between the questions asked and the learning in the classrooms, these results are as valid and as significant as the positive SEL results above.

We recommend reviewing and revising learning outcome objectives and conducting future internal assessment of those outcomes to attempt to ensure that all students are gaining exposure to key concepts, tools, or experiences.
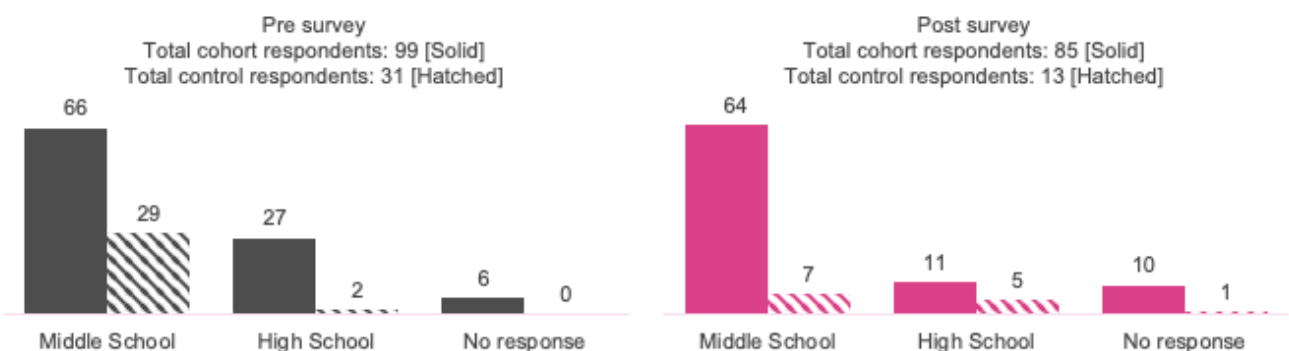
Digital Animation Technical Questions Responses
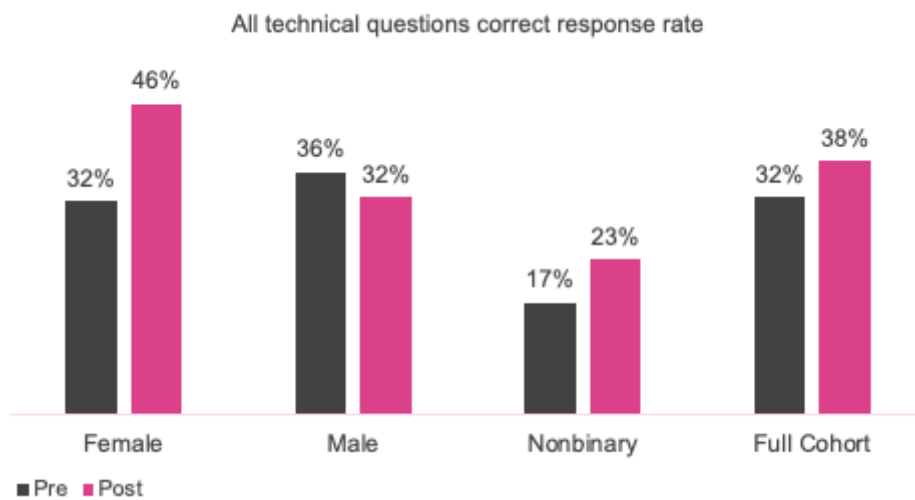
All technical questions correct response rate

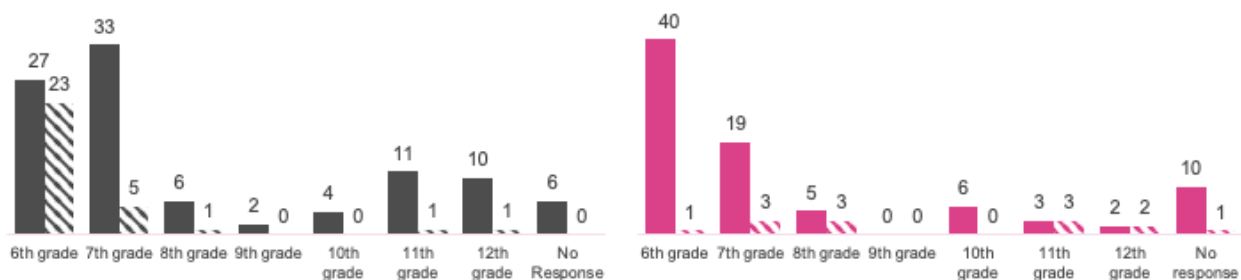| Question	Correct response	Female % change	Male % change	Nonbinary % change	Overall % change
Which of these tools would you use to MAKE A 3D OBJECT?	Create	↑ 2.4%	↑ 0.3%	↑ 15.4%	↑ 3.2%
When editing a 3D object in 3D software, what tool is used to pull and push the face of an object?	Extrude	↑ 11.4%	↓ 5.0%	↓ 4.6%	↓ 0.02%
What would be the first step in creating a table when using 3D software?	Create a box	↑ 31.4%	↓ 12.3%	↑ 10.8%	↑ 9.5%

Question	Correct response	Female % change	Male % change	Nonbinary % change	Overall % change
After you have an idea to make a 3D movie, which of these should you definitely do before you begin to animate?	Make a storyboard	↑ 6.7%	↓ 2.3%	↑ 3.1%	↑ 2.3%
In the context of making a 3D animation, what is THE BEST definition of an asset?	An object in a 3D space	↑ 31.0%	↑ 15.5%	↓ 2.3%	↑ 18.9%
What does EVERY story have?	Theme or important message	↑ 4.8%	↓ 18.2%	↑ 16.2%	↓ 1.9%

3. Demographic Effects by Grade

Since we were unable to analyze students by grade or age due to sample size constraints, students were divided into two groups for age-range analysis: middle school (grades 6–8) and high school (9–12). Overall, there were many more middle school students surveyed than high school students. In particular, in the post-survey, the number of high school students drops dramatically compared to the pre-survey, perhaps indicating a higher dropout rate of high school students over the course of the program. It is important to note here that this would be consistent with the population of the schools, where many students are at risk of dropping out. This can be seen most clearly in the bottom two charts of the figure below. The hatched bars show the control group. As is evident in this graph, high school students, especially the 11th and 12th graders, drop out at a much higher rate than middle school students. Although a large number of 7th graders also seemed to have dropped out, it is less clear that this is a trend as opposed to a sampling artifact.

Grade Breakdown

Left chart (dark bars):

27, 23, 33, 5, 6, 1, 2, 0, 4, 0, 11, 1, 10, 1, 6, 0

6th grade | 7th grade | 8th grade | 9th grade | 10th grade | 11th grade | 12th grade | No Response

Right chart (pink bars):

40, 1, 19, 3, 5, 3, 0, 0, 6, 0, 3, 3, 2, 2, 10, 1

6th grade | 7th grade | 8th grade | 9th grade | 10th grade | 11th grade | 12th grade | No response

3.1 Social-Emotional Learning (SEL) and Teamwork by Grade

Although middle school students are the majority of the respondents, they have a relatively low number of significant results compared to high school students. High school students seem to dominate the global trends in SEL, showing significant change in 5 statements from pre- to post-TAP, while middle school students showed change in only 2. This difference in variation may indicate that the program is more effective for high school students than middle school students.

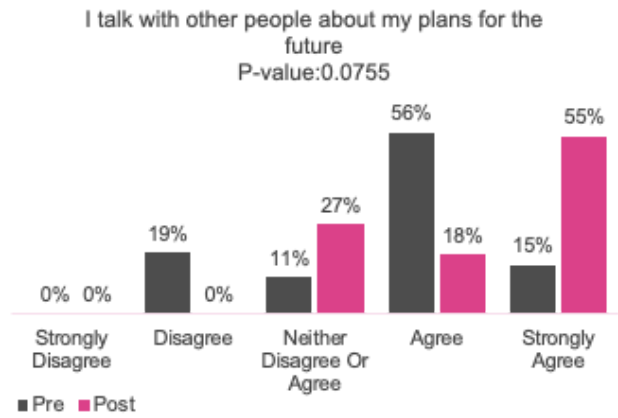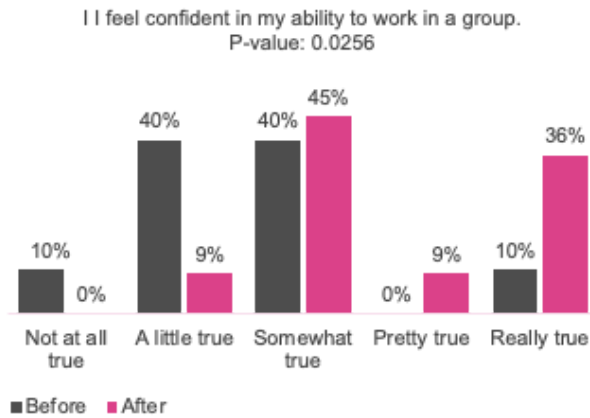| Statement	Indicator	Full cohort	Middle school	High school
My peers come to me to help them solve problems	Community: Social competence	↑	↑	
People listen to my ideas and take them seriously	Community: Social competence	↑		↑
I have people close to me who motivate and encourage me	Community: Social support			↑
I talk with other people about my plans for the future	Community: Social support and Exploration in depth			↑
I feel I am basically no good	Self-esteem	↑	↑	↑
I wish I had more respect for myself	Self-esteem	↑		↑
I feel confident in my ability to work in a group	Teamwork	↑	↑	↑
I know how to give my group members feedback that won't hurt their feelings	Teamwork, Social competence	↑	↑	
I value the contributions of my group members	Teamwork	↑	↑	

High school students showed increased agreement to the statements "I feel I am basically no good" and "I wish I had more respect for myself," indicating increased introspection. Significantly more agreement to the statements "People listen to my ideas and take them seriously," "I have people close to me who motivate and encourage me," and "I talk with other people about my plans for the future" suggests an increased sense of community. It is also important to note that high schoolers showed an increase in "I talk with other people about my plans for the future." This relates to a student's identity development, more specifically, exploration in depth. As opposed to exploration in breadth where the person explores all potential options, when exploring in depth, the student attempts to gain a better understanding of an already-formed decision, in this case about their future. By talking to other people about their plans, they are taking action to explore a smaller deck of options rather than expanding in breadth or ruminating about the possibilities.

Although high school students showed more change in SEL, those in middle school drove the change in questions related to teamwork. Middle school students reported improvement in such statements as "I know how to give my group members feedback that won't hurt their feelings" and "I value the contributions of my group members," while high school students only showed significant change in "I feel confident in my ability to work in a group," a statement in which middle school students also showed improvement.

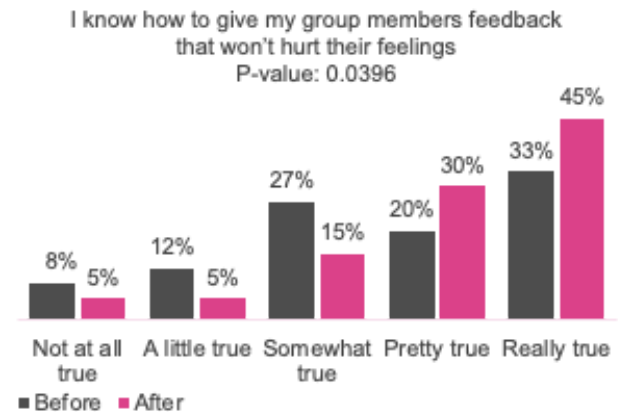**SEL Questions with Statistically Significant Changes: High School Students**

People listen to my ideas and take them seriously
P-value:0.0889

I have people close to me who motivate and encourage me
P-value:0.0941

I feel I am basically no good
P-value: 0.0397

I wish I had more respect for myself
P-value: 0.0755

I I feel confident in my ability to work in a group.
P-value: 0.0256

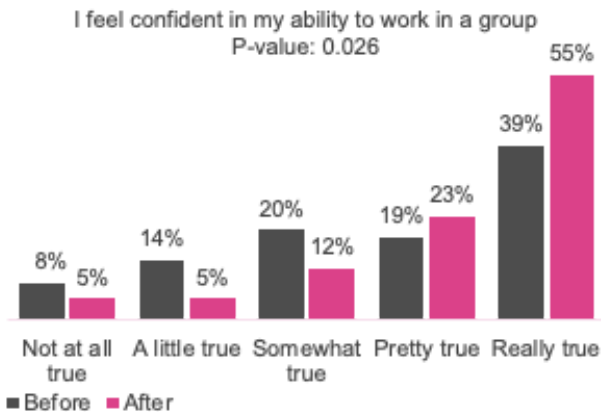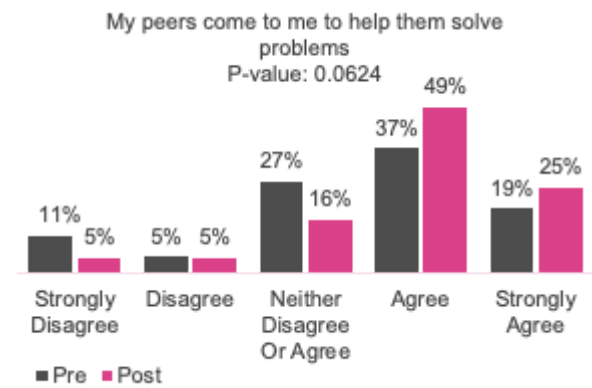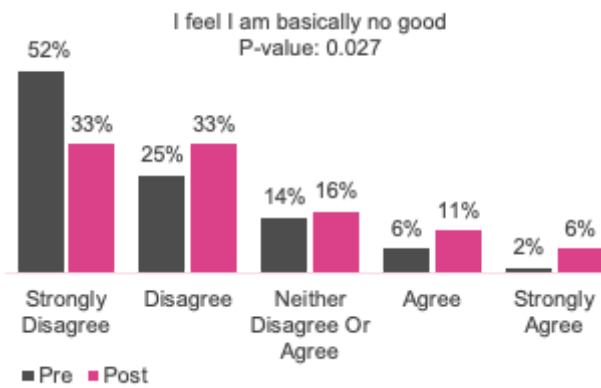**I talk with other people about my plans for the future**
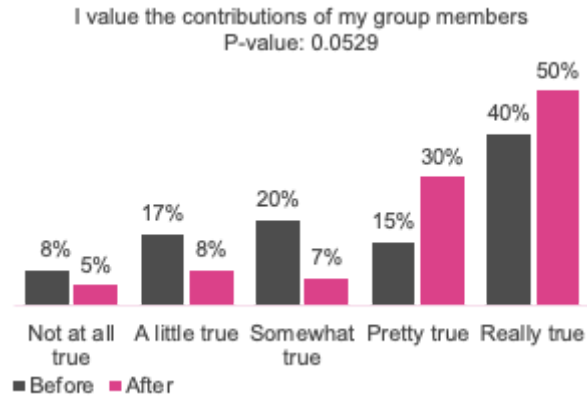P-value:0.0755
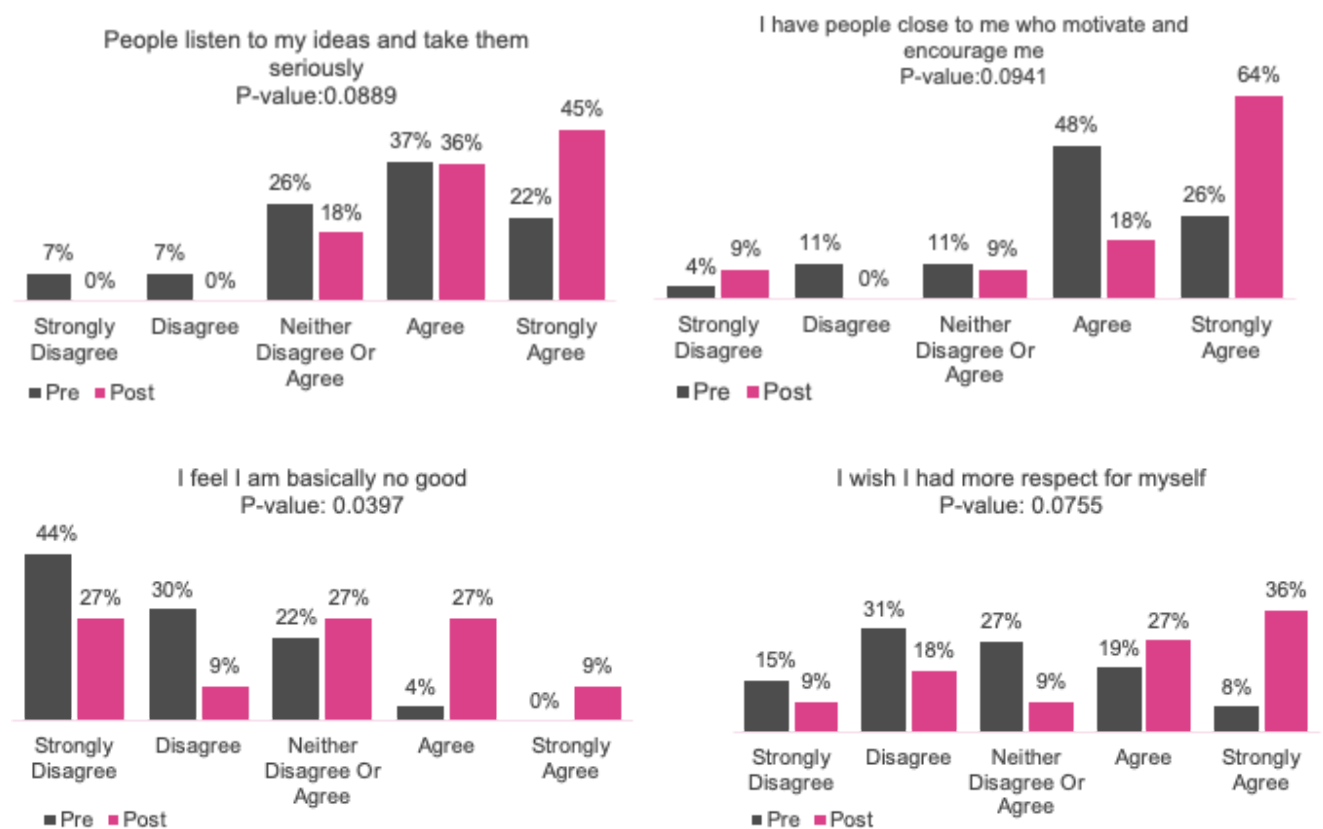
Middle school students showed an increase in "My peers come to me to help them solve problems," indicating an increased perception of social competence, as well as "I feel I am basically no good," which could indicate increased introspection regarding their self-esteem.

Questions with Statistically Significant Changes: Middle School Students

I feel I am basically no good
P-value: 0.027

My peers come to me to help them solve problems
P-value: 0.0624

I feel confident in my ability to work in a group
P-value: 0.026

I know how to give my group members feedback that won't hurt their feelings
P-value: 0.0396

I value the contributions of my group members
P-value: 0.0529

| Not at all true | A little true | Somewhat true | Pretty true | Really true |
Before: 8%, 17%, 20%, 15%, 40%
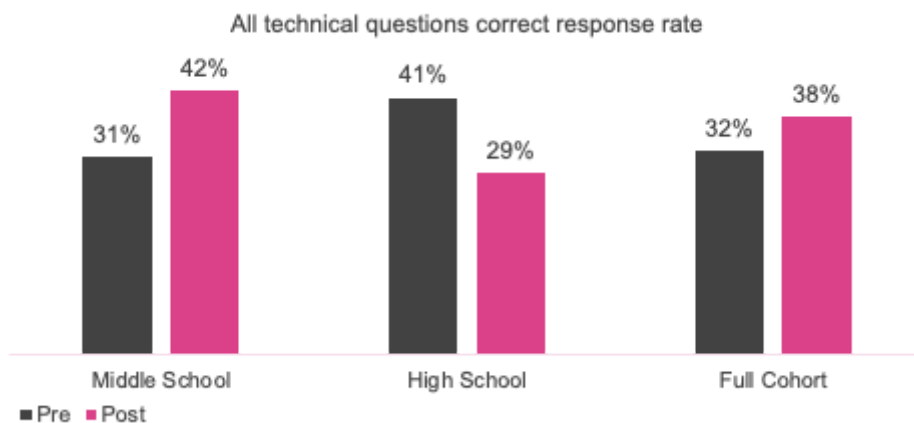After: 5%, 8%, 7%, 30%, 50%

■ Before ■ After

3.2 Technical Proficiency Questions by Grade

Responding to the technical proficiency questions, middle school students showed an overall improvement, while high school students showed a decrease in the rate of overall correct responses. When analyzing the results for high school students, we can see a drastic decrease in the rate of correct responses for questions like "What would be the first step in creating a table when using 3D software?," where 59% of students answered correctly in the pre survey, but only 27% got the correct answer during the post survey.

Digital Animation Technical Questions Responses

All technical questions correct response rate

| Middle School | High School | Full Cohort |
Pre: 31%, 41%, 32%
Post: 42%, 29%, 38%

■ Pre ■ Post

Question	Correct response	Middle school % change	High school % change	Overall % change
Which of these tools would you use to MAKE A 3D OBJECT?	Create	↑ 3.1%	↑ 6.7%	↑ 3.2%
When editing a 3D object in 3D software, what tool is used to pull and push the face of an object?	Extrude	0.00%	↓ 5.7%	↓ 0.02%

Question	Correct response	Middle school % change	High school % change	Overall % change
What would be the first step in creating a table when using 3D software?	Create a box	↑ 21.9%	↓ 32%	↑ 9.5%
After you have an idea to make a 3D movie, which of these should you definitely do before you begin to animate?	Make a storyboard	↑ 7.8%	↓ 11.8%	↑ 2.3%
In the context of making a 3D animation, what is THE BEST definition of an asset?	An object in a 3D space	↑ 25%	↓ 5.7%	↑ 18.9%
What does EVERY story have?	Theme or important message	↑ 6.3%	↓ 23.2%	↓ 1.9%

Final Considerations

Limitations

It is important to note that the analysis conducted above faces several limitations, which imposed restrictions on the explanatory power of the data and the analysis.

Small sample size: Although the database was strong enough to produce some statistically significant results, a larger sample would allow for further demographic and geographic breakdown and analysis. Furthermore, the explanatory power of the data is reduced when subdivided into smaller groups by demographics; for example, while we can analyze gender and middle/high school effects, we cannot further subdivide into gender by middle school and high school. Finally, since certain questions were only answered by a subset of the survey population, the sample size varies from question to question. Among questions with small sample sizes (n<30), the results should be interpreted with caution.

There are several explanations to this small sample size:

- High student turnover: Many students who started the program did not complete it. Students enter and leave at various times throughout the semester or have inconsistent attendance due to various external factors in their lives. This is a reflection of the schools that TAP is working with, which includes alternative education programs and transfer

schools. This creates greater uncertainty in the assessment because many students may not be assessed either when they start, or they leave midway through the cycle and are not present for the post-survey. While we did attempt to adjust for this turnover in the second semester of the assessment process, this was nevertheless a reality of the environment and cohort that remained a challenge.

- Low consent return rate: significant efforts were made to increase consent return rate, including multiple classroom visits. However, consent return rate continues to be low, with numbers as low as only one student consented in some cohorts.
- Size and frequency of cohort sizes: At the request of some schools, who prefer a deeper dive into the technical and social-emotional components of the program, the program was modified to be implemented in semester- or year-long cycles in some schools, instead of the initial plan to have 2 cohorts throughout the semester. This reduced the number of pre and post surveys we were able to collect at these schools.

Panel data: Personally identifiable information needed to build a respondent panel was only introduced into the methodology midway through the year. Since many students had already responded to the pre survey, particularly in schools with full year program cycles (1 cohort), we didn't have enough overlap to really track individual level change. Furthermore, the high turnover rates meant that a lot of the students were not present to take both the pre and post surveys. This meant that not enough data was gathered to successfully build a panel dataset that could provide better information on an individual level than when analyzed as a group. However, what we were able to build was a pooled dataset. In a pool dataset, we have a "time series of cross sections" but the observations in each cross section does not necessarily refer to the same individuals. In other words, this is a snapshot of a sample of individuals at various moments in time. This methodology is often used to see the impact of policy or programs and yield accurate results if the following conditions are met:

- Population has similar characteristics, meaning that variables are constant over time or we can control for this change.
- Mean can be different, but we assume that the variance is the same: although the average answers can change, we assume that the variation or distribution between answers stays the same.
- Observations come from the same population: we are surveying the same population group (although with different individuals).

Varied cycle length and returning students: Inconsistent cycle length can also have an effect on data accuracy. It can be expected that a year-long program will have a different impact than a 2-month program, especially on social-emotional learning measures. The different cycle lengths between schools and small sample size per school make it hard to control for length in the program. Similarly, some students have attended multiple TAP cycles, meaning that the pre-survey might not be an accurate reflection of the student's status before TAP. Although a question aimed at and measuring returning students was added to the survey during the second semester, not enough information was collected to properly control for it during the data analysis.

Small control group: Control group surveys were only introduced to the methodology during the second semester. Late addition and difficulties coordinating with school administrations meant that control groups in only 3 schools could be completed.

Key findings

The analysis found that the statistically significant changes between pre and post surveys can be grouped into three main categories: (1) an increased sense of community, (2) increased self-awareness, and (3) increased skills necessary for teamwork.

Sense of community
We found significant increases in participant's sense of community across the full cohort. These changes can be categorized into social support and social competence. However, when divided further into demographics, we found that this effect is mostly driven by the males in the cohort.

Teamwork
Significant changes towards self-assessment of skills involving communication and teamwork were found across four out of six questions for the whole cohort. When analyzed by demographics, we found that females drove most of the effect in 3 out of the 4 statements, suggesting that aspects of TAP that seek to promote teamwork as a part of social functioning and the development of skills necessary to work in the digital animation field are more effective in females.

Self-awareness
As with community, we found significant changes in participant's self-awareness and self-esteem across the full cohort. This came from an increase in two statements. First, there was a significant increase in the statement of "I feel I am basically no good." Surprisingly, this was the statement with the most significant changes when analyzed by demographics; we found a significant change in this statement across all ages and males. While on the surface, this might be cause for alarm, or an analysis that there is a decrease in self-esteem, when taken in context of the various other results, we think it is quite possible that this reflects either 1) a more candid self-assessment of self-critical feelings and/or 2) greater candor in the post survey than in the pre survey. Simply put, we think it is more likely that, as a result of TAP, participants are either noticing or communicating existing critical sentiment to a greater degree than that they are experiencing a great increase in this criticism itself.

The second change in this category was found in response to the statement "I wish I had more respect for myself." Again, this information could be read as self-critical or as aspirational. As TAP does focus, in part, on social-emotional learning measures of self-awareness and self-respect, we think it is more likely these responses signal an increase in self-awareness and a desire to better themselves. When coupled with the also significant increase in the use of positive words when asked to describe themselves, the results seem to point to the second hypothesis. However, this phenomenon should be further examined with the TAP therapists. Particularly with regard to the theme of "I feel I am basically no good," attention should be paid to working with students about how to handle a growing self-awareness of self-criticism with gentleness and compassion.

Convergence of expectations about job occupations
When analyzing the responses regarding job occupations, we found that there was no significant increase in the prestige of the job occupations, neither desired nor expected by students, between pre and post TAP. However, we did find that expectations and desires did converge after TAP. In other words, this means that after TAP there is a greater alignment between what students *want* to do and what they *expect* to be doing. This could point towards increased self-confidence towards achieving their desired job or a clustering toward perceived "realistic" jobs, among other possibilities.

Gender effects

Females showed a statistically significant change in their confidence about self-learning and teamwork. Furthermore, female respondents improved their responses more than males in all of the technical proficiency questions, suggesting that they improved their technical understanding and that their self-confidence in learning was well-founded. All the effects evidenced in females are in line with the key competencies identified by TAP as crucial to succeed in the digital animation field. Gender effects on males center around increased sense of community and increased self-awareness both to their own limitations and their own achievements.

Age effects

Although not as clear cut as the gender effects, there are also some significant differences between the program effects for middle school students and high school students. When it comes to teamwork and technical proficiency, middle school students register the most significant changes. However, despite the fact that there are more middle school students surveyed than high school students, the results of analyzed data do not show many statistically significant changes in community and self-awareness for middle school students between pre and post surveys. This indicates greater impact by the program on social competence, social support, and self-awareness in high school students.

Annex 1: Source Surveys

Questionnaire or research	Description
DIDS Dimensions of Identity Development Scale	"Model poses that identity is a process consisting of five aspects: Exploration in Breadth, Commitment Making, Ruminative Exploration, Exploration in Depth and Identification with Commitments. The Dimensions of Identity Development Scale (DIDS) is a 25-item instrument developed to assess those five aspects."
Capturing ruminative exploration: Extending the four-dimensional model of identity formation in late adolescence, Luyckx, Koen et al. (2007)	"Identity exploration has been associated with openness and curiosity but also with anxiety and depression. To explain these mixed findings, the four-dimensional identity formation mode was extended using data from two late adolescent samples (total N = 703). A fifth dimension, labeled ruminative (or maladaptive) exploration, was added as a complement to two forms of reflective (or adaptive) exploration already included in the model (i.e. exploration in breadth and exploration in depth)."
CAYCI SES: Peer Relationship Scale in Middle & High School, Anderson-Butcher, Amorose, Iachini, & Ball. (2016)	"Research has explored the effects of peer relationships on the academic achievement and adjustment of students. Studies have shown that positive peer group characteristics and support from peers promoted the following outcomes in schools: prosocial behaviors, higher academic performance, positive feelings of group membership/friendship, and lower levels of emotional distress. Given these findings, peer relationships not only impact academics, but also the psychosocial development of youth. An examination of middle and high school student perceptions of their peer relationships can help schools determine strategies to support positive peer interactions and pro-social norms. Furthermore, understanding and recognizing the impact of negative peer relationships in the school may be important to consider when evaluating these results. "The Peer Relationships scale assesses the extent to which middle/high school students feel they are supported by and have positive relationships with their peers."
CAYCI SES: Social Skills in Middle & High School, Anderson-Butcher, Amorose, Iachini, & Ball. (2016)	"Research has shown that development of social skills promotes overall positive youth development and that social relationships promote success in school. "The Social Skills scale assesses student perceptions of their ability to engage in positive social interactions with others."

Questionnaire or research	Description
LiFEsports Survey: The Perceived Social Competence, Anderson-Butcher, Amorose, Lower-Hoppe, & Riley. (2014)	"Social competence is defined as the degree to which youth engage in prosocial behaviors that allow them to successfully create and maintain positive social interactions with others. Assessment of perceived social competence is important as it has been associated with academic success and higher levels of self-esteem. "Perceived Social Competence Scale (PSCS) [is] a brief, user-friendly tool used to assess social competence among youth."
LiFEsports Survey: Teamwork Scale for Youth, Lower, Newman, & Anderson-Butcher. (2015)	"Teamwork is defined as a youths' ability to collaborate and work with others to achieve a common goal in the group/team context. Specifically, the construct of teamwork involves members of a group/team who are willing to appropriately interact with one each other by demonstrating prosocial behaviors such as problem solving, negotiating, supplying feedback, and illustrating responsibility and accountability. "The Teamwork Scale for Youth is a brief, easily administered, psychometrically sound tool that can be used with confidence in social work research and practice."
LiFEsports Survey: Perceived Social Responsibility Scale, Anderson-Butcher, Amorose, Lower, & Newman. (2016)	"Broadly defined, social responsibility is the adherence to social rules and expectations with concern for broader ethical issues and the common good. More specifically within the context of positive youth development, social responsibility refers to attitudes and initiative to respect the rights and feelings of others, being a responsible citizen, and avoiding violent and destructive behaviors. "The Perceived Social Responsibility Scale (PSRS) was originally developed for use in a sport-based positive youth development program to assess youths' perceptions of their commitment to others and their community."
Adolescent Social Functioning Form (TCU ADOL SOCForm), Texas Christian University Institute for Behavioral Research	"An assessment domain comprised of 4 scales that address hostility, risk taking, and social support, and social desirability. Was originally designed as a part of a set of four brief but comprehensive instruments measuring patient motivation, psychosocial functioning, treatment process, social network support, and services received are needed for monitoring drug abuse treatment delivery and patient progress. Combining this information across patients within a program also provides useful indicators about institutional composition and functioning."

Questionnaire or research	Description
Assessment of Identity development and identity diffusion in adolescence (AIDA), Goth, Foelsch, Schlüter-Müller, Birkhölzer, Jung, Pick, & Schmeck. (2012)	"AIDA (Assessment of Identity Development in Adolescence) questionnaire was developed to assess the complex dimension of identity development in healthy and disturbed adolescents, varying from "Identity Integration" to 'Identity Diffusion', in a broad and substructured way."
A Brief Questionnaire for Measuring Self-Efficacy in Youths, Peter Muris (2001)	"The SEQ-C contains 24 items that are hypothesized to represent three domains of self-efficacy: (1) social self-efficacy that has to do with the perceived capability for peer relationships and assertiveness; (2) academic self-efficacy that is concerned with the perceived capability to manage one's own learning behavior, to master academic subjects, and to fulfill academic expectations; and (3) emotional self-efficacy that pertains to the perceived capability of coping with negative emotions (all SEQ-C items are shown in Table I). Each item has to be scored on a 5-point scale with 1 = not at all and 5 = very well."

Annex 2: Clustered Words

Cluster	Clustered words	Positive/Negative/Neither
1	impatient, quick-tempered	negative
2	dedicated, positive, patient, determined, confident, proud, loyal, stable, sure, stubborn, diligent	positive
3	fun, entertaining	positive
4	focused, creativity	positive
5	individual, closed, technical, mean, small, scientific	neither
6	cool, mature, calm, quiet, collaborate, freelance	positive
7	smart, great, boss, classy, ok	positive
8	lustful, interested, curious, sexy	positive
9	honest, king, godly, responsible, good	positive
10	independent, comfortable, successful, lucky, cheerful, happy	positive
11	sweet, helpful, rich, beautiful, pretty, healthy, fine, brave, kind, nice, handsome	positive
12	weird, impossible, marvelous, remarkable, unique, funny	positive
13	lazy, uncooperative, bored, uninterested	negative
14	capable, experienced, professional, cute	positive
15	bad, sad, horrible, ugly, high, strong	negative
16	leader, artist, trailblazer, creator	positive
17	afraid, scared	negative
18	goofy, mad, incapable, awkward, dumb, silly, crazy	negative
19	outgoing, communicative, talkative	positive
20	boring, unoriginal	negative
21	unconfident, insecure	negative

Cluster	Clustered words	Positive/Negative/Neither
22	believer, listener	positive
23	respectful, friendly, social	positive
24	athlete, better, advocate	positive
25	clingy, caring	positive
26	knowledgeable, motivated, intelligent	positive
27	jumpy, angry, confused, annoyed, nervous	negative
28	blunt, savage, sassy, chill, rude	negative
29	passionate, energetic, excited, ambitious	positive
30	male, boy	neither
31	shy, cringey	negative
32	amazing, awesome	positive
33	learning	positive
34	computer	neither
35	reflective	positive

Annex 3: Top 5 Most Common Occupations

Desire: What kind of job or occupation <u>do you want to have</u> when you are 30 years old?			
Before TAP		**After TAP**	
	Prestige		Prestige
Athletes, coaches, umpires, and related workers	79.87	Physicians and surgeons	95.42
Secondary school teachers	90.87	Athletes, coaches, umpires, and related workers	79.87
Musicians, singers, and related workers	65.63	Lawyers	88.53
Physicians and surgeons	95.42	Musicians, singers, and related workers	65.63
Actors	65.90	Software developers, applications and systems software	78.22

Expectation: What kind of job or occupation <u>do you think you'll have</u> when you are 30 years old?			
Before TAP		**After TAP**	
	Prestige		Prestige
Physicians and surgeons	95.42	Physicians and surgeons	95.42
Athletes, coaches, umpires, and related workers	79.87	Lawyers	88.53
Police and sheriff's patrol officers	77.91	Athletes, coaches, umpires, and related workers	79.87
Entertainers and performers, sports and related workers, all other	8.63	Software developers, applications and systems software	78.22
Secondary school teachers	90.87	Musicians, singers, and related workers	65.63