

LEANLAB EDUCATION

Cohort 6

RESEARCH

Executive Summaries



LEANLAB Education

Cohort 6 Research: Executive Summaries

by Erin Huebert, PhD

These studies were conducted and compiled during the Fall of 2019 as part of the LEANLAB Education K12 Fellowship. Full reports for each study, containing exhaustive results, will be available in a forthcoming report in the Spring of 2020.

For more information on any of the companies, please contact Rohan Pidaparti at rohan@leanlabeducation.org.

For research-based inquiries, please contact Erin Huebert at erin@leanlabeducation.org.



Floop + Van Horn High School

PROBLEM

- Teachers need a time-efficient way to provide meaningful, accurate, and timely feedback that is both engaging and turns students into active (rather than passive) learners.
- Nature of assessment and instruction doesn't allow for or encourage iteration or growth.

RESEARCH GOALS

1. Assess impact of Floop on students' perceptions of agency.
2. Assess impact on students' learning performance.
3. Gather teacher and student feedback on product usability in order to adapt the product to be more user-friendly for the teacher and student.

METHODOLOGY

- Student pre- and post-surveys with control and treatment group
- Teacher and student interviews
- Student pre- and post-learning assessments with control and treatment group
- Tracking of teacher feedback and student engagement within the Floop app

Floop

Floop is a web and mobile platform that helps teachers give meaningful feedback faster and teaches students to use feedback to learn.

Fellow: Melanie Kong

Van Horn High School

Independence, MO

Public suburban high school

N=171

School Demographics

55% White

26% Latinx

12% Black

8% Two or More Races/Other

74% Free & Reduced Lunch Eligible

Pilot School Partner

Adam Surrey, English Teacher

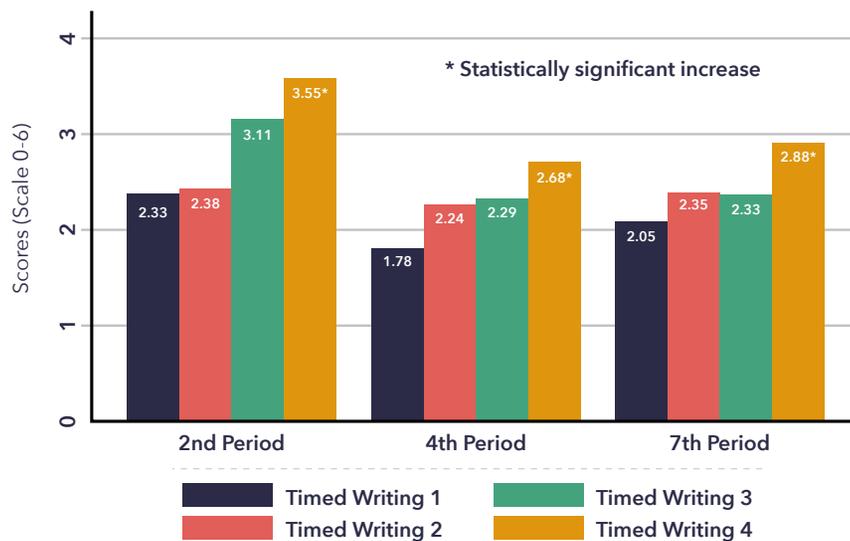
RESULTS

LEARNING ASSESSMENTS

Students in all three Advanced PLacement Language classes experienced statistically significant growth, on average, from the first to the fourth timed writing exam: 2nd period saw a 52% increase, 4th period saw a 51% increase, and 7th period saw a 40% increase (figure below).

In one out of the three English I classes that used Floop, the class experienced an 11% statistically significant increase from their first learning assessment to the third. The English III class did not experience statistically significant growth.

Changes in Class-Average AP Language Timed-Writing Scores



STUDENT AGENCY

Students in Adam's classes (N=171) who used Floop and students in comparison classrooms (N=135) were given a pre- and a post-survey to measure their growth mindset, perceptions of agency, and opinions on teacher feedback. Given the short timeframe of the pilot period, there were few areas where either group saw statistically significant increases. Among the survey questions regarding feedback (figure below), students in the Floop group did report a statistically significant increase that the feedback they were receiving in class helped them in their other classes.

Changes in Student Perception Regarding Teacher Feedback



Teacher Feedback

- "Floop enables me to give an opportunity to students that want to do better in a way that is really tangible and really immediate."
- "I like the speed with which I can access the work and give them feedback. Normally by the time I get it back to them, it doesn't mean anything to them because we've already moved onto something else."
- "I've seen kids making adjustments to their timed writing process in a more meaningful way than I have in the past."

Student Feedback

- "It helped me receive feedback in a way I could keep track of and could respond to."
- "I like that I can look back and compare other work I've done and where I need to improve."
- "I enjoyed that it was a method of communicating with my teacher that was convenient for both of us."

Suggestions

- It would be helpful for the teacher to have a gradebook view per class that showed whether students have turned an assignment in or not and whether the teacher has given feedback or not.
- A general communication platform to be able to post a message would be handy.
- The ability to sync with Google Classrooms would be helpful.

PRODUCT MODIFICATIONS

Floop added the ability for students to upload their documents from Google Drive rather than converting it to a pdf, which made the process much easier for students.



Flyer Connect + Scuola Vita Nuova

PROBLEM

- School communication has not effectively reached families
- A wide language diversity requires translation capabilities.
- Desire to go paperless in communication delivery.
- Past options for communication, robocalls and paper, were ineffective and not successful.

RESEARCH GOALS

1. Survey parents on the extent to which Flyer Connect has impacted how informed parents have become in their child’s education and their satisfaction with the app.
2. Capture teacher/staff opinions on how well Flyer Connect has allowed teachers/staff to deliver school information and engage with families.
3. Gather their feedback on the usability of the app from staff and parents.

METHODOLOGY

- Parent surveys
- Teacher interviews

Flyer Connect

Flyer Connect empowers families to get engaged with their children’s education and gives schools a simple yet powerful platform to keep families informed and participating.

Fellow: Zuben Bastani

Scuola Vita Nuova

Kansas City, MO

Urban elementary charter

K-8

Scuola Vita Nuova has been using Flyer Connect since the fall of 2018

63 parents completed survey in January 2020

School Demographics

308 students enrolled

95% Free & Reduced Lunch Eligible

65% Latinx

20% Black

7% White

8% Asian

64% English Language Learners

Native Languages of ELL students

65 % Spanish

25% Somali

8% Other (Vietnamese, Arabic, Burmese, Swahili)

Pilot School Partner

Jessica DiGiovanni, K-8 Principal



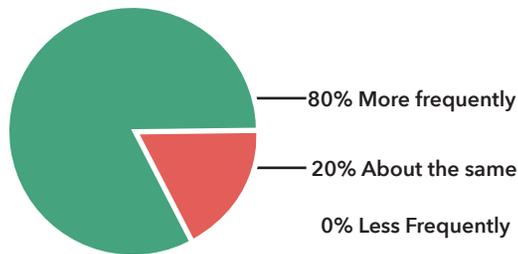
RESULTS

USER ASSESSMENTS

All parents at SVN were sent a survey through the Flyer Connect app that asked their opinions on how well the app has informed them on school related matters and their general satisfaction with the app. In every indicator, the majority of parents reported being "satisfied" or "extremely satisfied" and 80% of parents reported that they receive school communication "more frequently" since using the Flyer Connect app.

COMMUNICATION

Since downloading the Flyer Connect app, how frequently do you receive school communication compared to before you downloaded the Flyer Connect app?



INFORMATIVE

Not at all informed (0) Extremely informed (5)

How informed do you feel about school information with the Flyer Connect app?



How informed do you feel about what your child is learning in the classroom on a day-to-day basis?



How informed do you feel about events happening at your child's school?



USEFULNESS

Strongly Disagree (0) Strongly Agree (5)

Flyer Connect has made me more aware of how well my child is progressing along academic standards.



Flyer Connect tells me how to get the resources I need to help my child.



Because of the information coming from Flyer Connect, I feel confident in my ability to support my child's learning at home.



Teacher Feedback

- "It gives a bridge to teachers to share a message and know that parents will be able to understand in their native language."
- "SVN has always had strong family engagement. However, with Flyer connect it has improved because families are able to see event information immediately via their phone, instead of having to wait via the mail to get a notification or via their students."
- "Flyer Connect has been a great support in collecting paperwork needed for students to attend field trips. Right after the notification, parents will stop and drop off the paperwork at SVN or provide it to their students."

Parent Feedback

- "Que puedo estar al tanto de todo lo que está sucediendo con la educación de mi hijo."
- "The flyer connect app keeps me updated even when I haven't checked it."
- "Puedo asegurar que estoy muy bien informando!"
- "I like this app because I receive every information very quickly."
- "I like how easy it is to use."

PRODUCT MODIFICATIONS

Scuola Vita Nuova is adopting Flyer Connect's private messaging feature based on feedback from families.

Intervene + KIPP Endeavor Academy & Operation Breakthrough

PROBLEM

- 7th grade students are behind in grade level math standards.
- Students often struggle with a “growth mindset” and “perseverance” related to math.

RESEARCH GOALS

1. Assess effect of Intervene on student math assessment outcomes.
2. Assess effect of Intervene on student engagement and growth mindset.
3. Gather teacher and student feedback on product usability in order to adapt Intervene to the unique needs of the schools and students.

METHODOLOGY

- Pre- and post-surveys
- Pre- and post-learning assessments
- Teacher interviews
- Student interviews
- Classroom observations

Intervene

Intervene is a comprehensive intervention system that assesses students, analyzes data, and tutors students online in groups of four, to provide accessible, high impact tutoring to schools and districts.

Fellows: Mehul Shah & Aaron McCloud

KIPP Endeavor Academy

Kansas City, MO

Urban middle-school charter

Pilot Demographics

7th Grade

N=19

35% Latinx

55% Black

10% White

100% Free & Reduced Lunch Eligible

Pilot School Partner

Justin Alt, 7th grade Math Teacher

Operation Breakthrough

Kansas City, MO

After-School Program

Pilot Demographics

3rd - 4th Grade

N=20

100% Black

100% Free & Reduced Lunch Eligible

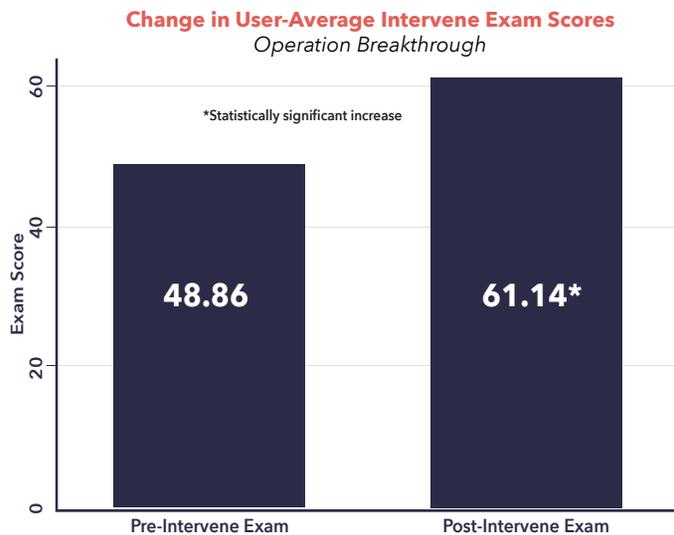
Pilot School Partner

Dajona Graves, Tutoring Manager

RESULTS

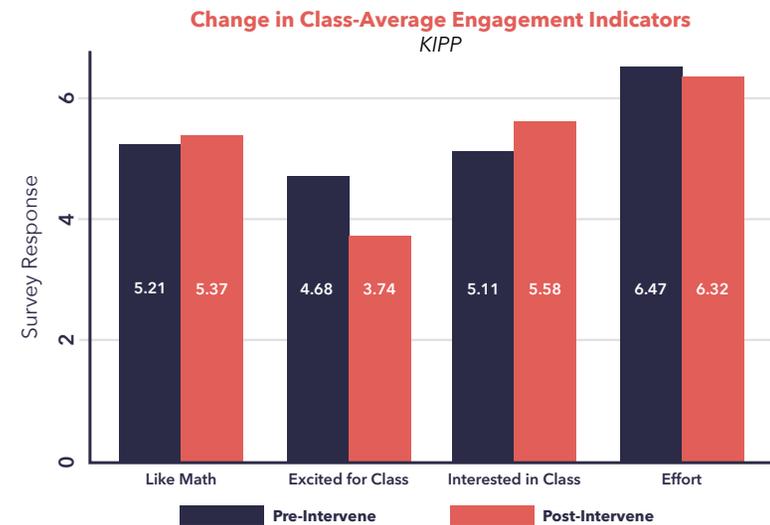
MATH ASSESSMENT OUTCOMES

The class-average was lower on the standardized post-exam than on the pre-exam at KIPP, although the decrease is not statistically significant. Students at Operation Breakthrough took a pre- and post-assessment that was created within Intervene itself. On average, the students' scores on the Intervene post-exam were 25% higher than their scores on the pre-exam and statistically significant.



STUDENT ENGAGEMENT

There were small gains in how much students reported they like math and are interested in math at KIPP, although the gains are not statistically significant. Given the short timeframe of the pilot period, there were no other significant increases in student-reported engagement or growth mindset indicators.



Teacher Feedback

- "When the tech is having no issues, it's easy to use."
- "When the tech is having issues, which was approximately 50% of the time, it's very hard to keep the kids engaged."
- The new interface allows the teachers to help the students get set up and troubleshoot technical problems easier.

Student Feedback

- "It helped me like math a little more than I used to."
- "Some ways Intervene helps me is by giving me some ideas on how to work harder."
- "A lot of students like the small group tutoring and like their tutors. They like working with other students in their group, and the collaboration makes it more successful, especially when they encourage each other."
- A teacher reported that a student who is typically disengaged feels more confidence during tutoring sessions to ask questions.

Suggestions

- Use same tutor with same group throughout semester in order to build relationships.
- "Kids have too much control over what's happening on the screen. Tutor should be able to monitor and control who can do what. They shouldn't be able to write all over the screen."
- The kids do not know when they are muted, so it would be better for the students to always have the ability to talk and not have that controlled by the tutor.
- In an after school program, kids are tired of typical classroom learning, so it would help if the tutoring was more game-based.

PRODUCT MODIFICATIONS

Intervene changed the interface, which makes the site more user-friendly and transparent for the teacher. The tutor is now visible throughout the tutoring session, which makes them more engaged.



Indigo + Blue Valley Center for Advanced Professional Studies

PROBLEM

- Teachers, students, and community stakeholders need resources to identify and address an increase in social and emotional needs of students who are part of a competitive, high-expectations, career-immersion environment.
- Students are feeling stress and anxiety about what direction to take their own careers and how to get there.

RESEARCH GOALS

1. Assess the impact of Indigo on student career clarity and direction.
2. Assess the impact of Indigo on student’s social/emotional health.
3. Gather teacher and student feedback on product usability in order to adapt product to be more user-friendly for students, meet the unique needs of the school, with the intention to make the Indigo supplemental resources more scalable.

METHODOLOGY

- 3 groups:
 - **Group A:** no exposure to Indigo (**N=179**)
 - **Group B:** students take the Indigo assessment, a series of online learning modules, but have no instruction/engagement from teachers (**N=85**)
 - **Group C:** students take the Indigo assessment, a series of online learning modules, and have instruction/engagement from teachers (**N=195**)
- Pre- and post-surveys to students
- Teacher and student interviews

Indigo

Indigo is a sophisticated data platform that delivers real-time actionable insights into self-awareness for students that supports student success, retention, social-emotional health and college and career readiness that can be communicated to parents, teachers, counselors, and administrators.

Fellows: Sueann Casey & Sheri Smith

Blue Valley Center for Advanced Professional Studies

Overland Park, KS

Public suburban school district career-readiness program

Pilot Demographics

N=459

11th grade: 53

12th grade: 406

10 Teachers Piloting Indigo

74% White

10% Asian

7% Two or More Races/Other

3% Latinx

2% Black

Pilot School Partner

Tammy Fry, PhD

Teacher Education Instructor



RESULTS

CAREER CLARITY

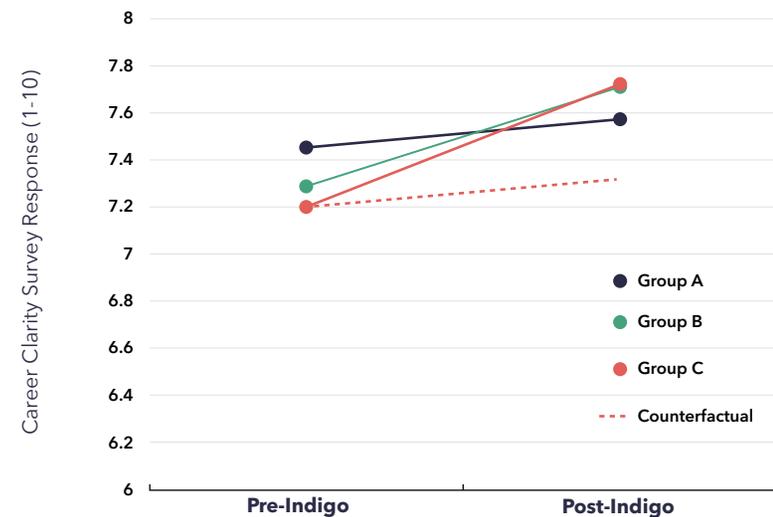
Among Indigo users that had teacher interaction (Group C), level of reported career clarity increased by 7% and is statistically significant. Among students that used Indigo but had no teacher interaction (Group B) there were pockets of growth in career clarity although did not quite reach statistical significance. As expected, students who did not use Indigo over the semester reported no change in career clarity (Figure 1).

Figure 1
Average Level of Student-Reported Career Clarity
Before and After Indigo, by Study Group



Furthermore, there is a statistically significant positive effect of Indigo on career clarity for three groups of students in Group C: 1) among boys (Figure 2), 2) among students that reported high levels of pressure and 3) among students that reported low levels of confidence in their plans for after high school. The figure below illustrates the effect of Indigo on boys. The counterfactual line in the figure below illustrates the predicted level of career clarity that boys in Group C would have reported *had they not used Indigo*.

Figure 2
Effect of Indigo on Career Clarity, on Boys



SOCIAL-EMOTIONAL HEALTH

While Indigo did not have a statistically significant effect on students' reported levels of stress related to school or stress related to their plans after high school, students who reported high levels of stress and pressure in Group C, reported statistically significant increases in career clarity.

Teacher Feedback

- Most teachers feel that the Indigo Assessment content is useful; they can easily relate and integrate it into their coursework and conversations with students.
- Many teachers believe that students have a better understanding of themselves in relation to others, especially as it relates to group dynamics.

Student Feedback

- 42% of students felt like the Indigo Assessment gave them a means of communicating about their own strengths, passions, and skills.
- 65% of students believe the Indigo Assessment gave them accurate results.
- 33% of students reported that they had more career ideas after the Indigo Assessment.

Suggestions

- Teachers and students find the Indigo Assessment itself particularly valuable, but suggest that the online learning modules be less repetitive and shorter.
- Teachers would like more tips for enrichment activities or ideas on how to incorporate modules into their classes. Teachers also suggest an immediate resource for technical support.

PRODUCT MODIFICATIONS

Indigo created a way for teachers to directly access their student progression/status through the online course modules and is now available to all users/teachers. They now have direct immediate visual access to see where each student is in real time.

Speak Agent + KIPP Endeavor Academy

PROBLEM

- Because many students are reading below grade level, they disengage from class and do not exhibit a growth mindset regarding reading, which leads to a cycle of disengagement and low performance.

RESEARCH GOALS

1. Assess the impact of Speak Agent on reading outcomes.
2. Assess the impact of Speak Agent on student engagement.

METHODOLOGY

- Student pre- and post-surveys
- Teacher and student interviews
- Student classroom observations
- Student pre- and post- learning assessments

Speak Agent

Speak Agent is a breakthrough digital platform that empowers diverse learners of all ages to quickly and deeply master challenging academic language and concepts critical for success in schools and careers.

Fellows: Ben Grimley and Dan LaFountain

KIPP Endeavor Academy

Kansas City, MO

Urban middle-school charter

Pilot Demographics

N=13

7th grade

100% Black

100% Free & Reduced Lunch Eligible

Pilot School Partner

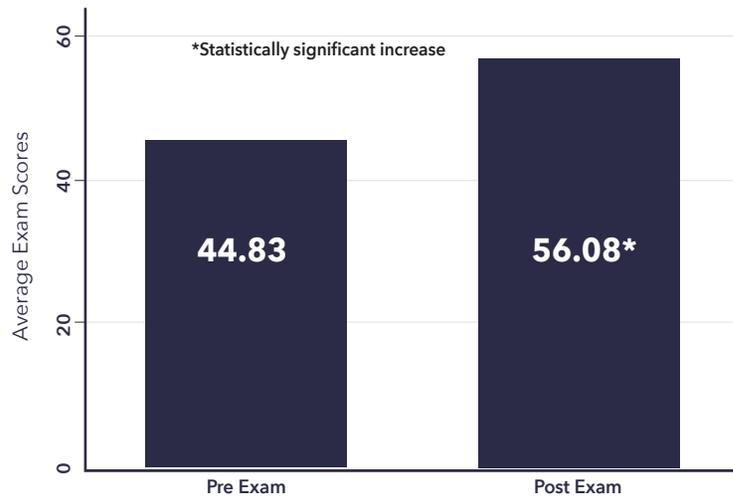
Skylar Hurst, 7th grade English teacher

RESULTS

READING OUTCOMES

Students took a pre- and post- 7th grade, standardized reading assessment and the class, on average, experienced a 27% statistically significant growth (figure below).

Changes in Class-Average Exam Scores



STUDENT ENGAGEMENT

Students took a pre- and post-survey centered on social-emotional competencies in engagement, confidence, and growth mindset. There were three components where there was a statistically significant increase in the class-average response: how much students like reading, how good at reading they think they are, and how confident they are that they can master topics in their class (figure below). There was not a statistically significant increase among any of the other growth mindset indicators.

Changes in Class-Average Engagement & Confidence Indicators



Teacher Feedback

- "I appreciate that it lines up with what we are doing in class."
- "It is allowing students to engage in various ways including active listening and read along."
- "I am surprised by how much they enjoy the activities where they record themselves and read out loud. They enjoy hearing themselves."
- "The quick feedback makes them feel successful."

Student Feedback

- "It teaches you what the words are. It challenges you to want to do more."
- "The voice application allows you to learn how to pronounce words."
- "It's challenging, but it's fun."
- "It helps me understand the definitions of words."

PRODUCT MODIFICATIONS

Speak Agent is working to build a teacher dashboard for teachers to be able to track student progress and outcomes on modules and activities within the app.

School Deets + Excelsior Springs High School

PROBLEM

- Teachers and administrators need a new approach to engage and communicate with parents.

RESEARCH GOALS

1. Assess how much communication parents receive through School Deets.
2. Assess impact of School Deets on parent engagement and awareness of what their child is doing in school and various events happening at the school.
3. Gather teacher feedback on product usability in order to adapt product to the unique needs of the school.

METHODOLOGY

- Parent pre- and post-surveys with control and treatment groups
- Student pre- and post-surveys with control and treatment groups
- Teacher interviews
- Tracking of parent engagement with the School Deets

School Deets

School Deets' communication platform is simple and effective and fixes disjointed school to home communication by providing one app for everyone. Admin, teachers, family liaisons, secretaries, parent volunteers, community members, etc. can all use the same platform to easily reach parents.

Fellow: Heather Wilson

Excelsior Springs High School

Excelsior Springs, MO

Public suburban high school

9th - 12th Grade

Pilot Demographics

85 parents enrolled in School Deets out of 90 parents in Tony's classes

24% are parents of students of color
42% are parents of students that are Free and Reduced Lunch Eligible

Pilot School Partner

Tony Harman,
*Project Lead The Way Engineering/
Mathematics Teacher*

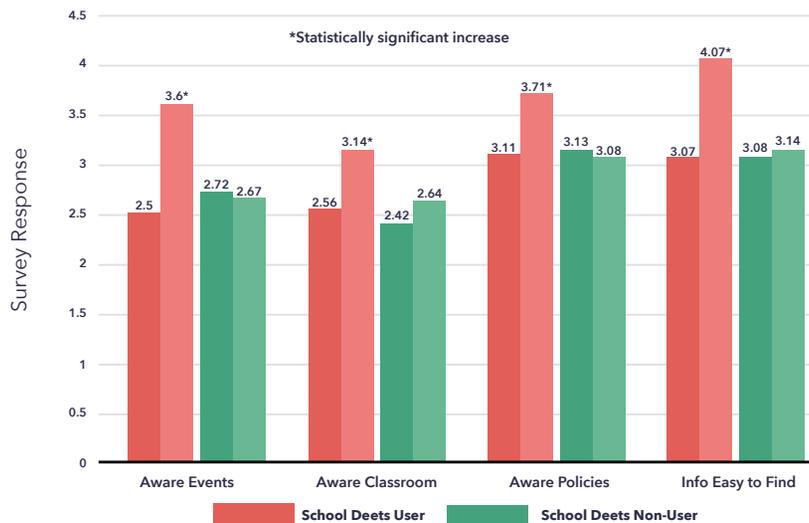
RESULTS

AWARENESS

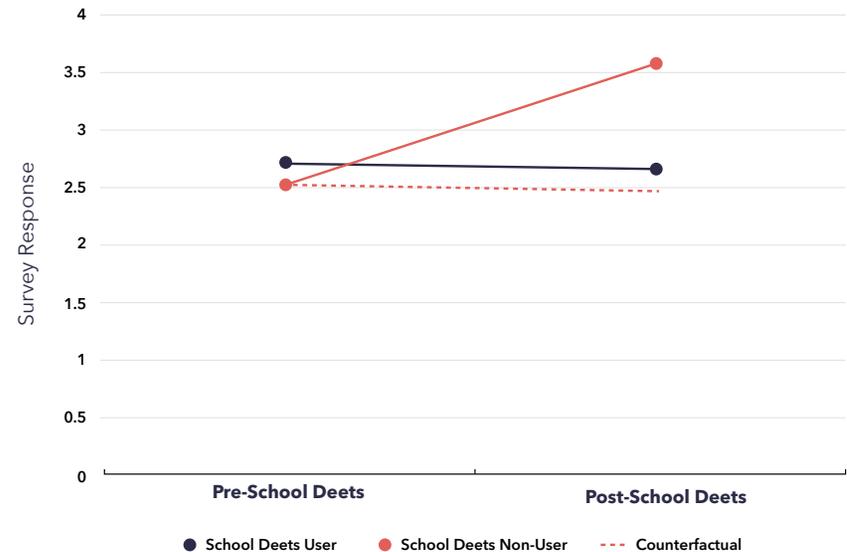
Parents of all of Tony's students (N=90) and 100 other randomly selected parents were given a pre- and post-survey that assessed their satisfaction with school communication, their level of awareness of school-related issues, and their connection with their students at home related to their education. Parents using School Deets reported statistically significant increases in all three areas of awareness (school events, school policies, and what their child is learning in the classroom) and in how easy it was to find relevant information. Conversely, parents who did not use School Deets did not report statistically significant increases.

Furthermore, the difference in the reported change in awareness between School Deets users and non-users is also statistically significant and suggests that School Deets has an effect on level of awareness. That is, controlling for other possible explanations between groups, School Deets has an independent effect on parents' level of awareness. As an example, the figure below shows the effect of School Deets awareness of events. The counterfactual line in the figure below illustrates the predicted level of awareness that parents using School Deets would have reported *had they not used School Deets*.

Change in Awareness between School Deets Users and Non-Users



Effect of School Deets on Awareness of Events



Teacher Feedback

- Students are participating in content generation for parents.
- Teacher is actively thinking more about the parent to home connection and has seen a huge increase in the number of parents that reach out to him about their child.
- Attendance at parent-teacher conferences increased from years past and teacher believes it is due to more consistent communication with the parents.

Suggestions

- Create a data dashboard in order to see engagement level in the platform.
- Teacher recommends a weekly guide for how to create quick content, in order to build up consistency of practice. A series of small simple assignments or video tutorials that indicate how to engage families each week would help.
- Being able to record a video directly to the app rather than having to upload to Google Drive would be nice.

PRODUCT MODIFICATIONS

School Deets modified the parent onboarding system, by changing the email template that was included with all-school email posts to further encourage parents to finish their account creations. Teacher reports that these product changes have allowed a broader reach of information.



**BANNEKER
ELEMENTARY**

Emote + Guadalupe Centers High School & Benjamin Banneker Elementary School

PROBLEM

- Teachers need a way to pro-actively and systematically help all students manage their social-emotional needs.
- Need a better system to track social/emotional learning needs of students and to track outcomes of interventions.
- Support staff spending a lot of time “putting out fires.”

RESEARCH GOALS

1. Assess effect of Emote on the type and frequency of student interventions.
2. Assess effect of Emote on teachers’ awareness of SEL needs and level of preparedness to address those needs.
3. Assess effect of Emote on teachers’ level of stress.
4. Gather teacher feedback on product usability in order to adapt product to the unique needs of the schools.

METHODOLOGY

- **Guadalupe**
 - 7 teachers using Emote
 - 6 teachers not using Emote
- **Banneker**
 - 2 teachers using Emote
 - 2 teachers not using Emote
- Teacher pre- and post-surveys
- Teacher interviews
- Teacher classroom observations
- Tracking of type and frequency of student interventions

Emote

Emote continually collects and analyzes SEL (socio-emotional learning) data to deliver insights to the right person at the right time -- empowering schools to deliver proactive support to 100% of students with existing staff.

Fellows: Julian Golder

Guadalupe Centers High School

Kansas City, MO

Urban high-school charter

9th - 12th Grade

Pilot Demographics

N=226

93% Latinx

97% Free & Reduced Lunch Eligible

Pilot School Partner

Sarah Hellhake, Electives

Benjamin Banneker Elementary

Kansas City, MO

Urban public elementary school

Grades: K-6th

Pilot Demographics

N=20

80% Black

15% Latinx

5% Asian

97% Free & Reduced Lunch Eligible

Pilot School Partners

Ashten Link, Kindergarten teacher

Cristina Marquez, LCSW,

Trauma Sensitive School Clinician at KCPS



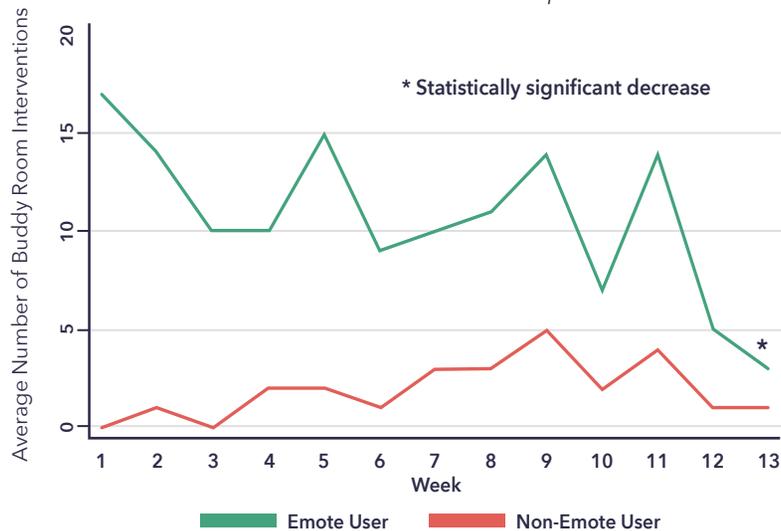
RESULTS

INTERVENTIONS

We tracked three forms of interventions with students: *Safe seat Interventions* (moving a student to a different spot in the classroom), *Buddy Room Interventions* (moving a student to a different classroom), and *Focus Room Interventions* (moving a student to a behavioral intervention coordinator's office).

There was no difference among teachers that used Emote and teachers that did not use Emote regarding the change in number of Safe seat Interventions or Focus Room Interventions. There was a statistically significant decline in the average number of Buddy Room Interventions among teachers that used Emote (see **Figure 1** below) while teachers that did not use Emote saw no change in Buddy Room Interventions. The difference between Emote users and Non-Emote users is also statistically significant.

Figure 1
Average Number of Buddy Room Interventions
Over Pilot Period at Guadalupe



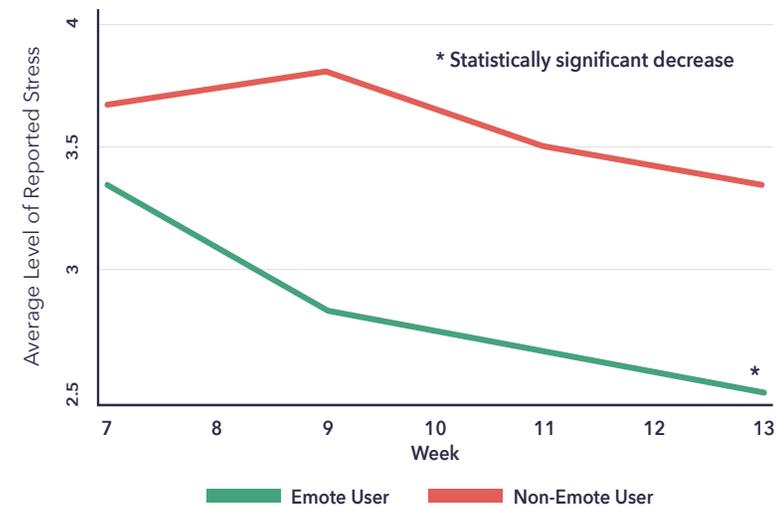
TEACHER AWARENESS AND PREPAREDNESS

Classroom observational data confirms teacher self-reports that there was no statistically significant difference in teacher SEL preparedness or SEL awareness between Emote users and non-users.

TEACHER STRESS

There is a statistically significant difference in the average level of teacher self-reported stress between Emote users and non-users at Guadalupe. The decrease in stress among Emote users is also statistically significant (**Figure 2**).

Figure 2
Average Level of Teacher Reported Stress
Over Pilot Period at Guadalupe



Teacher Feedback

- "It is nice to be informed when a student is "off" on a particular day."
- "It is helpful to see patterns with students and the time of day they are most likely to be in a vulnerable mood."
- Teachers reported that Emote gives teachers a tool to collaborate on student's SEL needs by being able to track emotions and follow-up with other teachers.
- Teachers feel like they are more conscious about checking-in with students.
- "It is hard to know whether any interventions with a student happened in a day, as Emote only tracks emotions."

Suggestions

Guadalupe

- It's hard for teachers to take attendance and log Emote at the same time, so it would be helpful to integrate Emote with Infinite Campus (attendance platform).
- For Emote to be the most effective - in terms of tracking and identifying students in need - all teachers/staff need to use it on a consistent basis.

Banneker

- Use Emote as a tool for students to self-report emotions and see their progress.

PRODUCT MODIFICATIONS

Added a system for tracking teachers' own social-emotional state.



Makers Empire + Academy for Integrated Arts & Operation Breakthrough

PROBLEM

- Many students in pre-K to 3rd grade do not have the opportunity to learn problem-solving and spatial-reasoning skills in their classrooms.
- Teachers need more support in being intentional about creating these opportunities.

RESEARCH GOALS

1. Assess the impact of Makers Empire on students' spatial reasoning skills.
2. Assess the impact of Makers Empire on students' oral language development related to projects they create.
3. Gather teacher feedback on product usability in order to adapt Makers Empire into an app suitable for young children.

METHODOLOGY

- Pre- and post-learning assessments
- Teacher interviews
- Classroom observations

Makers Empire

Makers Empire helps K-8 educators teach design thinking, STEM and 21st-century learning skills with 3D design and printing. Our program helps develop the critical thinking, design thinking, creative, collaborative and problem-solving skills and growth mindset they'll need to thrive in the future.

Fellow: Jon Soong

Academy for Integrated Arts

Kansas City, MO

*Urban elementary charter
Pre-K and Kindergarten*

Pilot Demographics

N=24

92% Black

8% White

100% Free & Reduced Lunch Eligible

Pilot School Partner

Andrea Davis, Pre-K/Kindergarten teacher

Operation Breakthrough

Kansas City, MO

After-School Program

1st and 2nd graders

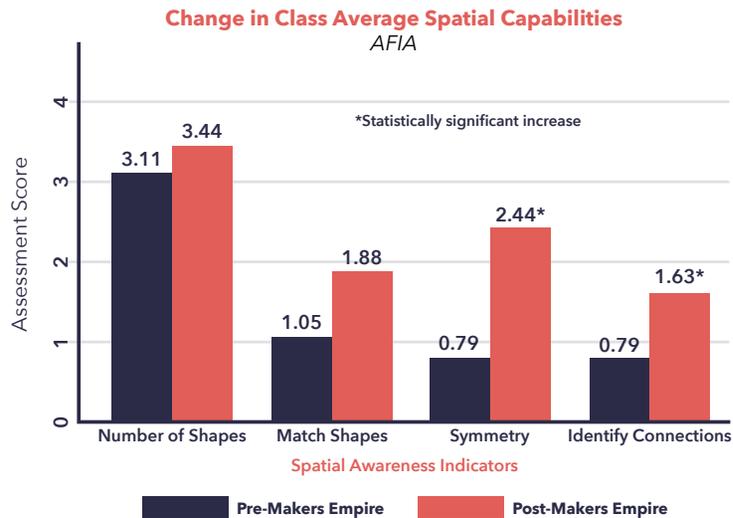
N=10

Pilot School Partner

Jadwin Rowles,
SMART Lab Education Coordinator

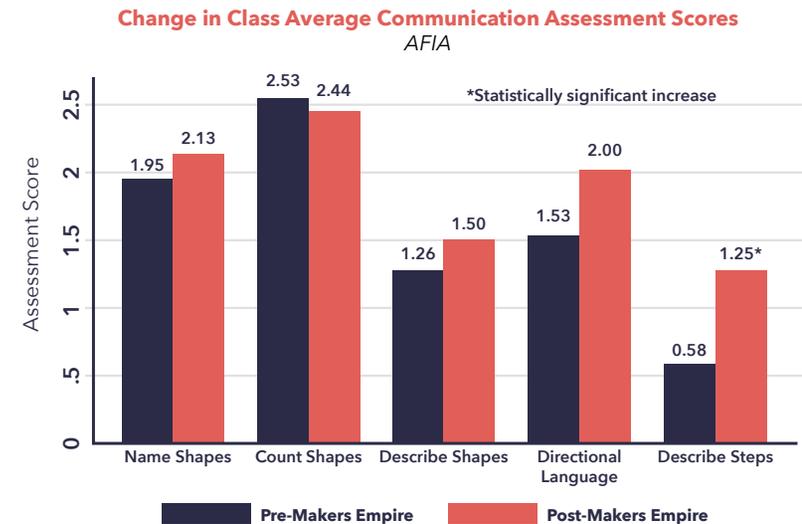
SPATIAL-REASONING SKILLS

Students at AFIA were given a pre- and a post-assessment, in which they were tasked with creating a house within the Makers Empire app. Teachers then assessed their spatial-reasoning abilities along four indicators: number of shapes a student used to make a house, number of shapes a student could match with the same side, number of shapes a student used in a symmetrical way, and number of connecting points a student could make and identify. Of the four indicators, the class average increased in a statistically significant way on symmetry and connecting points (figure below).



ORAL LANGUAGE DEVELOPMENT

Students at AFIA were given a pre- and post-assessment that evaluated their communication skills regarding their house projects. Teachers assessed their communication along five dimensions: number of shapes a student could name, number of different shapes a student could count, number of attributes about a shape that a student could describe, number of directional terms (eg. above, below) a student could use, and number of sequential steps a student could use to describe their process of creation. Among the five communication indicators, the only one that exhibited a statistically significant increase was the ability of students to describe the steps in their design process (figure below).



Teacher Feedback

- “A bit overwhelming to use with this age group (Kindergarten). They require so much individual attention.”
- There was frustration by kids not being able to use it without constant support from teacher which led to kids being disinterested.
- Kids were excited to use it and enjoyed creating an avatar.

Suggestions

- A number of things are still suggested to help make it easier for young kids to use:
- Sound is needed to give students instruction and to confirm when they do things right.
 - Video needed to illustrate the world in Makers Empire and how to navigate it.
 - Have different shapes available for different grade levels
 - Teachers also suggest that it is more manageable for the teacher when he/she can use it with one small group of students at a time.

PRODUCT MODIFICATIONS

Teacher implementation and feedback were major components of this research study in order to assess and adapt the viability of Makers Empire for younger children (pre-K to 2nd grade). A number of significant challenges for children arose early in the pilot, and teachers communicated those challenges to Makers Empire developers. As a result, a number of product enhancements were made to try to make Makers Empire easier for young children to use.

- *Instructional videos were created since this age-group cannot yet read instructions.*
- *A custom challenge course was created to make it easier for kids to know where to go in the app.*
- *Character attributes were added to reflect racial diversity.*
- *Text narration will soon be added to the app.*

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