

Spark! Innovation Fellowship: My Science Guide 🚀

STEM Mentorships for All

The Spark! Fellowship program is dedicated to catalyzing Boston University student innovators passionate about solving problems through technology. As a Spark! Innovation Fellow, I led the development of the first online research mentorship platform for Latin American High School Students.

The Challenge

High School Students in Latin America face hardships while conducting research and lack access to research mentorship and resources. This causes students to become discouraged from pursuing research or showcasing it in science competitions and conferences.

Solution

The My Science Guide app matches students to mentors based on their research interests, experience level, and language. Students and mentors can then connect, learn more about their backgrounds, and chat to share advice, guidance, and feedback on their research journey.



The challenge we were focused on solving came from personal experience. In 2016, I was an 11th grade high school student in Puerto Rico showcasing my research at the Intel International Science & Engineering Fair. There, I witnessed something shocking.

There were students from every country in the world but there was a significant educational gap that existed between the quality of research from students in Latin America compared to the rest of the world.

Problem Validation

Given my own personal experience with the issue and speaking with many STEM teachers from around the island, the issue is increasingly prevalent in public low-income schools.

To gauge the scope of this problem in other countries, I launched Facebook Ads for a mock service that promised students and mentors the opportunity of connecting and conducting research.



My Science Guide
Sponsored · 1 day ago

¿Eres apasionado de las CIENCIAS, la INVESTIGACIÓN y la INGENIERÍA? ¡Sé uno de los primeros en saber acerca de la PRIMERA plataforma de mentoría científica para Latinoamérica! Accede a nuestra página para más información:

UNBOUNCEPAGES.COM
MENTORIA CIENTIFICA [Learn More](#)

The ads were linked to a splash page where they can sign up to receive further info.

In 2 weeks with \$30 Ad Spend:

- Targeted to teachers & students from Mexico, Costa Rica, Panama & PR
- Around 160,000 Impressions
- Over 800 Link Clicks
- 50 User Conversions in 5 days!

Customer Interviews

To further understand this problem, I spoke to science & math teachers, research professors, and dozens of students from around the world. Highlights include:

Caitlin Sullivan: Director of Outreach & Equity Programs at the Society for Science & The Public

As the lead for the Science Advocate Program, Caitlin was knowledgeable about underrepresented student and mentors' needs. During our conversation, we dove deep into the nature and importance of mentorship in students' lives. She expressed "Students greatly benefit from having a mentor. They're more accessible than a research lab and increase their motivation for presenting at top competitions."

Youth Scientists for Puerto Rico: Largest Private Non-Profit Science Fair in Puerto Rico

Enerys Pagán (President), founded this organization after competing in a US Science Fair and noticing a gap in the quality of projects coming from Puerto Rico compared to the states. They've worked with students from all socioeconomic backgrounds in showcasing research. They expressed “One of the brightest students in our fair originally did not even have access to a computer in their house but portrayed an incredible potential that just required some mentoring to let shine.”

Design Sprint

We brought together our market research, customer interviews, and problem validation metrics to a weekend-long design sprint to come up with possible technological approaches to the challenge. It followed the following structure:

1. **Understand:** Present our collective knowledge on the challenge to the Spark! Fellowship instructors and mentors. See presentation in footnotes.¹
2. **User Story Mapping:** Plan out what steps a student might follow to find a mentor and start a research project. Design a minimum story map where they can obtain mentoring through our service.
3. **Crazy Eights Exercise:** This fast-sketching exercise involves each team member designing a potential feature that provides value for one user story item in 1 minute. Doing 8 of these allows creativity and innovation to flow through all team members.
4. **Assumptions Test:** Before developing possible solutions, it was important to list out important assumptions that needed testing. These included the effect of language barriers on research quality and the correlation between mentors and the students' work quality.
5. **Wire-framing:** Lo-fi wireframes were drawn to connect the structure of our solution and ideate how it could be developed.

¹ Presentation is found on <https://normant.me/my-science-guide.html>

User Personas

Two user personas were developed from the insights collected:

GUADALUPE: LATIN AMERICAN HIGH SCHOOL STUDENT



Guadalupe is a 9th grade high school student in Mexico, who is interested in scientific research, yet can't seem to find the resources to get started. She feels as if she is losing motivation and needs a bit of guidance and direction to begin working on her project.

Jobs: Searching for a mentor to start a research project.

Pains:

- Have no previous experiences, don't know how to start with a new research.
- Language Barriers.
- Couldn't find tailored mentors or exciting research.
- Couldn't keep the mentorship and feels unsupported.

Gains:

- Find a related science research community.
- Obtain information about mentors, researches, and labs.
- Keep the connection with mentors and other students.
- Expand their knowledge and ideas to improve their work.
- Exposure to their work.

CAMILLA: RESEARCH MENTOR



Camilla is a university professor who has had experience researching within their respective fields and they have an interest in providing mentorship to interested students within this area of study but don't know how to access these students within a platform that provides seamless interactions.

Jobs: Mentor a Latin American High School Student doing research.

Pains:

- Has a hard time recruiting students who are interested in specific projects.
- Faces difficulty providing and sustaining mentorships without structure.
- Hard to keep up with students.
- Challenging to motivate students and give them a needed coach without reliable resources.

Gains:

- Find students and communities.
- Keep up with the latest progress on the project.
- Be able to maintain communication with the students.
- Receive coaching on how to best mentor their students.
- Networks with other related researchers and programs.
- Train their skills as a science team leader.

Minimum User Stories

User stories were refined and refined until the minimally viable user story that provided enough value to the user was found. In My Science Guide, the user stories focused on forming the student-mentor connections easily and intuitively.

Student

1. Fill out sign-up form
 - Preferred research topic
 - Experience level
2. Obtain 3 suggested mentor matches
3. See mentor profile information and connect

Mentor

1. Fill out sign-up form
2. Receive coaching resources
3. Wait for initial student response
4. Connect and provide mentorship to students

Wireframes

Sample wireframes were designed to showcase the minimum user story.

Science Guide

Let's get started!

Research Level

Please select what level of research you have previously done.

- I am a beginner
- I've done 1 or 2 research projects

Research Area

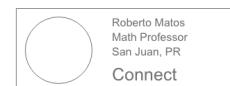
Please select which area of research you would like a mentor to assist you in.

- Any Subject
- Science
- Mathematics
- Technology

Available Mentors



Betzaida Ramos
Science Teacher
Tijuana, México
Connect



Roberto Matos
Math Professor
San Juan, PR
Connect



Name
Occupation
Location
Connect

Design & Code!



Mockups

Many iterations of our app design were developed, with a 3-step sign-up process chosen as the final version. Bright colors were chosen to suit the high school student demographic. Each feature corresponded to a user story that provided value through the application.

The image displays four iPhone X mockups illustrating the app's user interface across four distinct screens:

- Research Level:** A screen titled "Research Level" with the sub-instruction "Please select what level of research you have previously done." It features three rounded rectangular buttons with black outlines:
 - "I want to make my first Research project!" (Red background)
 - "I won at my school but want to win nationally!" (Yellow background)
 - "I won nationally and want to further the impact of my research!" (Blue background)
- Research Interests:** A screen titled "Research Interests" with the sub-instruction "Select up to three research areas you are interested in." It shows four categories with corresponding icons:
 - Mathematics (yellow square)
 - Language (grey square)
 - Technology (blue square)
 - Chemistry (green square)A yellow button at the bottom right says "Confirm".
- Language Preference:** A screen titled "Language Preference" with the sub-instruction "Are you comfortable with English?" It has two large, rounded rectangular buttons: "Yes" (Yellow) and "No" (Yellow).
- Matched Mentors:** A screen titled "Matched Mentors" with the sub-instruction "Select one to connect and learn more about their research." It lists three mentors with profile pictures and details:
 - Betzaida Ramos, Science Teacher, Expertise: Astronomy, Earth Science
 - Roberto Román, Math Teacher, Expertise: Combinatorics, Number Theory
 - Angela Pérez, Research Professor, Expertise: Biology, Molecular Biology

Code Development

My Science Guide was developed using React Native to cater to a diverse range of devices used in Latin America. I developed the Front-End of the application, working through different device sizes and requirements. Development was structured in weekly sprints, where each developer was tasked with implementing one user story into the application.

Launch & Future Development 🚀

Originally planned for a full launch in May 2020, the COVID-19 Pandemic limited our ability to conduct user testing with students using the final app. We pivoted to launching a beta for students and teachers through TestFlight. The app is currently being tested on iOS and slated for a soft-launch in Puerto Rico this Summer!

The My Science Guide Team

I didn't build this app alone! I owe it all to the amazing My Science Guide team. Special thanks to the Spark! Fellowship instructors, STEM organizations, and communities that made this app possible!



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