

## **Team Coterm**

Anjini, Kayla, Kimberly, and Misbah

# **EXPERIMENT PLANNING WORKSHEET #1**

## **POV + HMW**

POV: We met Ana, a former ESL student who moved to the US from Cuba in 2010 and joined the ESL program in 7th grade. We were amazed to learn that as an ESL student, she felt completely separate and siloed from the rest of her peers and in the classroom. (She actually learned English from watching Disney Channel, where she felt she gleaned the appropriate cultural context to understand the language, instead of in her ESL classroom!) It would be game changing to help Ana feel more comfortable in American classrooms and with American culture.

**HMW: How might we help teachers design lessons that bridge the students' home cultures and classroom environment?**

## **SOLUTION**

A digital platform that suggests media resources to supplement an ESL student's classroom education and is designed to grow confidence with idiomatic expressions and everyday English; the platform includes media-based crutches for students listening to teachers in mainstream classrooms and allows teachers to monitor overall cultural and linguistic progress.

## **ASSUMPTION TO TEST**

Language learning is facilitated when the student is (1) engaged by relevance to contemporary popular culture and (2) exposed to culture through mass media.

## **EXPERIMENT OVERVIEW**

We plan to show participants clips of American TV shows (1) in English with subtitles and (2) in English without subtitles and ask them to discuss their confidence and vocabulary before and after watching.

## **DETAILED EXPERIMENT DESIGN**

**1. Participants** (target participants, how many, recruiting strategy, compensation)

We will recruit school students of various age groups who do not speak English as their first language and show them clips of age-appropriate mainstream American TV shows. We will conduct a follow-up discussion with each student, in which we ask them to tie the content of the TV shows to their classroom curricula and ask them about their confidence and new vocabulary post-watching.

**2. Preparing for study & prototype creation** (including any required software, supplies, additional people, etc.)

We will potentially have to curate the clips of TV shows and, if not already present, add subtitles. We will have to ensure the choices of show are age-appropriate and representative of American children for whom English is the first language.

**3. Running study** (length, plan for mgmt during study if needed)

We will conduct our follow-up surveys both immediately and (given that we are dealing with children, who may have a shorter attention span) after a few days of showing them the video clips.

**4. Analysis plan**

Due to the nature of the variables we're looking at, we hope to conduct both a qualitative and quantitative analysis of our results (for example, numerical scales for confidence but also quotes and anecdotal evidence from students).

## **OPEN ISSUES**

1. How can we ensure our platform is conducive to both students and teachers (i.e. at both ends of the pipeline)? We may need to explore certain design choices here.
2. We will hopefully gain a better understanding of a target student age group through our experiments (i.e. for what age/ grade level might such an intervention be most appropriate).

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# **EXPERIMENT PLANNING WORKSHEET #2**

## **POV + HMW**

### **POV: Ana Cabrera**

We met Ana, a former ESL student who moved to the US from Cuba in 2010 and joined the ESL program in 7th grade. We were amazed to learn that as an ESL student, she felt completely separate and siloed from the rest of her peers and in the classroom. It would be game changing to help Ana feel more comfortable in American classrooms and with American culture.

**HMW:** How might we help teachers design lessons that bridge the students' home cultures and classroom environment?

Reasoning: She would feel more comfortable and less siloed if her background/culture was incorporated into the classroom

## **SOLUTION**

Lesson plan and curriculum generator that takes into account students' backgrounds, interests, and proficiency levels in different subjects to increase engagement and learning, and provide a space for personalized and collaborative learning.

## **ASSUMPTION TO TEST**

We are testing the assumption that providing information about students' cultural background, interests, and skills will be helpful for them in creating class content and formulating effective lesson plans.

## **EXPERIMENT OVERVIEW**

In order to test our assumption, we will recruit the help of 2 teachers and present each with a prompt for a learning goal that they must create a lesson plan for. We will then ask them to explain the lesson plan as well as any tools they would need to execute the plan. After the plan

description, we will hand (virtually) them a folder of student profiles that describe background, interests, and areas of strengths and weaknesses. We will then prompt them to make a second lesson plan for this “classroom” of students.

## **DETAILED EXPERIMENT DESIGN**

### **1. Participants** (target participants, how many, recruiting strategy, compensation)

We will have 2 teachers as our participants, all either classroom teachers or reading pullout teachers. These individuals are previous teachers and family friends.

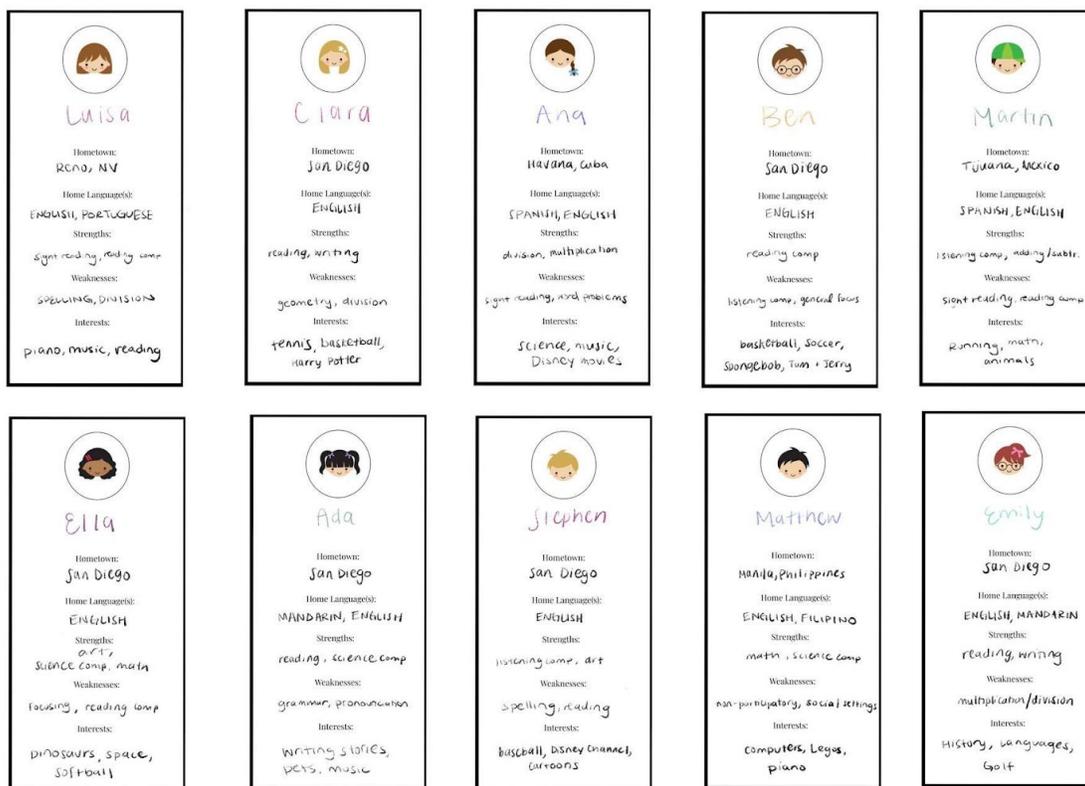
### **2. Preparing for study & prototype creation** (including any required software, supplies, additional people, etc.)

We will prepare two learning objectives as follows:

1. Subject-verb agreement of irregular verbs
2. Long division of 3 digit numbers

For one participant, the first learning goal will be paired with the general classroom and the second learning goal with the classroom of specific students. For the other participant, this will be vice versa, as to determine that any lesson plan differences were in fact from the change in student identities rather than the change in learning objective.

We will prepare 10 student profiles for the activity and share them via a google drive link during the experiment. We are sending the profiles mid-experiment as to avoid priming for part 1, but because of this we will give each participant 5 minutes to look over the profiles.



### 3. Running study (length, plan for mgmt during study if needed)

We estimate this study to take about 20 minutes, depending on the intricacy of the teachers' responses. We will set timers on though

### 4. Analysis plan

We will record each experiment and note the resulting lesson plan for each learning goal. We will congregate the plans for each of the participants and compare and contrast the plan for the generic classroom versus the plan for the classroom with specified students.

After the exercises, we will send a follow-up message composed of the following questions to gather more information about lesson plan creation:

1. In a given year, how much do you know about your students' backgrounds?
2. In your time teaching, how much have your lesson plans changed year to year?
3. How does your class composition impact the way you teach, if it does?

## **OPEN ISSUES**

1. Strategies of lesson plan development could be different among participants,
2. Making lesson plans may be more standardized than our initial assumptions,

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# EXPERIMENT PLANNING WORKSHEET #3

## POV + HMW

### POV: Sandy Wallace

We met Sandy, a teaching aid with over 30 years of experience teaching low and middle-income K-5 students, including ESL students. We were amazed to realize that she is given little information about her students and no preparation for assisting newly immigrated students. It would be game changing to help prepare non-ESL teachers to interact with and understand students of diverse backgrounds and varying English proficiency.

\* Non-ESL teachers refers to teachers who have not received formal ESL certifications, training, or licensing, including teachers who do not teach ESL classes and teaching aids.

**HMW:** How might we design a training program for non-ESL teachers that immerses them in different cultures and help them empathize with newly immigrated ESL students, such that these teachers can?

**Context for POV:** Sandy feels like she lacks contextual understanding of her students' home backgrounds, especially their culture. She is given little information about her students and no preparation for assisting newly immigrated students, such as American phrases that could be considered improper in another country. She feels this lack of "cultural competence" makes it difficult for her to understand how to interact and understand her students, so she wants to better understand her students' home culture and needs.

## SOLUTION

Teacher training game powered by embodied AI agents, where teachers can immerse themselves into different scenarios

Teachers can embody personas of newly immigrated ESL students and live through their daily school life, home life, language struggles, and cultural clashes. Student personas can come from Mexico, Latin America, Southeast Asia, East Asia, and other regions, with backgrounds incorporating home country, age, and length of time in the U.S. Based on scenarios and player response, the game gives suggestions on how teachers or others could help the students. The purpose of this embodied experience game is to help teachers better understand their students' cultural backgrounds and give them context on how to better interact with the student in the classroom.

## **ASSUMPTION TO TEST**

We assume first-person storytelling of a persona (e.g. newly immigrated ESL student) can improve non-ESL teacher empathy and improve student-teacher interactions in classroom learning. By allowing a player to “step into another person’s shoes,” this can increase the player’s understanding of that person and better assist that person. In this case, we are looking at teacher’s embodying newly immigrated ESL students to understand their cultural challenges.

## **EXPERIMENT OVERVIEW**

We will test whether first-person storytelling of a person improves teacher empathy and understanding. Based on our earlier interviews, we will create a short first-person story of a challenge faced by a newly immigrated ESL student, which will act as our embodied experience. We will survey participants before they read and after they read, taking qualitative and quantitative metrics on empathy, cultural understanding, and response to the situation. These results will help us evaluate whether embodied experiences are useful to curate stronger teacher empathy and improve how to teach in the classroom.

## **DETAILED EXPERIMENT DESIGN**

### **1. Participants** (target participants, how many, recruiting strategy, compensation)

The target participants are individuals who have resided in the U.S. for a long-period of time (at least half their life) and feel that they have limited experiences interacting with other cultures in the U.S. Participants will include at least 1 non-ESL educator. We will recruit and test at least 3 participants, reaching out to our own personal network.

### **2. Preparing for study & prototype creation** (including any required software, supplies, additional people, etc.)

We will converse through participants either in-person or through Zoom. We will share-screen or give the participants the story for them to read live. We will describe a scenario and ask how participants would respond. We will ask these questions before and after the reading, which will gauge the impact of the simulated embodied experience. The two main materials will be technological for video conferencing and the story.

### **3. Running study** (length, plan for mgmt during study if needed)

Each study will take at most 30 minutes. Participants will be questioned prior to the story for around 5-10 minutes. The story will be around 1-2 pages, taking at most 10 minutes to read. Then, participants will be asked follow-up questions taking 5-10 minutes.

### **4. Analysis plan**

We will examine the effects of the first-hand simulated storytelling experience. To do so, we plan to compare and contrast the results related to reading the short story. The results are based on empathy, cultural understanding, and response to the situation. See the sample story scenario and questions:

**Sample Story:**

Due to privacy of interviewees, we are using a publicly available story shared from ctmirror (link below):

**Scenario:** You are the homeroom teacher for Osman Raja Kamal. He just moved from Malaysia, having only taken a few English classes before moving to Hartford for sophomore year of high school. It is his first day.

**Story:**

“We never thought of moving to United States until we got educational and economic problems. I did go to school in Malaysia. I was in my first year of high school. I did not do good enough in first year. I promised myself to try harder in second year until I knew that my mom had a neck cancer. My father is around 60 years old. So, he won't be able support the families. In Malaysia, we had to pay school fees every months and workers get pay monthly only.

My family open a grocery store in the house and I knew it won't able to pay up my mom surgery and the three children's of schools fees. So, I decided to quit school and work. I gave up on my dream and goals. My first job was a carpenter. It was really hard because I have to carry all the heavy stuff and I never work that kind of jobs before. I'm not strong enough but somehow I get through everything.

After 2 years, my brother finished his high school and my sister finished her class as an seamstress but most importantly, my mom did beat her cancer. After working hard as carpenter for two years, I decided to take a little rest and spent more times with my family.

Since we are [UN Refugee Agency] card holder, the UN's give my family a chance to go another country or we can refuse their offer and apply for citizenship and stay in Malaysia. We all decided to move to United States. My only reason for moving is to find a job and support my family. My sister will continue her high school and my family social case worker say that I can still continue my high school too. But I refuse it because I already gave up on school. I'm not interesting in school anymore.

My family convinces me in so many ways to go to school. In the end I accept their decision. So, I went school and I made couples of friend on my first day. It went pretty well. My first period was gym and I play soccer, from that I made a few more friends.

... I was really nervous at first because everything is strange to me. I had a hard time to interact with people because I'm not a socializing person.

In sophomore year, I joined a Spirit Horse Program. In that program I take care of the horse and clean their poop. I had a chance to make more friends and ride a horse for the first time. That program helped me a lot like socializing with people and learn more English. After the I get invited to National Honor Society and student council.

I felt proud of myself because they only choose 19 students. Because of that I decided to join more program in school. That is why I am in the library program.

### **Sample Questions:**

#### **Prior to Reading**

1. How would you describe your background?
  - Degree in Speech & Handicap
  - Master's in Education and Adminsitration
  - Taught Speech and language through K-8 grade, 2nd grade class, special ed school, pull out, language health
  - Worked with low-income students
  - Vice President for 1-2 years
  - Low income and ESL students
    - Students that did not speak English
    - Mostly Hispanic
    - W/O computers at the time
    - Parents didn't understand English so had interpreter to communicate with parents
    - Long process in incorporating students in the classroom
    - Pulled out students
      - First grade students—would teach them English
      - Would read to them
      - Work on letters and sounds
      - Picture-me-reading
        - Visuals to aid learning—perform the action
        - Engage learning by hearing, sight, and tactile
        - Feel letters
        - Was able to learn a full story
        - Takes time—needs to see a word at least 75 times
        - Repetition with reading
        - Touch every finger—read a sentence and keep going
        - Letters, sounds, form
2. What does the word “culture” mean to you?
  - Incorporating everyone in and where they come from and different background
  - Embracing who they are

- Where they were and where she wanted to bring them
- Really always liked the underdog kid
- Helping a single kid

**Describe the scenario**

3. What would you do for the student in this scenario?
  - Would like to learn more about his background
  - Gauge his English
  - Make him feel welcome and comfortable
  - Possibly pair with another student with similar backgrounds and partners
  - Make him feel as comfortable

**After Reading**

4. What does the word “culture” mean to you?
  - Relates to her past experiences with students
  - How you were brought up and respect for family
  - Where you come from
  - Saw his heartache
5. What is your updated understanding of this scenario?
  - He gave up everything to better his ways
  - Struggling to help his mom
  - Understood why he gave up on school because he has been working hard
  - Emphasis on taking care of his family
6. What would you do for the student in this scenario?
  - Would not change her approach—reminds her of past students
  - Doesn't treat students differently
  - Will treat him as a person in her classroom
  - Knowing his background, will be more sympathetic
  - If he missed school
    - i. Would follow-up and maintain respect
    - ii. Want to open up
7. How has this experience shaped your perspective? About the scenario? ESL? Any additional insights?
  - Brought up old memories of the classroom
  - Social workers and get everything in power to get student to school
  - Sadness
  - Early teaching experiences
    - i. First teaching job in entire black community
    - ii. One of 5 white teachers
    - iii. Was teaching speech therapy
    - iv. Paddling was permitted at the time—never did it
    - v. Students sometimes lost respect for teachers
    - vi. Young and naive—learn and grow
      1. Support from other teachers

- Cultural learning curve
  - i. Low economic school
  - ii. Students and parents appreciated the efforts
- Training/orientation program
  - i. Students have different cultural interactions
    - 1. Male, female
    - 2. Different interactions of respect
    - 3. Need to understand where students are coming from
    - 4. Accept and understand different aspects
    - 5. E.g. Cole had very long hair or food restrictions
      - a. Certain students not allowed to celebrate holidays
  - ii. Parents would inform of certain issues
    - 1. They would let them know
    - 2. Interpreter would fill out the forms—for the 20 languages, interpreter would communicate and fill out the forms

## OPEN ISSUES

1. Determining which aspects of students' home backgrounds are most relevant and which aspects should remain private. Student backgrounds are extremely personal, carrying vulnerabilities that do not necessarily need to be shared with teachers.
2. Curating empathy over sympathy.
3. Mapping whether increased empathy and teacher understanding will lead to more effective teaching practices for ESL students.

### Links:

<https://prolitteracy.org/Blogs/Article/421/4-Challenges-ESL-Learners-Face>  
[https://sac.edu/AcademicProgs/ScienceMathHealth/MathCenter/PDF/Tutor%20Training/Module%204/Challenges\\_%20Tips%20for%20English%20Language%20Learners.pdf](https://sac.edu/AcademicProgs/ScienceMathHealth/MathCenter/PDF/Tutor%20Training/Module%204/Challenges_%20Tips%20for%20English%20Language%20Learners.pdf)  
<https://www2.ed.gov/datastory/el-experiences/index.html>  
<https://ctmirror.org/2017/07/31/in-their-words-english-learners-share-their-stories-about-school/>

Photo evidence



## POV, HMW, and Solution Process

# #1

### POV

We met Ana, a former ESL student who moved to the US from Cuba in 2010 and joined the ESL program in 7th grade. We were amazed to learn that as an ESL student, she felt completely separate and siloed from the rest of her peers and in the classroom. It would be game changing to help Ana feel more comfortable in American classrooms and with American culture.

### How might we...

#### A. Classroom and curriculum improvements

1. Create an open and inclusive classroom environment
2. Help teachers design lessons that bridge the students' home cultures and classroom environment
3. Celebrate differences between classmates
4. Help ESL students become active participants in the classroom
5. Connect concepts taught in ESL education to everyday lives
6. Devise curriculums that combine ESL students' home and American culture
7. Connect classroom learning to American culture

#### B. Alternative ways

8. Change ESL learning so they do not need to be removed from the classroom
9. Use cultural events without borders (e.g. sports) to bring students together
10. Help students' assimilate to American culture through their family and support network
11. Get ESL students to watch more American TV
12. Assess ESL students on cultural integration and understanding
13. Use school organizations or groups to teach about American lifestyle

#### C. Classmates

14. Leverage other classmates to help talk about American culture
15. Encourage ESL and non-ESL student interaction and collaboration

**Selected HMW:** How might we help teachers design lessons that bridge the students' home cultures and classroom environment?

### Solutions:

1. Lesson plan and curriculum generator that uses students' backgrounds
2. Digital platform that suggests media resources to help teach English
3. STEM classes that use problems/examples in different cultural contexts (e.g. chemistry of a certain cuisine)

4. Have students play games in different situations to better understand American customs
5. VR/AR that puts you into American books
6. Little helper that explains the context of the activity instead of just the instructions
7. Talent shows and storytelling time where students can share stories from their life to the class
8. AR that recognizes everyday objects/situations and translates them in the students' home language and context
9. Virtual buddy of life as another student
10. Find parallel content between country and America
11. Interactive storytelling where students can create an oral/written story in their home language about American culture

**Selected Solution #1:** Lesson plan and curriculum generator that uses students' backgrounds

**Selected Solution #2:** Digital platform that suggests media resources to help teach English

## #2

### POV

We met Sandy, a teaching aid with over 30 years of experience teaching low and middle-income K-5 students, including ESL students. We were amazed to realize that she is given little information about her students and no preparation for assisting newly immigrated students. It would be game changing to help prepare non-ESL teachers\* to interact with and understand students of diverse backgrounds and varying English proficiency.

\* Non-ESL teachers refers to teachers who have not received formal ESL certifications, training, or licensing, including teachers who do not teach ESL classes and teaching aids.

### How might we...

#### A. Through official school/district means

1. Give additional culture training to all teachers
2. Test teachers' mindsets and understanding of ESL students' home cultures
3. Make school districts care about cultural competency
4. Collect more and better information/context about ESL students for teachers
5. Show teachers the levels and interests of their students
6. Reduce unnecessary preparation work for teachers so they have the bandwidth to prepare for these students
7. Ensure that teachers are trained to support the social needs of ESL students

#### B. Techniques teachers can develop

8. Help teachers gauge their students' backgrounds and proficiency levels

9. Help teachers make connections between their ESL students' homes and things they are personally familiar with
10. Encourage teachers to be encouraging and supportive of ESL students

C. Alternative ways to prepare teachers

11. Immerse teachers in the different cultures and experiences of students
12. Encourage students to share their backgrounds and proficiencies with teachers
13. Get teachers involved in students' education outside of the classroom
14. Facilitate conversation between parents and teachers

**Selected HMW:** How might we immerse teachers in the different cultures and experiences of students

**Solutions:**

1. Teachers live through simulations of students' lives
2. Create AI simulation of different teaching scenarios and test out response
3. Virtually shadow the students
4. Students record videos/snippets of their lives at optimal times
5. Open-ended AI that collects student's experiences from their lives for teachers
6. Tool to help manage other elements of the classroom that are time-suckers to allow teachers to spend more time learning about their students' cultures
7. AI that asks students to journal about experiences with optimal prompts based on class curriculum
8. AI that brings up relevant and corresponding information about students' countries (articles, foods, etc.)
9. Talk to their parents
10. AI that shows the student's homeland's sights, cultures, shows, etc.

**Selected Solution:** Teachers live through simulations of students' lives

## #3

### POV

We met Samia, a shy ESL student in her senior year of high school who moved to the USA from Afghanistan in 2016. We were amazed to realize that she struggled to ask for help, even though teachers were always willing to help. It would be game-changing if ESL students feel well-supported and receive the help that they need.

### How might we...

A. What teachers can do

1. Help teachers anticipate what questions ESL students may have
2. Make teachers seem more approachable to students
3. Help teachers better gauge when students are confused
4. Help non-ESL teachers track ESL student learning progress to better anticipate their needs
5. Ensure that questions are answered well
6. Track students' understandings
7. Teach students how to look for answers on their own

#### B. Classroom improvements

8. Create an accepting and supportive classroom environment
9. Reduce embarrassment in students for not always speaking well
10. Make asking questions easier in large classrooms
11. Reduce the stress of asking a bad question
12. Add anonymity to the help/question process
13. Normalize asking for help often

#### C. Classmates

14. Encourage other classmates to work with ESL students
15. Ensure other students help answer ESL students' questions

**Selected HMW:** Help non-ESL teachers track ESL student learning progress to better anticipate their needs

#### **Solutions:**

1. AI that identify the theme/area of questions that students usually get wrong
2. Count which words and how many times they were erased
3. AI that generates HW with question in areas that the student gets wrong
4. Virtual assistant that understands students' patterns and generates reports
5. Analyze type of question that students gets wrong (MC, FR, fill in the blank)
6. AI buddy system between kids to monitor each other's progress
7. Alert when kids spend too long on a HW problem
8. See where everyone in the class is compared to each other
9. Neurology hats worn to see brain sensors and when kids get confused
10. Facial recognition for confused faces

#### **Other POVs:**

We met Helen Quinn, an emerita Professor in Physics at Stanford and expert in ELL education and STEM learning. She has been involved in improving education for years and has two daughters who are ELL students. We were amazed to realize that teacher-student interactions can significantly impact the learning motivations of the student and shape classroom dynamics. Interrupting students to fix grammar can act as a deterrent for learning. It would be

game-changing to help teachers instill a growth mindset and be more equipped in understanding their student's backgrounds and culture, so they can help the students grow and connect learning beyond the classroom.

We met Sandy and Tammy, educators with over 30 years of experience teaching low and middle income K-5 students. Tammy worked intensely with testing new ELL students and helping them with speech and language therapy, and Sandy was an ELL aid that worked both with testing and day to day education of the students. We were amazed to realize that testing new ELL students is very non-uniform, and getting misplaced as a student with a learning disability is not uncommon, especially without translators that are trained in ELL education. It would be game changing to correctly place students in either ELL or special ed (or both) such that students get the education that is appropriate for them.

We met Zahra, a tutor to high school and college ELL students in math, English, and film. We were amazed to realize the extent to which cultural education impacted both the students and the tutors -- the students were adjusting to both a new language and a new set of expectations about homework and the tutors benefited by understanding the previous learning context. It would be game changing if ELL students were not only given language instruction, but also prepared for the culture shock of being a student in the US.

We met Samia, a shy ESL student in her senior year of high school who moved to the USA from Afghanistan in 2016. We were amazed to realize that she was not interested in her ESL classes, even though she really wanted to learn and was excited about specific ways to improve her English skills. It would be game-changing to bridge the disconnect between topics ESL students want to learn/are at their level and topics that are actually covered in ESL classes.

We met Helen Quinn, an emerita Professor in Physics at Stanford and expert in ELL education and STEM learning. She has been involved in improving education for years and has two daughters who are ELL students. We were amazed to realize that the educational systems and aspects outside of language learning hindered ELL students from reaching their full potential. ELL proficiency tests, administrative staff, and classroom interactions contribute to an ELL student's learning and growth beyond just language. It would be game-changing to revitalize ELL proficiency tests to understand students' backgrounds related to ELL learning, such as American cultural familiarity, home language (written and spoken), and more.